Antipresuppositions[1]

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Abstract. Some sentences come with an interesting kind of condition on their use: they require that a certain proposition p *not* be taken for granted. Recent work by Sauerland and Schlenker proposes an explanation: the sentences in question compete with other sentences that require that p *be taken* for granted, and win only when those other sentences are infelicitous. This paper is concerned with the precise nature of this competition, and with what can be learned from it.

1. Background: Presuppositions

We are all familiar with the idea that sentences carry with them conditions on when they can be asserted felicitously. And there is one kind of condition that we are especially familiar with. The rules of conversation require that conversation take place against a background of propositions that the interlocutors agree to take for granted, and some sentences impose the condition that a certain proposition be part of that background. In these cases, where a sentence imposes the condition that a certain proposition be part of what is taken for granted, we say that the sentence <u>presupposes</u> that proposition.[2]

Some textbook examples of presuppositions are in (1)-(3). It is commonly accepted that (1) imposes the condition "Assert me (i.e. use me to say that I am true) only if it is already taken for granted that Jane is pregnant." (2) imposes the condition "Assert me only if it is already taken for granted that Mary has exactly one chair in her living room." (3) imposes the condition "Assert me only if it is taken for granted that Mary has exactly two students."

(1) Mary knows that Jane is pregnant.

  presupposes that Jane is pregnant

(2) John is repairing the chair in Mary's living room.

  presupposes that Mary has exactly one chair in her living room

(3) John assigned the same exercise to both of Mary's students.

  presupposes that Mary has exactly two students

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[1] I presented this material to audiences in Berlin, Paris, Cambridge, and Fukuoka, and I am grateful to the audiences on all these occasions for comments. I would like to thank at least the following for thought-provoking remarks: Emmon Bach, Richard Breheny, Patricia Cabredo-Hofherr, Gennaro Chierchia, Takao Gunji, Ringe Hayashishita, Irene Heim, Clive Perdue, Massimo Piattelli-Palmarini, Gillian Ramchand, Chris Tancredi, Robert van Rooij. I am particularly grateful to Ayumi Ueyama for giving me the opportunity to participate in the 2005 KAKEN general meeting "Generative Grammar and Semantics." The reactions I received there influenced the current version of this paper in important ways. And Uli Sauerland deserves special thanks: without him and his *Semantiknetzwerk*, this topic would not be on the research agenda.

[2] See Stalnaker 1974 for the origin of this use. Work in the early 1970s, notably by Stalnaker and Karttunen, gave rise to the point of view I am alluding to here. See Stalnaker 1973, 1974, 1978, Karttunen 1974.

There are complications here. Sometimes it isn't obvious that the sentence imposes these conditions. Even if I know that you are not aware that Jane is pregnant, if you ask me (4ai) I can pretty naturally respond (4aii). Someone who thinks the conditions are as I said would say that this is because sometimes we let speakers pretend that a proposition is being taken for granted even when it isn't.[3] Someone who thinks this would say that the best way to see that a sentence presupposes p is to look at cases where the interlocutor makes it explicit that he is not taking p for granted – at cases like (4b), for example, where the interlocutor would not have asked the question if he were taking for granted that Jane is pregnant. In cases like these, it is clear that the sentences in question can't be asserted.

(4) a. i. Why is Mary smiling?
       ii. Because she knows that Jane is pregnant.

   b. i. Mary apparently thinks that Jane is pregnant. But is she right?
       ii. ? Yes: she *knows* that Jane is pregnant.
         (cf. Yes: Jane is pregnant.)
         (cf. Yes: she is correct in thinking that Jane is pregnant.)

While here I talked about presuppositions as associated with sentences, a moment's reflection reveals that it is more accurate to say that presuppositions are associated with syntactic structures.[4] One way to make this point is to observe that, in syntactically ambiguous sentences where which claim is being made depends on which structure is being used, the different claims may be associated with different presuppositions:

(5) Mary knows that John killed a man with a knife.

Really, what is going on in (1), then, is that we have a condition that says: "Use the *syntactic structure* of (1) to say that it conveys something true only if it is already being taken for granted that Jane is pregnant." One can therefore ask: How does a syntactic structure like (1)'s give rise to a presupposition like the presupposition that Jane is pregnant?

There are a number of facts of relevance to the question of how presuppositions get associated with syntactic structures. One fact is that presuppositions can be traced to the presence of particular words, like *know*, *the* and *both*: if we had substituted another word for one of these, we would have lost the presupposition. Another fact of importance to the question of how presuppositions generally arise from syntactic structures is that one can identify patterns in the kinds of presuppositions that get generated – patterns that we know as "presupposition projection" patterns. One pattern is, roughly speaking, this: suppose that, whenever we combine an individual-

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[3] The alternative view is that the condition these sentences impose isn't the one stated above, that these sentences can only be asserted if p is taken for granted. It is that the sentence *can't* be asserted if the information it contributes is merely that p is true. Someone holding this view would modify the Domain Condition in (10) to something like: Don't assert S if the [[S]]-worlds in the C(ommon) G(round) are the worlds in CG∩Dom([[S]]).

[4] Or, still more precisely, with structure-assignment pairs. On common assumptions, semantic values are determined on the basis of a syntactic constituent together with an assignment. What claim a sentence is used to make depends not only on what syntactic structure is being considered for this sentence, but also – sometimes -- on what assignment is being considered for the evaluation of this syntactic structure. In cases where which claim is being made depends on the assignment, it seems that different claims may be associated with different presuppositions.

     In what follows, I will sometimes ignore the relevance of assignments, and speak of semantic values as though they were determined on the basis of a syntactic constituent alone. But I will only say things like "v is the semantic value of constituent C" (or write " [[C]] = v ") in cases where C evaluated under any assignment would always yield the same value v.

denoting expression with a certain predicate, we end up presupposing that the individual in question has property Q; then, when we combine *every A* with that predicate, we end up presupposing that every individual being quantified over has property Q.[5]

(6) If for all individual-denoting expressions X, [X P] presupposes that [[X]] has property Q, then [[Every A] P] presupposes that every individual with the A- property has property Q.

For instance, given that the use of (7a) is felicitous only if it is taken for granted that *Mary* has the property of being pregnant, the use of (7b) is felicitous only if is taken for granted that *every woman here* has the property of being pregnant. Similar remarks apply to the examples in (8)-(9).[6]

(7) a. Mary λ_1 t_1 knows that she$_1$ is pregnant.

　　　　presupposes that *Mary* is pregnant

　　b. [Every woman here] λ_1 t_1 knows that she$_1$ is pregnant

　　　　presupposes that *every woman here* is pregnant.

(8) a. John λ_1 t_1 is repairing the chair in his$_1$ living room

　　　　presupposes that *John* has exactly one chair in his living room

　　b. [Every one of them] λ_1 t_1 is repairing the chair in his$_1$ living room

　　　　presupposes that *every one of them* has exactly one chair in his living room

(9) a. John λ_1 t_1 assigned the same exercise to both of his$_1$ students

　　　　presupposes that *John* has exactly two students

　　b. [Every one of them] λ_1 t_1 assigned the same exercise to both of his$_1$ students

　　　　presupposes that *every one of them* has exactly two students

To the question of how syntactic structures give rise to presuppositions, various answers have been given, and I want to present this paper against the background of a familiar one.

For convenience, I will make the familiar assumption[7] that we can model the common ground in a conversation – the information that the interlocutors take for granted about the world – as a set of possible worlds, those worlds that as far as the interlocutors are concerned are candidates for the actual one. On this view, to say that a syntactic structure S presupposes p is to say that you can use S to say that it conveys something true only if p is true in every world in the common ground. Another background assumption is that syntactic structures for sentences have semantic

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[5] This generalization has been questioned, but I will take it for granted here.   Cooper 1983 and Heim 1983 took this position.

[6] I here assume syntactic structures like those in Heim and Kratzer 1998. Certain elements in these structures function as variables, and there are also silent items that serve as lambda-abstractors.

[7] See Stalnaker 1978. Stalnaker 1978 is also the source of the proposal I am about to present.

values that are functions from worlds to truth values – to say that a syntactic structure conveys something true is to say that its semantic value yields 1 for the actual world.

The proposal then has two aspects to it. First, it says that some semantic values for sentences are *partial* functions from worlds to truth values. On top of this, it says that there is a general condition, the *Domain Condition*, on when we can use a syntactic structure S to convey that it characterizes the actual world: when we look at S's semantic value, we have to find that the domain of that function includes every world in the common ground. (In other words, the interlocutors must take for granted about the actual world that it is in the domain of that function.)

(10) Domain Condition on the assertion of S: The domain of [[S]] must include every world in the common ground.

On this proposal, to explain why S presupposes p, it is enough to analyze S as having a domain that consists only of worlds in which p is true. The Domain Condition will then impose the requirement that every world in the common ground be among those worlds, and thus that every world in the common ground be a world in which p is true. So, on this proposal, to explain why (7a) and (7b) presuppose what they do, it will be enough to say that they have semantic values that are partial functions. Worlds in which Mary is not pregnant are not in the domain of (7a); worlds in which there are women who are not pregnant are not in the domain of (7b). On the basis of this, the Domain Condition will then impose the requirement that the interlocutors take for granted that Mary is pregnant, or that every woman is pregnant. I have given semantic values of this kind in (7').[8]

(7') a. Mary λ_1 t_1 knows that she$_1$ is pregnant

      => λw_s: <u>Mary is pregnant in w</u>. Mary thinks in w that Mary is pregnant

   b. every woman λ_1 t_1 knows that she$_1$ is pregnant

      => λw_s: <u>for every (relevant) woman x in w, x is pregnant in w</u>. for every (relevant) woman x in w, x thinks in w that x is pregnant.

As for why (7a) and (7b) have these partial functions as values, we can attribute this to the semantic values of the words in these structures, together with familiar principles of semantic composition (cf. Heim and Kratzer 1998). In particular, if the semantic value of *know* is as in (11) and places limits on what combinations of worlds and propositions can serve as its arguments, we can guarantee a semantic value for *knows that she is pregnant* as in (12), which yields the kind of partial function we want once it combines with an individual. And if the semantic value for *every* is as in (13) and places limits on what combinations of worlds and properties can serve as its arguments, then *every woman* will be sensitive to the partiality in *knows that she is pregnant* in just the way we want.

(11) [[know]] = $\lambda p_{<s,t>}.\lambda x_e.\lambda w_s$: <u>p holds of w</u>. x thinks p in w.[9]

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[8] In (7') I use the notation for partial functions from Heim and Kratzer 1998. The condition following the colon conveys what is in the domain of the function.

[9] When I write that p "holds of" w, I mean more precisely that p(w) = 1. When I write that x "thinks" p in w, I have in mind the classical Hintikka-style treatment of belief in terms of possible worlds: for all worlds u among x's doxastic alternatives in w, p(u) = 1. While strictly speaking I imagine that verbs like *know* select for a time argument as well, I will be ignoring temporal information throughout this paper.

(12) Consequence: $[[\lambda_1 \, t_1 \text{ knows that she}_1 \text{ is pregnant}]]$
      $= \lambda x_e.\lambda w_s$: <u>x is pregnant in w</u>. x thinks in w that x is pregnant

(13) a. $[[\text{every}]] = \lambda Q_{<e, \, <s, \, t>>}. \, \lambda P_{<e, \, <s, \, t>>} \, . \, \lambda w_s$: for every x such that Q(x) holds of w, x is in the
            domain of P and w is in the domain of P(x). for every x such that Q(x) holds of w,
            P(x) holds of w.

   b. Consequence: $[[\text{every woman}]]$
      $= \lambda P_{<e, \, <s, \, t>>}. \lambda w_s$: for every x such that x is a (relevant) woman in w, x is in the domain of P
            and w is in the domain of P(x). for every x such that x is a (relevant) woman in w,
            P(x) holds of w.

     To summarize, on this view, when a syntactic structure presupposes something, this is due to the normal semantic values of the words, which place limits on what their semantic arguments can be, to the way in which semantic composition normally works, and to the Domain Condition.

     A note before proceeding. I am not committed to the specific semantic values that I chose here. I chose them just to keep the structures simple. An alternative (and my tendency) would have been to assume semantic values like those in (11')-(13'), according to which *woman* and *know* combine with their world arguments first, and *every* combines with predicates (<e,t>) rather than properties (<e, st>).[10] However, this would have meant positing structures like those in (7''), with silent variables over possible worlds and lambdas that bind them. In what follows, for expository purposes, I will keep the structures simple where I can and use the original semantic values, but there are some places where these other semantic values are more convenient and I will have to switch.[11]

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[10] (11')-(13') make explicit the fact that assignments play a role in determining semantic values. Until now, I have simplified away from this (cf. fn. 4) and I will continue to do so when possible.

[11] Apart from these simplifications, I have also significantly simplified the semantic value of *know* in my discussion so far. My discussion suggests that, in cases where it is taken for granted that Jane is pregnant, I should generally be able to use "Mary knows that Jane is pregnant" to convey that Mary's beliefs are in accordance with this. But in a variety of situations, I would not feel it appropriate to use the sentence in this way. For instance: if I thought that Mary's conviction came to her in a dream; if I were a talented neuroscientist and discovered Mary's frame of mind purely by analyzing her patterns of cerebral activity; if I felt that Mary came to this conclusion by a process that could have easily led her to misdiagnose other non-pregnant people as pregnant. This is not the place to review all the data about *know* that emerged in the wake of Gettier 1963. I would like to suggest, however, that structures of the form *Mary knows that S* presuppose more than I have made out here – and, accordingly, that the semantic value of *know* places more limits on what its arguments can be.
    What does *Mary knows that S* presuppose, other than that S is true? One guess, roughly along the lines of Nozick 1981, is: that, if S were *not* true, then Mary would *not* think that S is true. Though the counterfactual has to be spelled out in more detail, this arguably implies that we will only use *Mary knows that S* when it is taken for granted that, if indeed Mary thinks that S is true, then this belief has been caused in some way by that aspect of the world that makes S true. This version of the "causal theory of knowledge" could help with the examples I mentioned above. A genius neuroscientist who discovers Mary's beliefs by physical experimentation would not be taking anything for granted about the source of these beliefs.
    Perhaps there are other presuppositions as well. Irene Heim brought to my attention that, in a situation in which it is taken for granted not only that I found the Picasso but also that I *told* the police that, I would *not* use (i) to convey that the police entertain doubts as to whether I found it. Since there are reasons to believe that (i) presupposes just what its affirmative counterpart would, one possible conclusion is that there is a further condition on *know*. *Mary* (or *the police*) *knows that S* requires us to take for granted that, if Mary thinks that S might not be true, then she has not been exposed to sufficient evidence for the truth of S.

(i) The police don't know that I found this Picasso.

(11') $[[\text{know}]]^g = \lambda w_s.\lambda p_{<s,t>}$: <u>p holds in w</u>. λx_e. x thinks p in w.

(12') $[[\lambda_1 t_1 \text{ knows } w_2 \text{ that she}_1 \text{ is pregnant}]]^g$
      $= \lambda x_e$: <u>x is pregnant in world g(2)</u>. x thinks in world g(2) that x is pregnant

(13') $[[\text{every [woman } w_2]]]^g$
      $= \lambda P_{<e,t>}$: for every x such that x is a (relevant) woman in world g(2), x is in the domain of P.
          for every x such that x is a (relevant) woman in world g(2), P holds of x.

(7'') (Somewhat) unsimplified structures

   a. $[\lambda_2 [\text{Mary} [\lambda_1 t_1 \text{ knows } w_2 \text{ that she}_1 \text{ is pregnant}]]]$

      => λw_s: Mary is pregnant in w. Mary thinks in w that Mary is pregnant

   b. $[\lambda_2 [[\text{every woman } w_2] [\lambda_1 t_1 \text{ knows } w_2 \text{ that she}_1 \text{ is pregnant}]]]$

      => λw_s: for every x such that x is a woman in w, x is pregnant in w. for every x such that
         x is a woman in w, x thinks in w that x is pregnant

2. Foreground: Antipresuppositions

Here is another kind of condition that sentences carry with them, one that we are not so familiar with. The sentences that we looked at so far imposed the condition that a certain proposition be part of what is taken for granted in the conversation. Other sentences, by contrast, impose the condition that the interlocutors *not* take the truth of a certain proposition for granted. (To satisfy the conditions that these sentences impose, either it will have to be taken for granted that the proposition in question is false, or it will have to be an open issue whether the proposition is true or not.) In these cases, we might say that the sentence <u>antipresupposes</u> the proposition in question.[12]

   Here are some examples of antipresuppositions. (14) imposes the condition: "Use me to say that I am true only if it is *not* being taken for granted that Jane is pregnant." (15) imposes the condition: "Use me to say that I am true only if it is *not* being taken for granted that Mary has exactly one chair in her living room." (16) imposes the condition: "Use me to say that I am true only if it is *not* being taken for granted that Mary has exactly two students."

(14) Mary thinks that Jane is pregnant.

      antipresupposes that Jane is pregnant

(15) John is repairing a chair in Mary's living room.

      antipresupposes that Mary has exactly one chair in her living room

(16) John assigned the same exercise to all of Mary's students.

      antipresupposes that Mary has exactly two students

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[12] I believe I first heard the term "antipresupposition" from Kai von Fintel.

I think that here the intuitions are quite clear. If it is established that Jane is in her fourth month, we wouldn't say "Mary thinks that Jane is pregnant" to convey that Mary's mental state is in accordance with that. Rather, we would say something like "Mary realizes that Jane is pregnant."[13]

Everything that I said about presuppositions carries over to antipresuppositions. Strictly speaking, antipresuppositions are associated with syntactic structures. The antipresuppositions in the examples we considered are linked to the presence of particular words -- *think*, *a*, *all*. There is even a similar pattern in the kinds of antipresuppositions that get generated: roughly speaking, suppose that, when we combine an individual-denoting expression with a predicate, we end up *anti*presupposing that the individual in question has property Q; then, when we combine *every A* with that predicate, we end up *anti*presupposing that every individual being quantified over has property Q.[14] Relevant examples are in (18)-(20). And we can ask the same question: how do syntactic structures give rise to antipresuppositions?

(17) If for all individual-denoting expressions X, [X P] *anti*presupposes that [[X]] has property Q, then [[Every A] P] *anti*presupposes that every individual with the A-property has property Q.

(18) a. Mary λ_1 t_1 thinks that she$_1$ is pregnant

antipresupposes that Mary is pregnant

b. [Every woman here] λ_1 t_1 thinks that she$_1$ is pregnant

antipresupposes that every woman here is pregnant.

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[13] In fact, I am simplifying a little in describing the antipresupposition of *Mary thinks that Jane is pregnant*. There do seem to be some exotic situations in which we can take for granted that Jane is pregnant and then, fairly naturally, use *Mary thinks that Jane is pregnant* to convey that Mary's beliefs are in accordance with that. For instance, a gifted neuroscientist discovering Mary's beliefs by analyzing her patterns of cerebral activity could use this sentence to report a discovery of his. This scenario already made an appearance in my earlier footnote about *know*. One thing that is common to these exotic cases, I think, is that we could *not* use *Mary knows that Jane is pregnant* to convey the same thing. This will be significant for the discussion to follow.

[14] I have been alerted to an apparent difference between the "projection patterns" for presuppositions and the "projection patterns" for antipresuppositions. It is commonly believed that a negated sentence (e.g. *John didn't assign the same exercise to both of Mary's students, Mary doesn't know that Jane is pregnant*) presupposes exactly what its affirmative counterpart does (*John assigned the same exercise to both of Mary's students, Mary knows that Jane is pregnant*). By contrast, it seems that antipresuppositions are more prone to "disappear" under negation.
To me, the clearest examples of this involve sentences with *think*. Gillian Ramchand points out that, in a situation in which it is taken for granted that Jane is pregnant, (ib) seems like a fairly natural response to (ia).

(i)   a. Why is Mary behaving that way?   b. Because she doesn't think that Jane is pregnant.

It might be relevant here that *think* is a "neg-raising" verb: while *Mary thinks that S* conveys that it *follows* from Mary's beliefs that S is true, *Mary doesn't think that S* conveys that is not *compatible* with Mary's beliefs that S is true. One possible approach to this phenomenon would say that there are in fact two verbs with different semantics, both pronounced "think," one a "negative polarity item" and one a "positive polarity item." One could maintain that only the positive polarity item induces the antipresupposition, and, in that case, (ib), which contains the negative polarity item, would not show that some antipresuppositions "disappear" under negation.
In the other cases that I have thought about where antipresuppositions seem to "disappear" under negation, arguably the sentence is being used contrastively. I will have a little more to say about this later (see the discussion around example (26)).

(19) a. John λ_1 t_1 is repairing a chair in his$_1$ living room

   antipresupposes that John has exactly one chair in his living room

   b. [Every one of them] λ_1 t_1 is repairing a chair in his$_1$ living room

   antipresupposes that every one of them has exactly one chair in his living room

(20) a. John λ_1 t_1 assigned the same exercise to all of his$_1$ students

   antipresupposes that John has exactly two students

   b. [Every one of them] λ_1 t_1 assigned the same exercise to all of his$_1$ students

   antipresupposes that every one of them has exactly two students

   We can ask the same question. But we can't give the same answer. In particular, we won't be able to attribute antipresuppositions to the application of the Domain Condition. The Domain Condition imposes the requirement that every world in the common ground have a certain property. Presuppositions are requirements that every world in the common ground have a certain property, but antipresuppositions are not. Antipresuppositions are requirements that *not* every world in the common ground have a certain property (or, if you like, that some do not). The Domain Condition cannot give us that.

   We need another explanation, then, for how syntactic structures give rise to antipresuppositions.

   If you are satisfied with this argument, then please proceed to the next section, but if you are not, I admit that it was a little quick. There are tricks that one can do to try to make antipresuppositions follow from the Domain Condition. Suppose one can generate a semantic value for (18a) whose domain takes this form[15]: a world w is in the domain only if Mary is not pregnant in some world of the common ground of the participants in U(w) (a certain situation in w).

(18') a. Mary λ_1 t_1 thinks that she$_1$ is pregnant
       => λw_s: <u>Mary is not pregnant in some world in the common ground of the participants in</u> <u>U(w)</u>. Mary thinks in w that Mary is pregnant.

   b. every woman λ_1 t_1 thinks that she$_1$ is pregnant
       => λw_s: <u>for every woman x in w, x is not pregnant in some world in the common ground</u> <u>of the participants in U(w)</u>. for every woman x in w, x thinks in w that x is pregnant.

The Domain Condition will then require for the case of (18a) that, in every world w in the common ground, Mary is not pregnant in some world in *the common ground of the participants in U(w)*. And, in the case of (18b), the Domain Condition will require that, in every world w in the common ground, every woman in w is not pregnant in some world in *the common ground of the participants in U(w)*.

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[15] This could be derived from the following semantic value for *think*. An alternative along the same lines might give *think* an additional, anaphoric argument that can take the common ground as its value.

(i) [[think]] = $\lambda p_{<i,st>}.\lambda x_e.\lambda w_s$: <u>p does not hold in some world in the common ground of</u> <u>the participants in U(w) (a certain situation in w)</u>. x thinks p in w.

Now think about what common grounds are like. Anytime a sentence is uttered, every world in the common ground will contain an "utterance situation" in which a speaker utters the sentence in question. It is reasonable to assume, moreover, that we establish common grounds in such a way that, in every world w in a common ground CG, the common ground kept by the participants in the "utterance situation" of w is CG itself. So with this in mind, suppose U has the following property: U is such that, for every world w in the common ground, U yields the "utterance situation" in w. Given that, for every world w in the common ground CG, the common ground of the participants in U(w) is CG itself, (18a)'s requirement will amount to the requirement that Mary is not pregnant in some world of CG. And that is the antipresupposition. A similar argument can be made for (18b) (at least assuming that all the same women are present in all worlds in CG).

So maybe we can design an account on which we can treat antipresuppositions as a kind of presupposition, and attribute them to partiality and to the Domain Condition. But it is certainly not straightforward. I think there is also a more substantial reason to steer clear of accounts like the one I just sketched. There seem to be limits to the kinds of conditions that sentences impose on the common ground. We find conditions that every world in the common ground have a certain property (presuppositions) and we find conditions that not every world in the common ground have a certain property (antipresuppositions). But I don't know if we find conditions that about half the worlds in the common ground have a certain property, or conditions that there be worlds with one property as well as (possibly different) worlds that have a second property compatible with the first. And certainly there are many other more sophisticated kinds of conditions that are excluded. Now, the account that I just sketched seems to give sentences the power to impose any condition on the common ground that they like. On this account, sentences can restrict their domains to worlds w such that the common ground of the participants in U(w) has a certain property. There is nothing about the approach that naturally limits what that property can be. A more constrained theory would be better.

3. Accounting for antipresuppositions

Should we then start again from scratch, abandon our view of how presuppositions are generated, and look for a simple unified way of deriving presuppositions and antipresuppositions alike? It would be easy enough to devise a mechanics for deriving both presuppositions and antipresuppositions compositionally on the basis of what is present in syntactic structure.[16] However, an intuition that has been pursued in the literature -- originating with Heim 1991 -- is that this is not the right approach to take.[17]

I didn't choose my examples randomly. What we saw so far is this: a structure with *thinks* antipresupposes certain things that a parallel structure with *knows* presupposes; a structure with *a* antipresupposes certain things that a parallel structure with *the* presupposes; a structure with *all* antipresupposes certain things that a parallel structure with *both* presupposes. And therefore: the use of a structure with *thinks* is infelicitous in all situations in which the use of a parallel structure with *knows* is felicitous; the use of a structure with *a* is infelicitous in all situations in which the use

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[16] Still, it would be a challenge to do so in such a way as to derive in a principled fashion that there are limits on the kinds of conditions a sentence can impose on the common ground. As I indicated at the end of the last section, I take this to be a desideratum – which the approach now to be presented meets.

[17] Heim specifically discusses the antipresupposition associated with *a*. Her future biographers will no doubt conjecture that she was looking for a principled way to explain the "novelty condition" on indefinites.

of a parallel structure with *the* is felicitous; the use of a structure with *all* is infelicitous in all situations in which the use of a parallel structure with *both* is felicitous.

The intuition is that what renders a sentence with *thinks*, *a*, or *all* infelicitous in the situations in which it is infelicitous precisely has something to do with the felicity of parallel sentences with *knows*, *the*, or *both*. On this view, there is no reason to try to assimilate the derivation of antipresuppositions to the derivation of presuppositions – there is no reason to make any new assumptions about how semantic composition works in order to derive antipresuppositions compositionally, or anything like that. What one needs instead is something from which it follows that the possibility of using a sentence with *knows*, *the*, or *both* blocks the possibility of using a sentence with *thinks*, *a*, or *all*.

One consequence of this view is that it allows one to maintain the traditional idea that words like *think*, *a* and *all* have the simple semantics that we have always imagined for them, with no partiality built into it -- and generally no special aspects that one could hold responsible for triggering antipresuppositions – and to say that words like *know*, *the* and *both* differ from them essentially only in that their semantics has partiality built into it. I have tried to present the idea dramatically in (21)-(22) by giving semantic values for *know*, *the* and *both* that are literally identical to those for *think*, *a* and *all* except for the limits they impose on what their arguments can be.[18, 19] (This is just for the sake of drama, though: there is no harm with a non-quantificational analysis for *the*.)

(21) a. $[[\text{think}]] = \lambda p_{<s,t>}.\lambda x_e.\lambda w_s.$ x thinks p in w.
   b. $[[\text{a}]] = \lambda P_{<e,st>}.\lambda Q_{<e,st>}.\lambda w_s.$ for some x, $P(x)(w) = Q(x)(w) = 1$.
   c. $[[\text{all}]] = \lambda P_{<e,st>}.\lambda Q_{<e,st>}.\lambda w_s.$ for every x, if $P(x)(w) = 1$ then $Q(x)(w) = 1$.

(22) a. $[[\text{know}]] = \lambda p_{<s,t>}.\lambda x_e.\lambda w_s:$ <u>p holds in w</u>. x thinks p in w.
   b. $[[\text{the}]] = \lambda P_{<e,st>}.\lambda Q_{<e,st>}.\lambda w_s:$ <u>there is exactly one individual x such that $P(x)(w) = 1$</u>. for some x, $P(x)(w) = Q(x)(w) = 1$.
   c. $[[\text{both}]] = \lambda P_{<e,st>}.\lambda Q_{<e,st>}.\lambda w_s:$ <u>there are exactly two individuals x such that $P(x)(w) = 1$</u>. for every x, if $P(x)(w) = 1$ then $Q(x)(w) = 1$.

Pursuing this idea, the only difference between the semantic values of (23a) and (23c) will be that the domain of (23a) will be limited to worlds in which Mary is pregnant. At the same time, because of the competition from (23a), (23c) will not be able to be used when (23a) is felicitous. To the extent that (23a) is felicitous whenever the Domain Condition is satisfied, (23c) will not be able to

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[18] In (21)-(22) I have omitted a further condition that *the*, *both* and *all* place on their arguments. I assume that they all impose as well the condition that I already mentioned that *every* imposes (cf. (13)): for every x, if $P(x)(w) = 1$ then x is in the domain of Q and w is in the domain of Q(x). This is the condition responsible for "universal projection of the presuppositions associated with the scope of the quantifier."

[19] The alternative lexical entries, for use in more complex structures, would be the following. (Remarks parallel to those in the previous footnote apply.)

(21') a. $[[\text{think}]] = \lambda w_s.\lambda p_{<s,t>}.\lambda x_e:$ x thinks p in w.
   b. $[[\text{a}]] = \lambda P_{<e,t>}.\lambda Q_{<e,t>}.$ for some x, $P(x) = Q(x) = 1$.
   c. $[[\text{all}]] = \lambda P_{<e,t>}.\lambda Q_{<e,t>}.$ for every x, if $P(x) = 1$ then $Q(x) = 1$.
(22') a. $[[\text{know}]] = \lambda w_s.\lambda p_{<s,t>}:$ <u>p holds in w</u>. $\lambda x_e.$ x thinks p in w.
   b. $[[\text{the}]] = \lambda P_{<e,t>}:$ <u>there is exactly one individual x such that $P(x) = 1$</u>. $\lambda Q_{<e,t>}.$ for some x, $P(x) = Q(x) = 1$.
   c. $[[\text{both}]] = \lambda P_{<e,t>}:$ <u>there are exactly two individuals x such that $P(x) = 1$</u>. $\lambda Q_{<e,t>}.$
      for every x, if $P(x) = 1$ then $Q(x) = 1$.

be used whenever it is taken for granted that Mary is pregnant. Similar remarks apply to (24): (24a) will block (24c) when (24a) satisfies the Domain Condition.

(23) a. Mary $\lambda_1 t_1$ knows that she$_1$ is pregnant

    b. λw_s: <u>Mary is pregnant in w</u>. Mary thinks in w that Mary is pregnant

    c. Mary $\lambda_1 t_1$ thinks that she$_1$ is pregnant

    d. λw_s. Mary thinks in w that Mary is pregnant

(24) a. John $\lambda_1 t_1$ is repairing the chair in his$_1$ living room.[20]

    b. λw_s. <u>there is exactly one individual x in w such that x is a chair in w and x is in John's living room in w</u>. for some x in w, x is a chair in w and x is in John's living room in w and John is repairing x in w.

    c. John $\lambda_1 t_1$ is repairing a chair in his$_1$ living room.

    d. λw_s. for some x in w, x is a chair in w and x is in John's living room in w and John is repairing x in w.

The position that *think* (*a, all*) has a "weak" semantics and that the antipresupposition associated with it is due to competition with *know* (*the, both*) is, I think, based on a deeper intuition about language. This intuition is that no language that contains a verb that behaves like *knows* could also contain a verb that has the weak semantics we assumed for *think* but that induces *no* antipresupposition. This word would behave like the combination of *think* and *know* – it would make *Mary VERBs that Jane is pregnant* felicitous whether or not it is taken for granted that Jane is pregnant, and true when Mary is of the opinion that Jane is pregnant. This apparent gap, if real, is explained if any verb with this semantics would find itself in competition with *know*, but could be mysterious if antipresuppositions arose in a different way. And, if competition with *know* would yield *think*'s antipresupposition for any verb with the weak semantics we have attributed to *think*, then it is plausible that *think* indeed has this weak semantics. Parallel remarks apply to the other cases we have considered: an intuitively sound speculation is that no language that contains a word like *the* (or *both*) could also contain a word with the weak semantics we assumed for *a* (or *all*) but that induces no antipresupposition.

(25) Speculations:

    a. Impossible in a language with *know*

        Mary VERB1s that Jane is pregnant

            felicitous whether or not is taken for granted that Jane is pregnant
            true if Mary thinks that Jane is pregnant

    b. Impossible in a language with *the*

        John is repairing DET2 chair in Mary's living room

            felicitous whether or not it is taken for granted that Mary has a single chair in her living room

---

[20] If the lexical entry for *the* is as above, *the chair in his living room* would have to QR here. I have ignored this detail. There are also some simplifications in the description of the semantic value.

true if John is repairing a chair in Mary's living room

c. Impossible in a language with *both*

John assigned the same exercise to DET3 of Mary's students.

felicitous whether or not it is taken for granted that Mary has exactly two students
true if John assigned the same exercise to all of Mary's students

In what follows, I will look at ways in which people have tried to spell out the view that antipresuppositions result from competition, and refine their proposals. I will also look at how this view encourages us to see a few other linguistic phenomena. But first a few further remarks about this view.

To start with, since the idea is that antipresuppositions should be attributed to the fact that the possibility of using a sentence with *know* (say) blocks the use of a sentence with *think*, this view might lead one to expect that in cases where independent factors render the use of a sentence with *know* odd, the antipresupposition should "disappear." (26) seems to represent a case of this kind: here, the use of *knows* would be incompatible with the contrast-related deaccenting in the second sentence. However, for the record, I have not found it easy to come up with examples of this sort.

(26) Last time Mary was pregnant, she thought she wasn't. THIS time, she thinks she IS.

Another comment is that, while thus far we have only looked at sentences with a single "antipresupposition trigger" like *think* or *all*, the view under discussion makes further predictions about sentences with two of these expressions. Here the predictions seem correct. In (27) I have given an example of a few sentences which vary in that, where one has *all* or *think*, another has *both* or *know*.

(27) a. Both of those women λ_1 t_1 know that they$_1$ are pregnant

b. Both of those women λ_1 t_1 think that they$_1$ are pregnant

c. All of those women λ_1 t_1 know that they$_1$ are pregnant

d. All of those women λ_1 t_1 think that they$_1$ are pregnant

The compositional semantics could determine for each sentence S here that, for every w in Dom([[S]]), [[S]] is true in w as long as all of "those" women in w think in w that they are pregnant. At the same time, it could determine that different domains are involved, in which case the Domain Condition would generate different presuppositions:

(27') a. Dom ([[27a]]) = {w: there are exactly two of "those" women in w
and all of "those" women in w are pregnant in w }

b. Dom ([[27b]]) = {w: there are exactly two of "those" women in w }

c. Dom ([[27c]]) = {w: all of "those" women in w are pregnant in w }

d. Dom ([[27d]]) = W

The kinds of predictions that our approach makes are as follows. Since (27b) contains *think* where (27a) contains *know*, (27b) should be "blocked" in cases where (27a) is felicitous. So, while presupposing what it does (that there are exactly two of those women), it should antipresuppose what (27a) presupposes – that there are exactly two of those women and that all of them are pregnant. In other words, it should presuppose that there are exactly two women but antipresuppose that at the same time both of those women are pregnant. Since (27c) contains *all* where (27a) contains *both*, we also expect (27c), while presupposing what it does (that all of those women are pregnant), to antipresuppose what (27a) presupposes. So (27c) should presuppose that all of those women are pregnant while antipresupposing that at the same time there are exactly two of those women. (27d), which doesn't presuppose anything[21], contains *all* where (27b) contains *both*, and contains *think* where (27c) contains *know*. We thus expect (27d) to be blocked *both* in cases where (27b) is felicitous *and* in cases where (27c) is felicitous. It should thus *both* antipresuppose what (27b) presupposes – that there are exactly two of those women – *and* antipresuppose what (27c) presupposes – that all of those women are pregnant.

A final remark, for Griceans. Don't say to yourselves: Of course a sentence like *Mary knows that she is pregnant* blocks *Mary thinks that she is pregnant* if the semantics is as I stated: the first sentence is stronger than the second – that is, true in fewer worlds – and a Maxim-of-Quantity-style injunction to be informative will tell us to choose the stronger option. That would be faulty reasoning. The injunction to be informative does *not* tell us to use *Mary knows that she is pregnant* over *Mary thinks that she is pregnant* when it is taken for granted that Mary is pregnant! In that case, the two sentences would be equally informative: they would be true in exactly the same worlds in the common ground. In general, in our examples, when the Domain Condition is satisfied for a sentence with *know*, *the*, *both*, the parallel sentence with *think*, *a*, *all* is equally informative. (This point is emphasized by Heim 1991.) So an account of antipresuppositions, even if it relies on competition, could not be based on the Maxim of Quantity. What could a competition-based account of antipresuppositions look like? That is what I will address in the next section.

4. Formulating and refining the account

Let us assume that the picture I just sketched is essentially correct: "antipresupposition triggers" like *think*, *a* and *all* have a weak semantics, and antipresuppositions result from competition. What principles govern the competition? This picture suggests to me that we want an account that takes the following format:

> 1. Certain expressions are associated with alternatives.
>
>   a. ALT (*thinks*) = {*knows*, ... }
>   b. ALT (*a*) = {*the*, ... }
>   c. ALT (*all*) = {*both*, ... }
>
> 2. Let the Alternative-Family of a sentence φ be the set of sentences that you get by replacing at least one alternative-associated expression in φ with an alternative.
>
> 3. Do not use φ if you can find a member of its Alternative-Family that ...

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[21] Or, to put it another way, which presupposes the tautology.

An account of this format would render *Mary thinks that Jane is pregnant* unusable if *knows* is an alternative to *thinks*, and *Mary knows that Jane is pregnant* has whatever property of sentences 3 alludes to. The question is how to fill in the gaps here. We want to specify: (i) what expressions are associated with alternatives, and how; (ii) how to fill in 3 – what property an alternative sentence has to have in order to exclude us from uttering the original sentence.

Here is one way. This, I think, fits the mentality of Sauerland 2003a, 2004a, who has imagined an account of this kind and called the maxim in 3 "Maximize Presupposition." (There are minor differences, however.)

(28) "Maximize Presupposition" (à la Sauerland)

   i. Alternatives are only defined for lexical items. For any lexical item, the alternatives consist of all other items of the same syntactic category.
   ii. 3. Do not use ϕ if there is a felicitous member of its Alternative-Family ψ that has fewer worlds in its domain but that coincides with ϕ on all the worlds there.

To see how this works, consider for instance *Mary thinks that she is pregnant*. *Mary knows that she is pregnant* is in the Alternative-Family of *Mary thinks that she is pregnant*, and moreover its semantic value differs only in that it has fewer worlds in its domain. This means that *Mary thinks that she is pregnant* will not be usable when *Mary knows that she is pregnant* is felicitous. To the extent that *Mary knows that she is pregnant* is felicitous whenever it meets the Domain Condition, *Mary thinks that she is pregnant* will not be usable when every world in the common ground is in the domain of *Mary knows that she is pregnant*, or in other words when every world in the common ground is one where Mary is pregnant.

(Or consider ϕ = *All of those women λ_1 t_1 think that they$_1$ are pregnant*, ψ = *Both of those women λ_1 t_1 think that they$_1$ are pregnant*. Or ϕ = *Both of those women λ_1 t_1 think that they$_1$ are pregnant*, ψ = *Both of those women λ_1 t_1 know that they$_1$ are pregnant*. Here too, ψ is in the Alternative-Family of ϕ. Moreover, given the semantics that we have been assuming for ϕ and ψ, ϕ has a larger domain than ψ but, in every world in the domain of ψ , $\psi(w) = \phi(w)$. Therefore, ϕ will be usable only if ψ is infelicitous. And so, to the extent that ψ is felicitous in all contexts in which ψ satisfies the Domain Condition, ϕ will be usable only when ψ does not satisfy the Domain Condition. If the domain of ψ is the set of p-worlds, then ϕ will antipresuppose p.)

(28) accounts for antipresuppositions essentially by saying that sentences will be blocked in situations where other sentences that presuppose more (but do not differ in any other way) would communicate the same thing. It therefore says that the use of (29b), for instance, will be blocked in situations where (29a) would communicate the same thing – in situations, that is, where it is taken for granted that every one of the people referred to has exactly two students. This account produces the right result here, but doesn't seem to go as far as it should elsewhere. Consider (30), for example. (30b) seems destined always to be infelicitous. It seems natural to try to relate this fact to the antipresupposition of (29b), and to say that in general a sentence with *all* is blocked when a sentence with *both* would communicate the same thing. The reason why (30b) is always blocked, then, would be that, unlike (29b), which communicates the same thing as (29a) only when it is taken for granted that every one of the people referred to has exactly two students, (30b) *always* communicates the same thing as (30a). But (28) doesn't go this far. It follows from (28) that (30a) should block (30b) only if (30a) presupposes more. But (30a) presupposes absolutely nothing. We expect *all* worlds to be in the domain of (30a), since what we would compositionally generate is the condition that a world is in the domain if in that world everyone with exactly two students has

exactly two students, and this condition is always met. So, on the proposal in (28), we don't expect (30a) to block (30b).

(29) a. Every one of them assigned the same exercise to both of his students.
　　 b. Every one of them assigned the same exercise to all of his students.

(30) a. Everyone with exactly two students assigned the same exercise to both of his students.
　　 b. # Everyone with exactly two students assigned the same exercise to all of his students.

　　　I take it that this is a good reason to look for a better way of filling in (i) and (ii). An alternative might be as in (31), and this is the version that I see Schlenker 2004 as endorsing.

(31) "Maximize Presupposition" (à la Schlenker)

　　 i. Alternatives are only defined for lexical items. For any lexical item, the alternatives
　　　 consist of all "presuppositionally stronger" items of the same syntactic category.
　　 ii. 3. Do not use φ if a member of its Alternative-Family ψ is felicitous.

The idea here is that a sentence with *all*, for example, will *always* get blocked by a parallel sentence with *both* if that parallel sentence with *both* is felicitous – whether or not that parallel sentence with *both* presupposes more than the original sentence did. We thus will account not only for the inappropriateness of (29b) in cases where (29a) is felicitous, but also for the utter bizarreness of (30b) to the extent that (30a) is always felicitous. On this formulation, what makes the *both* sentence compete with the *all* sentence is the fact that *both* is "presuppositionally stronger" than *all*. What does it mean to be "presuppositionally stronger"? The intuitive idea is that *both* is "presuppositionally stronger" than *all* for the following reason: if we take two simple sentences that differ only in that one contains *both* where the other contains *all*, the domain of the *both* sentence is always a subset of the domain of the *all* sentence, and sometimes a proper subset. On this view, *the* is "presuppositionally stronger" than *a*, which never gives rise on its own to any domain restrictions, and similarly *knows* is "presuppositionally stronger" than *thinks*. A rough formulation appears in (32).[22]

(32) Attempt at defining "presuppositionally stronger":
　　 A is "presuppositionally stronger" than B iff the domain of [[B]]* properly includes the
　　 domain of [[A]]*, where [[A]]* and [[B]]* are [[A]] and [[B]] adjusted to apply to sequences[23].

(33) Examples.

　　 a. *know* is presuppositionally stronger than *think*
　　　 because [[think]]*(<p, x, w>) is defined for all <p, x, w>
　　　 while　 [[know]]* (<p, x, w>) is defined <u>for all <p, x, w> such that p(w) = 1</u>.

　　 b. *the* is presuppositionally stronger than *a*

---

[22] The entailment-based notion of "strength" that is relevant in discussions of Horn scales could be explicated in a similar way, as follows: A is "stronger" than B iff {σ: [[A]]*(σ) = 1 } ⊂ {σ: [[B]]*(σ) = 1 }. One way of meeting this condition if A is presuppositionally stronger than B is if at the same time: [[A]]* and [[B]]* yield the same value for every sequence in the domain of [[A]]*; and [[B]]* yields 1 for some sequence not in the domain of [[A]]*. The presuppositionally stronger-weaker pairs that we have been considering, like *know-think*, all happen to meet these additional requirements too, so pairs of the kind we have been considering can also be seen as Horn scales.

[23] Possibly after type-shifting, to make it possible to compare two elements of the same type.

because $[[a]]^*(<P, Q, w>)$ is defined for all $<P, Q, w>$

while $[[the]]^* (<P, Q, w>)$ is defined for all $<P, Q, w>$ <u>such that there is exactly one individual x in w for which P(x)(w) = 1.</u>

   c. *both* is presuppositionally stronger than *all*

because $[[all]]^*(<P, Q, w>)$ is defined for all $<P, Q, w>$

while $[[both]]^* (<P, Q, w>)$ is defined for all $<P, Q, w>$ <u>such that there are exactly two individuals x in w such that P(x)(w) = 1.</u>

(31) will also account for our other examples, of course: if we look at the ψs and the φs we have been considering, we see that the ψ is always in the Alternative-Family of the φ – it always contains a presuppositionally stronger item – and so just as before (31) predicts that φ will be usable only if ψ is infelicitous. Notice, however, that something from our earlier proposal got lost in (31). Our old proposal allowed a ψ to block a φ only if, in a situation where ψ is felicitous, the two would communicate the same thing (that is, the two would be true in just the same worlds in the common ground). Our new formulation in principle allows a ψ to block a φ even if, in a situation where ψ is felicitous, the two would *not* communicate the same thing. I think this could be a mistake. Consider the sentences in (34):

(34) a. One friend of mine brought both his children.
    b. One friend of mine brought all his children.

(35) [[one friend of mine]]
    $= \lambda P_{<e, <s, t>>} \lambda w_s.$ for at least one friend x in w, P(x) holds in w.

Sentences like this do not seem to presuppose anything, and in particular I think it is felicitous to utter either one in a situation in which we take for granted that I have friends with two children and friends with more. (This would follow from a semantics for *one friend of mine* as in (35), with no partiality.) But the two sentences do not communicate the same thing: (34a) is true only if a friend of mine with two children brought all his children, while (34b) could be true even if no friend of mine with two children brought all his children (as long as, say, some friend of mine with three children brought all of those). On our new proposal, it is surprising that there are situations in which both are felicitous: after all, (34a), which contains *both*, is in the Alternative-Family of (34b), which contains *all*. I suggest that the difference between this pair of examples and the others we have seen is precisely that, in situations where the *both* sentence is felicitous, the *both* sentence does not necessarily convey the same information that the *all* sentence does. I therefore suggest a modification to the way we filled out (ii):

(36) "Maximize Presupposition" (final version?)

  i. Alternatives are only defined for lexical items. For any lexical item, the alternatives consist of all "presuppositionally stronger" items of the same syntactic category.
  ii. 3. Do not use φ if a member of its Alternative-Family ψ is felicitous <u>and contextually equivalent to φ.</u>
    (ψ is contextually equivalent to φ iff for all w in the common ground, ψ(w) = φ(w).)

Note that in (36) I specified that, for ψ to block φ, it is enough for ψ to be contextually equivalent to φ -- to coincide with φ on every world in the common ground. This contrasts with the stronger condition in our first proposal, which required ψ to coincide with φ on every world in its

own domain. The weaker condition here reflects the fact that the *both* sentence *would* block the *all* sentence if it were taken for granted that all friends of mine have exactly two children.[24]

I suspect that this will not be the last word on the subject.[25]

5. An application: "Maximize Presupposition" and ϕ-features

Now that we have perhaps managed to pin down the pragmatic principle that is responsible for antipresuppositions, what use is it to us as linguists?

Here is one way it could be of use to us: it could help us to draw conclusions about the semantics of lexical items. If sentence A presupposes p and sentence B antipresupposes p, and the two sentences differ with respect to one item, it is a good guess that the different item in B deserves a semantics that is presuppositionally weaker than the semantics of the parallel item in A. We took this approach when we assumed a weak semantics for *think, a* and *all* above, and just this logic has been applied to other cases in work by Sauerland and Schlenker. Sauerland and Schlenker look specifically at sentences that differ with respect to the ϕ-features on pronouns, and draw conclusions about the semantics of ϕ-features. Here I would like to discuss a case that Sauerland and Schlenker do not discuss, but that Sauerland alludes to when he writes: "I suggest that plural, third person and masculine are semantically unmarked" (Sauerland 2004a). This discussion will show that, while the strategy of using our pragmatic principle to draw conclusions about the semantics of lexical items is a good one, one has to apply it with caution.

The relevant facts are these. A sentence like (37a), rather than, say, presupposing that every professor is male, antipresupposes that every professor is female: it is fine if we take for granted that some of the professors are male and some are female, but unsuited to a context in which we take for granted that all of the professors are female.[26] Since this is what (37b) presupposes, and (37b) *looks* as though it differs from (37a) only with respect to the pronoun it contains, sentences like these could be used to motivate a weak semantics for the pronoun *his*.

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[24] Note that, in a situation in which this is *not* taken for granted, by using (34b) I would nonetheless tend to communicate that, for all I know, the friend of mine in question does not have exactly two children. I would say that this is a scalar implicature of the standard kind: in this context, (34a) is more informative than (34b) (true in fewer worlds in the common ground), so in using (34b) I implicate that, for all I know, (34a) is not true.

[25] We will see why in Section 7. There are various questions that come to mind already at this point. One that I will not return to is: should the alternatives to a lexical item B be further limited to just those "presuppositionally stronger" items A that "coincide with B on their domains" ? (I.e., to those "presuppositionally stronger" items A such that [[A]]* and [[B]]* yield the same value for every sequence in the domain of [[A]]*.) Given this further condition, even though *both* is presuppositionally stronger than *one*, *both* would not count as an alternative to *one* -- a sentence like *One of my parents is male* can be true in a situation in which *Both of my parents are male* is false. I also leave open the question of whether a more insightful approach to (36) could be given by "dynamic" approaches that view sentence interpretation as involving the construction of intermediate contexts. I have tried to do without such auxiliary notions here.

[26] At least this is so in less "politically correct" dialects such as mine. In more politically correct dialects, (37a) presupposes that every professor is male. In a case where it is neither presupposed that all professors are male nor presupposed that all professors are female, I think some can use *their* in the "his" position. (I think *their* is also a possibility in example (43b), to come). The label "politically correct" is misleading here, of course: it is the speakers of the other dialect who would think that my way of speaking is less politically correct. For them, my use of (37a) in a context of mixed men and women professors would suggest that I am taking for granted that everyone around is male, and one might naturally jump to the conclusion that I expect all professors to be male.

(37) a. Every professor λ_1 t_1 was decorating his$_1$ office.
   antipresupposes that every professor is female

  b. Every professor λ_1 t_1 was decorating her$_1$ office.
   presupposes that every professor is female

   To express the idea, we have to use our less simplified structures here, with world variables. The rough idea is that pronouns are made up of variables together with features, one of which is a gender feature. *His* and *her* differ only with respect to this gender feature. The role of *her*'s gender feature, *fem*, is to limit the possible values of the variable to female human beings. *His*'s gender feature, *masc*, by contrast, imposes looser restrictions: it just limits the possible values of the variable to human beings. *Fem* is thus presuppositionally stronger than *masc*. The details are in (38).

(38) a. $[[fem]] = \lambda w_s. \lambda x_e$: x is female (and human) in w. x   a'. [fem w_i pro$_j$]   "she"/"her"

  b. $[[masc]] = \lambda w_s. \lambda x_e$: x is human in w. x   b'. [masc w_i pro$_j$]   "he"/"him"/"his"

   I have given some rough diagrams for the sentences in (39). I have taken some shortcuts there,[27] but the idea should be clear: because of the restrictions *every* imposes on its arguments, we will get out of the structure with *masc* a function whose domain consists of worlds in which every professor is human, and we will get out of the structure with *fem* a function with a narrower domain, a domain of worlds in which every professor is female. By the Domain Condition, the structure with *fem* will thus presuppose that every professor is female, and by our principle, since this structure is in the Alternative-Family of the structure with *masc*, the structure with *masc* will antipresuppose that every professor is female.

(39) a. [λ_2 [[every professor w_2] [λ_1 t_1 decorate w_2 (the) **[[masc w_2] pro$_1$]** [office w_2]]]]

  b. [λ_2 [[every professor w_2] [λ_1 t_1 decorate w_2 (the) **[[fem w_2] pro$_1$]** [office w_2]]]]

(40) a. λw: for every x such that x is a (relevant) professor in w, <u>x is human in w</u> and
   x has a unique office in w. for every x such that x is a (relevant) professor in w, x
   decorated in w an office of x in w.

  b. λw: for every x such that x is a (relevant) professor in w, <u>x is female (and human) in w</u> and
   x has a unique office in w. for every x such that x is a (relevant) professor in w, x
   decorated in w an office of x in w.

   This approach to the facts in (37) – that (37b) is in the Alternative-Family of (37a) – is certainly reasonable, but I think that this particular implementation should be controversial, for a number of reasons.

   First of all, if variables can be free, this account suggests that a sentence like (41) should have a structure parallel to the one we have seen for *Every professor was decorating his office* but which contains a free variable. If as is often assumed the presence of a free variable is what underlies the deictic use of pronouns, then we would expect (41), on the basis of the structure in

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[27] For instance, I didn't QR the definite description, which on my assumptions thus far is quantificational. Nothing crucial depends on those assumptions. To avoid making a lot of mental adjustments, at least for the duration of this section it would be helpful to imagine that definite descriptions are individual-denoting.

(42), to antipresuppose that the person under discussion whose office Mary was decorating is female, but not to impose stronger requirements.

(41) Mary was decorating his office.

(42) [λ_2 [**Mary** [λ_1 t_1 decorate w_2 (the) [[masc w_2] **pro$_3$**] [office w_2]]]]

This seems wrong, however. (41) seems to suggest very strongly that the person in question is *not* female, much more strongly than, say, *Jane thinks that Mary is pregnant* suggests that Mary is not pregnant. And in a situation in which the interlocutors make explicit that for all they know the person could be male or female, it sounds decidedly odd. Compare these two dialogues:

(43) a. A. I don't know whether Mary is pregnant or not.
    B. I don't either. Jane thinks she is.

  b. A. I can't tell from here whether that professor is a man or a woman.
    B. I can't either. ? Mary was decorating his office. Let's ask her.

    A second reason to give this approach more thought is that it is not obvious that the only difference between the two sentences regards the two pronouns. This becomes clear when we consider sentences like (44). The reading we are interested in is the "bound" reading, the one that states that the professor in question was decorating her own office and that no other person under discussion was decorating his own office. On this reading, the sentence presupposes that the professor in question was female, but doesn't seem to presuppose anything about those other people under discussion who are being stated not to have been decorating their offices. They might be exclusively male, exclusively female, or a mix of the two.

(44) Only the professor was decorating her office.

On the basis of these facts, we can build an argument that there is something in sentence (44) over and above the elements that until now we imagined to be there. Here is a short version of this point, which is based on many similar arguments in the literature about similar examples. (See Heim 1994, Kratzer 1998 and others.)

    A reasonable analysis for *only* would be along the lines of (45). Basically, *only* combines first with a silent anaphor whose denotation provides the comparison class, and then with an individual and a predicate. It says that the predicate holds of no one in the comparison class other than that individual (I will ignore here the question of what further conditions *only* imposes on its arguments).

(45) [[only]] = $\lambda C_{<e,t>}.\lambda x_e. \lambda P_{<e,t>}$:.... P holds of x and of no other C-individual.

Now, the thing to note is that, if our sentence has the structure in (46) – with no element other than those we have been assuming so far – and if *fem* carries a restriction to female individuals, then the predicate that *only the professor* attaches to will be a predicate that holds exclusively of female individuals. But if the predicate that *only the professor* attaches to is a predicate that holds exclusively of female individuals, essentially we expect the sentence to convey just that no other individual in the comparison class was *a woman* who decorated her office, and this is not the case.

(46) a. [λ_2 [**[Only C$_4$ [the professor w$_2$]]** [$_\alpha$ λ_1 t_1 decorate w_2 (the) [[fem w_2] pro$_1$] office w_2]]]

b. $[[\alpha]]^g =$
λx: <u>x is female in g(2)</u> and x has a unique office in g(2). x decorated in g(2) x's office in g(2)

c. $[[\ (46a)\ ]]^g = \lambda$w: there is a unique (salient) professor in w and ....
the unique professor in w is female in w, has a unique office in w and
decorated his/her office in w
but no one else in the class given by g(4) has those characteristics

Consider if you like the following scenario: the room consists of Prof. Heim, and five administrators, none of whom had shown up to lunch. I ask them if they had spent the time decorating their offices. A male administrator responds (44). Afterwards we find out that while it is true that Prof. Heim had been decorating her office (with the help of one of the administrators), in fact the guy himself had also been decorating his own office. Assuming that we find the sentence felicitous as a claim about the six of them, (46a) predicts that we should consider the sentence true. But the judgment is that it is false.

Reflecting on this example shows that, if we want to produce the right meaning for this sentence, on the one hand we do not want the predicate to which *only the professor* attaches to be true only of female individuals, and on the other hand we want something in the sentence to introduce the presupposition that the professor is female. This has two consequences. First, the *fem* that we find on the pronoun must *not* be introducing a restriction to female individuals. Second, there must be something *else* around that insures that the professor is female. In fact, the reading we are after is what we would obtain from a structure that differs from the one we have been looking at in that *fem* appears not on the pronoun, where it is pronounced, but instead on the DP *the professor*:

(47) a. $[\lambda_2\ [\ [$Only C$_4$ **[fem w$_2$ [the professor w$_2$]]]** $[_\alpha \lambda_1$ t$_1$ decorate w$_2$ (the) **pro$_1$ office w$_2$**]]]

b. $[[\alpha]]^g =$
λx: x has a unique office in g(2). x decorated in g(2) x's office in g(2)

c. $[[\ (47a)\ ]]^g = \lambda$w: there is a unique (salient) professor in w and the unique professor in w
is female in w and....
the unique professor in w has a unique office in w and decorated his/her
office in w but no one else in the class given by g(4) has those
characteristics

What should we conclude from this? One possibility, pursued originally in Heim 1994 and then in more detail in Kratzer 1998, is that the structure that is interpreted really *is* the one in (47a), and that the reason why the lower pronoun is pronounced *her* has something to do with the way structures like these are pronounced. The idea would be that bound variables in configurations like this are not generated with features attached, and, after the sentence is shipped off to interpretation, an agreement rule attaches the feature *fem* in cases where something in the binder carries the feature *fem*.

But now suppose we accept that the features on bound variables are sometimes just agreement morphology, and interpreted features in these sentences are present elsewhere, like the feature on *the professor*. Then this opens up other possibilities for generating the antipresupposition in (37a,b). It could be that these sentences vary not with respect to the feature on the pronoun itself, but rather with respect to a feature generated elsewhere. And in that case, from

our facts about antipresuppositions, one should not conclude something about the semantics of features on pronouns, but rather about the semantics of the features that we find elsewhere.

There seems to me to be no very simple hypothesis that accounts for the facts. One possible hypothesis is as follows. Upstairs we find not only a *fem* feature and a *masc* feature but also a feature *hm* ((48)). *Fem* would restrict the individuals concerned to female individuals, and *masc* to male individuals, but *hm* doesn't care about whether the individuals concerned are male or female. *Hm* is what is responsible for those cases in which we quantify over both male and female individuals.[28]

(48) a. [λ_2 [[every ...**hm**... professor w_2] [λ_1 t_1 decorate w_2 (the) pro$_1$ office w_2]]]

b. [λ_2 [[every ...**fem**...professor w_2] [λ_1 t_1 decorate w_2 (the) pro$_1$ office w_2]]]

(49) a. [$_{NP}$ ... hm ... professor w_2]

a'. [[(49a)]]^g is defined iff for every y such that y is a (relevant) professor in world g(2), y is human in world g(2).
When this condition is met, [[(49a)]]^g = λx_e. x is a (relevant) professor in world g(2).

b. [$_{NP}$ ... fem ... professor w_2]

b'. [[(49b)]]^g is defined iff for every y such that y is a (relevant) professor in world g(2), y is female and human in world g(2).
When this condition is met, [[(49b)]]^g = λx_e. x is a (relevant) professor in world g(2).

Hm, however, is special in two ways. One way in which *hm* is special is that *hm* triggers *masc* as an agreement feature. This means that, whenever we see *Every professor was decorating his office* and we read it as talking about a class that does not contain exclusively male individuals, there must be a *hm* upstairs. But then, since *fem* is a presuppositionally stronger alternative of *hm*, the sentence will be infelicitous when a parallel sentence with *fem* would convey the same thing – i.e. when the domain of quantification contains exclusively female individuals. This is how the antipresupposition of *Every professor was decorating his office* comes about. (Of course, we also predict that *hm* can't be used when the domain of quantification contains exclusively male individuals, because *masc* would be felicitous there – but the sentence that *is* felicitous, with *masc*, would be pronounced the same way as the sentence with *hm*, so we won't see that.)

(50) a. [[fem]] = λw_s. λx_e: x is female (and human) in w. x   a'. [fem w_i pro$_j$]   "she"/"her"

b. [[masc]] = λw_s. λx_e: x is male (and human) in w. x   b'. [masc w_i pro$_j$]   "he"/"him"/"his"

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[28] If the semantic values of the NPs *hm professor w_2* and *fem professor w_2* are as I indicated in (49), then the former will give rise to the presupposition that every (relevant) professor is human and the latter will give rise to the presupposition that every (relevant) professor is female and human – as desired. But obviously, if gender features have the kind of semantics I have been assuming, to arrive at this result there must be more in the NP than just the gender feature, *professor* and the world variable. There are many possibilities that one might entertain here. For instance -- though there are simpler solutions -- one might imagine, roughly following Matthewson 2001 and Sauerland 2003a, that the more detailed structure of (49b) is something like α [[fem w_2] [sup * [professor w_2]]] , where α means "atom-of," *sup* means "supremum," and * is the pluralizer. There might also be different ways of getting from structures with an NP-internal gender feature to the desired presuppositions, ways that do not assume the semantic values in (49). I have not paid much attention in this paper to where implicit quantifier domain restrictions come from, and I have the feeling that treatments of this issue could raise additional possibilities.

c. $[[hm]] = \lambda w_s. \lambda x_e$: x is human in w. x

The other way in which *hm* is special is that, unlike *fem* and *masc*, we never find it on DPs, only within NPs.[29] The fact that we never find it on a pronoun is responsible for the fact that no pronoun seems adequate to refer to a person whose gender is uncertain ((51a)). The fact that we don't find it on other DPs either is responsible for the fact that sentences like (51b), unlike (37a), seem inadequate to talk about a professor whose gender is uncertain. If we could generate *hm* on DPs, this would be unexpected: we could generate for (51b) a structure just like (47a) but containing *hm* instead of *fem*, and *hm* would trigger *masc* agreement.

(51) a. # Mary was decorating his office. (We don't know whether it's a man or a woman.)
b. # Only that professor was decorating his office.

One might speculate that the two ways in which *hm* are special are related. Maybe the fact that *masc* shows up as the agreement feature for *hm* on pronouns is related to the fact that there is just no way of generating, and thus of spelling out, *hm* on a pronoun. (There is another way, incidentally, of thinking about the fact that *hm* triggers *masc* agreement. It is that *hm* actually does get realized on the pronoun via the agreement rule, but then in the morphology there is syncretism between *masc* and *hm*. Anyway, this suggestion raises the issue of how to think about the special aspects of *hm*.)

To summarize, we can indeed use our principle to help us draw conclusions about the semantics of lexical items. But sometimes this is harder work than it looks. Even if here it seems plausible that the two sentences *Every professor was decorating his office* and *Every professor was decorating her office* are part of the same Alternative-Family, it is not immediately clear which element of one sentence is responsible for introducing the presuppositions, and thus for which element of the other it makes sense to posit a weak semantics.[30]

6. Some problems

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[29] But maybe it does attach to DPs in the "more politically correct" dialects that use *they*. There, one possibility is to say that *hm* gets realized on DPs and as an agreement feature on bound pronouns, and *hm* pronouns get pronounced "they", perhaps because "they" is the elsewhere pronunciation for third person pronouns.

[30] There are alternative hypotheses worth considering to the one I have given in the text. Suppose (cf. Sauerland 2003a) that gender features can *only* be generated on DPs, and that – *uniquely in the case where the DP is of a higher type and this combination is uninterpretable* – the DP can raise leaving its feature behind on its (type e) trace. Suppose, moreover, that, while *hm* can be generated on DPs, for some reason *hm* is required to appear on a trace at LF. Then we make the right predictions. We will be able to combine *hm* with *every professor* but not with an expression like *that professor* (assuming crucially that it is of type e) – while the former would result in an acceptable LF (cf. (i)), the latter would result in no acceptable LF (cf. (ii)). And we will produce the right presuppositions for sentences with expressions like *every professor* -- note that (i) will yield the presupposition that every professor is human, as desired, since only individuals who are human in g(2) will be in the domain of the predicate that combines with *every professor*.

(i) $[\lambda_2 [$ [every professor w_2] [λ_1 **[hm w_2] t_1**] decorate w_2 (the) pro$_1$ office w_2]]]
(pronounced "Every professor was decorating his office")

(ii) a. * $[\lambda_2 [$ **[hm w_2 [that professor w_2]]** [λ_1 t_1 decorate w_2 (the) pro$_1$ office w_2]]]
(*hm* must appear on a trace at LF)
b. * $[\lambda_2 [$ [that professor w_2] [λ_1 **[hm w_2] t_1**] decorate w_2 (the) pro$_1$ office w_2]]]
(DPs can escape their features only when not doing so would yield uninterpretability)

In the remaining sections of this paper, I want to return to our formulation of "Maximize Presupposition," and bring up some issues that arise there.

First of all, I want to bring up some facts that I consider puzzles. In formulating our account for antipresuppositions, I assumed throughout that alternatives were established at the lexical level, and I assumed that there was a straightforward way of determining what the alternatives were for a given lexical item. There seem to be some challenges for this assumption, however. There are cases where it looks as though sentences are competing with sentences that are *not* created simply by varying lexical items.

Consider for example the sentences in (51) with postnominal genitives. These have the kinds of antipresuppositions that we are now used to seeing in sentences with indefinites. (51a) can't be used if it is taken for granted that John has only one graduate student; (51b) can't be used if it is taken for granted that everyone under discussion has only one graduate student.

(51) a. # John brought along a graduate student of his.   (if established that he has only one)
   b. # Everyone brought along a graduate student of his.   (if established that each has only one)

How do these antipresuppositions arise? The first guess, given what we have said, might be that they arise from competition with parallel sentences with a definite determiner. But this looks tricky. A peculiarity of sentences with definite determiners and postnominal genitives is that they need to have some further modification of the NP. Thus, there is something odd about (52a,b) even if it is known that John has a single graduate student. (By contrast, a sentence like *John brought along the graduate student of his that you mentioned* is significantly better.) If we are concerned with why sentences like (51a,b), *without* a modified noun phrase, have the antipresuppositions they do, and want to attribute this to competition with a member of the Alternative-Family with a definite determiner, then this member of the Alternative-Family also wouldn't have a modified NP. But since a sentence like (52a) on its own, with no modification, doesn't seem felicitous in situations where it is known that John has a single graduate student, we don't expect it to block (51a) in these situations.

(52) Competitors?

   a. ? John brought along the graduate student of his
   b. ? Everyone brought along the graduate student of his

Another possibility could be this: (51a,b) seem to antipresuppose just what (53a,b) presuppose. Maybe, then, (53a,b) have underlying structures that are just like (51a,b) up to a lexical item or two that has been switched for another item. This has been argued, but is not a settled issue by any means.[31]

(53) Competitors?

   a. John brought along his graduate student.
   b. Everyone brought along his graduate student.

What is the solution? One might be that our "maxim" that generates antipresuppositions is respected at a more abstract level than we have been assuming. Suppose that, even if *the* is not itself like that, our resources for language make available a lexical item that has the semantics that

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[31] See Storto 2003 for a recent discussion of approaches that have been taken to postnominal genitives.

we were assuming for the definite determiner and that *can* appear in the position occupied by the indefinite determiner in (51). This lexical item would give us a member of the Alternative-Family of (51) that would compete with (51) and thereby generate the antipresupposition. Maybe, even though English itself does not use this determiner, it is taken into consideration by our maxim. Perhaps. But I am not happy with the idea that a word that the language does not use can count as an alternative, because it makes the cross-linguistic predictions of our theory much less clear. I would therefore tend to see this kind of proposal as more an indication of a problem than a solution. Possibly, we have missed something in our consideration of what the pieces of the original sentence are.[32]

(54) Competitors?

    a. John brought along `Def` graduate student of his.
    b. Everyone brought along `Def` graduate student of his.

      Another place where we find ourselves in a similar situation is in trying to explain all the antipresuppositions associated with *all*. Judgments indicate, I believe, that a sentence like (55a) not only antipresupposes that John has exactly two children, it also antipresupposes that he has exactly one child. (Similarly, (55b) not only antipresupposes that everyone under discussion has exactly two children, it also antipresupposes that everyone under discussion has a single child.) We can explain why (55a) antipresupposes that John has exactly two children by saying that *both* is an alternative to *all*. But how can we explain the fact that it also antipresupposes that John has exactly one child? What we need to find, it seems, is a member of the Alternative-Family of (55a) that is equivalent to *John's child has a French passport*. But it is hard to see how we could arrive at such a sentence by substituting lexical items in (55a) for other lexical items. One could take the same step here that we took earlier, and say that there is an alternative to *all* that means something like *the unique member of*, that English doesn't lexicalize but that counts anyway. But I think it is more likely that somewhere or other our assumptions need to be revised.[33]

(55) a. #All of John's children have a French passport.
              if it is known that John has exactly two children
              if it is known that John has exactly one child

    b. # Every one of them brought all his children.
              if it is known that every one of them has exactly two children
              if it is known that every one of them has exactly one child

      One reaction at this point would be simply to throw in the towel and give up the idea that only minimal syntactic units are associated with alternatives. Suppose we modified "Maximize

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[32] As Gillian Ramchand reminded me, a puzzle of just the same kind arises in the case of *there*-insertion contexts, the prime example of an environment in which definites are banned. *There is a sun in the West* clearly antipresupposes that there is a single sun, but it doesn't look as though we can attribute this to competition with # *There is the sun in the West*.

[33] When it comes to (55), I think that there is also a further unexplained antipresupposition. These sentences also antipresuppose that John – or everyone under discussion – has *one or two* children. A sentence like (55b), for instance, seems OK in a situation where it is taken for granted that, say, one of them has one child, one of them has two, and the rest have three. But it does not seem suited to a situation in which it is taken for granted that they all have either one or two children. This is especially puzzling: is there any natural alternative sentence that expresses the same thing but presupposes that they all have either one or two children ?

Presupposition" in such a way that alternatives are defined not only for lexical items, but more generally for constituents of any size.

(56) "Maximize Presupposition" (desperate modification?)

 Alternatives are defined for all constituents. For any constituent, the alternatives consist of all "presuppositionally stronger" items of the same syntactic category.

In that case, we wouldn't get into the problems I brought up here. For instance, in the case of *John brought along a graduate student of his*, the entire sentence would be an alternative-associated expression, and *John brought along his graduate student* would be an alternative to it.   The result: *John brought along his graduate student* would indeed be in the Alternative-Family of *John brought along a graduate student of his*.   I will leave open the question of whether some solution along these lines is tenable -- noting only that, on this specific approach, computing the Alternative-Family of a given sentence would be quite a bit of work.[34, 35]

7. Antipresuppositions and scalar implicatures

The various ways of generating antipresuppositions that we considered – repeated below -- are strongly reminiscent of, and inspired by, a schema for generating quantity implicatures – given in (57).[36, 37] The resemblance raises the question whether we could actually see scalar implicatures of the traditional kind, and antipresuppositions of the kind we considered, as being generated by the same maxim. Is it possible to reformulate these schemata in such a way as to provide a unified account of both kinds of phenomena?

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[34] Thanks to Chris Tancredi for bringing up this approach and making me consider its merits.   It would also help with another troubling problem: sometimes it appears that the trigger of the antipresupposition is not a single word.   It was pointed out to me in Cambridge that expressions like *have a notion that*, which one can paraphrase with *think*, give rise to the same antipresupposition that *think* gives rise to.

 Emmon Bach suggested another route.   Perhaps there is an additional level of structure for sentences, one that represents the sentence meaning more transparently by putting together items from a universal vocabulary of "semantic primitives." If at this level we took the representation of *John brought along a graduate student of his* and changed (or added?) a unit, perhaps we *could* arrive at the representation of *John brought along his graduate student*.   One could maintain, then, that a maxim like our original one applies at this level.

[35] This kind of proposal could have interesting consequences for the treatment of anaphoric reference.   Notice that, although one might naturally expect *both midwives* to be presuppositionally stronger than *both women*, both of the continuations in (i) are possible.   One approach to this puzzle would be to say that in sentences of this kind, the overt syntactic restriction of *both* actually does no semantic work: it is conjoined with a covert property-denoting expression that, for every world in its domain, yields a function characterizing two people who are midwives in that world.

(i) Chantal and Odette emerged from the hospital haggard and wan....
  a. ...Both midwives were exhausted after the long night.
  b. ...Both women were exhausted after the long night.

[36] See fn. 22 for an explication of the notion of "strength" in (57).   In what follows, I will assume that *all* is stronger than *some*, although this is not compatible with the simplified semantic value for *all* that I considered above. Just imagine from here on that there are more restrictions on *all*'s arguments than I have said: P is in the domain of [[*all*]] only if there is at least one x such that $P(x) = 1$. This does not affect the earlier discussion in any significant way.

[37] Note that, while (57) does indeed generate scalar implicatures, it is not strictly speaking a Gricean "be informative" maxim, given that context doesn't make any appearance.   Even in a case where *Some dominoes fell* and *All dominoes fell* are contextually equivalent – when we know that, if one does, they all do – it would tell us to use *All dominoes fell* over *Some dominoes fell*.   In this case, the result seems to be the right one: in this situation, *All dominoes fell* seems more appropriate. (And the schema in (58) retains this result.)   At the same time, it is not clear that the contextual blindness of (57) is always an advantage.   It would seem to predict the wrong result for the examples in fn. 35 given that *midwives* is stronger than *women*.   (The schema in (58) retains this result too.)

(28) "Maximize Presupposition" 1

 i. Alternatives are only defined for lexical items. For any lexical item, the alternatives consist of all other items of the same syntactic category.
 ii. 3. Do not use ϕ if there is a felicitous member of its Alternative-Family ψ that has fewer worlds in its domain but that coincides with ϕ on all the worlds there.

(31) "Maximize Presupposition" 2

 i. Alternatives are only defined for lexical items. For any lexical item, the alternatives consist of all "presuppositionally stronger" items of the same syntactic category.
 ii. 3. Do not use ϕ if a member of its Alternative-Family ψ is felicitous.

(36) Final version?

 i. Alternatives are only defined for lexical items. For any lexical item, the alternatives consist of all "presuppositionally stronger" items of the same syntactic category.
 ii. 3. Do not use ϕ if a member of its Alternative-Family ψ is felicitous and contextually equivalent to ϕ.

(57) A schema for generating (at least some) quantity implicatures. (Cf. Sauerland 2004b)

 i. For any lexical item, the alternatives consist of all items on the same scale (a sequence of items of which each is "stronger" than the succeeding one)
 ii. 3. Do not use ϕ if a member of its Alternative-Family ψ that you know to be true is felicitous and asymmetrically entails ϕ.

 At first glance one might think so. Suppose we modified the schema for generating quantity implicatures as follows:

(58) Modification of (57)

 i. For any lexical item, the alternatives consist of all "stronger" items on the same scale.
 ii. 3. Do not use ϕ if a member of its Alternative-Family ψ that you know to be true is felicitous and (contextually) entails ϕ.
 (ψ (contextually) entails ϕ : the ψ-worlds (in CG) are or are contained in the ϕ-worlds (in CG).)

If we then consider the scales in (60), this maxim will tell us not to use *Some students passed* when *All students passed* is true and felicitous, and not to use *All students passed* when *Both students passed* is true and felicitous.[38] So if we think that a speaker obeys this maxim, we will conclude from his utterance of *Some students passed* that he doesn't believe that *All students passed* is true, and that is the scalar implicature. And if it is taken for granted that there are two students, a speaker who obeys this maxim will not assert *All students passed*, corresponding to the antipresupposition.

(59) a. Some students passed.
    b. All students passed.
    c. Both students passed.

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[38] Note that *both* is not only presuppositionally stronger than *all*, but in fact stronger than *all*.   As I noted in fn. 22, all the presuppositionally stronger-weaker pairs that I have been considering are in fact stronger-weaker pairs as well.

(60) Two relevant scales:

     a. <all, some>
     b. <both, all>

     However, my impression is that any attempt to give a unified account for scalar implicatures and antipresuppositions has important problems to face. On the one hand, it seems that, if we want to account for the full range of "antipresupposition" facts with a principle like (58), it is important to do as we did above and to restrict the alternatives to "stronger" items on the same scale, rather than to just any items on the same scale. If we eliminated "stronger" above, it seems we are not going to get what we want in cases where items on the same scale are contextually equivalent. Suppose it is part of the common ground that there are two relevant students, and suppose the speaker knows that they passed. The maxim without "stronger" will tell us "Don't assert *All students passed* if *Both students passed* is felicitous" but also "Don't assert *Both students passed* if *All students passed* is felicitous." But assuming that "is felicitous" means "pass the other conditions for use," if (59c) does then presumably (59b) does too – they both satisfy the Domain Condition, for example -- so if anything we predict neither sentence to be usable. Similar remarks apply to examples like the ones in (30) (repeated below) that forced us to abandon Version 1 of our maxim. Without restricting the alternatives to "stronger" items on the same scale, I don't see how we are going to predict these facts.

(30) a. Everyone with exactly two students assigned the same exercise to both of his students.
     b. # Everyone with exactly two students assigned the same exercise to all of his students.

     But, at the same time, if our schema restricts alternatives to "stronger" items on the same scale, we are not going to be able to predict "scale reversal" effects in the generation of scalar implicatures. If *all* items on the same scale count as alternatives, then (61b) will be in the Alternative Family of (61a)[39], and we will thus have a handle on why we conclude that an utterer of (61a) does not believe that Mary didn't pass any of the students: (61b), which contains a weaker item on the same scale, competes. If *only "stronger"* items on the same scale count as alternatives, however, (61b) would not be in the Alternative-Family of (61a).

(61) a. Mary didn't pass all of the students.
     b. Mary didn't pass any of the students

     My conclusion, then, is that I don't see right now how a single schema along the lines of those we considered could be held responsible both for distinguishing (30a) from (30b), and for accounting for implicatures like those of (61a).[40]

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[39] Here I crucially and uncontroversially assume that *any* is semantically identical to *some*.

[40] The game changes, however, if we assume that alternatives are defined for all constituents – I mentioned this position at the end of Section 6. A schema with this property might be better equipped to account for antipresuppositions and implicatures alike.

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