Presupposition Projection

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Preface

The projection problem for presuppostions is the problem of predicting the presuppositions of complex sentences in a compositional fashion from the presuppositions of their parts. A primitive illustration is provided by the following three sentences.

    (1)   The king has a son.

    (2)   The king's son is bald.

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

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

The rules of presupposition projection were a major focus of research in formal pragmatics throughout the 1970's. As early as 1973, some researchers (notably Stalnaker

and Karttunen[1]) criticized the search for such rules as misguided and denied that there was any component of the grammar at all that dealt specifically with presupposition projection. They suggested that one only needed to appropriately characterize the semantic and pragmatic nature of presupposition and combine that characterization with an independently motivated account of the truthconditional semantics of the constructions under consideration, and the projection phenomena would fall out at no extra cost.

While nodody denied the appeal of this approach, it did not make any direct impact on the way in which the issue was approached during the remainder of the decade. One reason for this may have been that Karttunen, in his later work with Peters, was more concerned with recasting the previously obtained descriptive generalizations in a more precise framework than with explaining them[2]. This in turn made it very easy for Gazdar[3], in an otherwise quite comprehensive review of the literature, to pass over Karttunen's earlier efforts at explanation and evaluate his work solely in terms of descriptive accuracy. And since he came to largely negative conclusions about the latter, it is no surprise that neither he nor those influenced by him were much inclined to appreciate the explanatory potential of an approach that they took to be misinformed about the facts. Apart from that, anyone who may have tried to work out Stalnaker's and Karttunen's programmatic remarks and apply their suggestion to a non-trivial variety of examples must have run into a few technical difficulties, especially in the treatment of quantified and modalized sentences. I identified and tried to remove at least the last-mentioned obstacle in my dissertation and in a subsequent short paper[4]: Presupposition projection in quantified sentences, I argued there, can be accommodated within a semantic framework that makes use of "discourse referents"[5]. Still, I covered only a tiny subset of the data that other theories purport to deal with. Moreover -- as I have since been persuaded by Rooth (p.c.) and Soames (1989) -- I overstated the explanatory force of this type of approach (and thus its difference from alternatives) when I claimed that context change potentials were fully determined by truth-conditional meaning.

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[1]Stalnaker 1973, Karttunen 1974.

[2]Karttunen & Peters 1976, 1979

[3]Gazdar 1979

[4]Heim 1982,1983b

[5]Such as the "File Change Semantics" developed in Heim (1982), or the "Discourse Representation Theory" of Kamp 1981.

I. What are presuppositions?

1. Some examples

I start with a few customary illustrations of the phenomenon: Definite descriptions have existence presuppositions, therefore (4) presupposes (5).

    (4)   John talked to his brother.

    (5)   that John has a brother

A certain class of sentence embedding verbs, the so-called "factives", presuppose the truth of their complement. So (6) presupposes (7).

    (6)   John realized that he had lost.

    (7)   that John had lost

Aspectual verbs like *start*, *stop*, and aspectual adverbs like *still, again* presuppose certain things concerning the truth or falsity of the embedded proposition at times before or after the reference time. E.g. (8) presupposes (9).

    (8)   It stopped raining (at 5 o'clock).

    (9)   that it had been raining (for an interval immediately preceding 5 o'clock)

Words like *too, also*, presuppose the truth of certain propositions that are in some sense analogous to the one they apply to. E.g. (10) presupposes (11).

    (10)   John will come too. (Spoken with focus on *John*.)

    (11)   that someone other than John will come

It isn't crucial whether every single one of these examples actually exemplifies presupposition, nor whether the particular descriptions of the presuppositions I gave are exactly the right ones. Some of these descriptions will be refined as we go along, and perhaps some of the examples will be found to fall outside the scope of the theory altogether. For the time being, they will do to serve as illustrations for a few preliminary points.

2. Conventional implicatures vs. admittance conditions

If we want examples more or less like the ones just given to fall under this concept, how should we define "presupposition"? People have proposed various definitions, and the debate about their relation to each other and their respective merits is far too extensive to summarize[6]. We will here contrast two major types of views of what presuppositions are

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[6]See Gazdar 1979, Stechow 1981, and especially Soames, ms. 1984, for useful overviews.

and examine them specifically with respect to their usefulness towards a solution to the projection problem.

View 1: Presuppositions as conventional implicatures.   According to this view, the presuppositions of a sentence are just another component of the total package of information that the sentence can be used to convey. Other components of this package include the content and the conversational implicatures. I attribute this view to Karttunen & Peters (1979) as well as to Gazdar (1979). Only Karttunen & Peters use the term "conventional implicatures"; Gazdar calls them "presuppositions". But what matters here is not terminology, but the concepts behind it.

View 2: Presuppositions as admittance conditions. This view is best represented by Stalnaker's work (1973, 1974, 1979) and was also adopted in Karttunen (1974). It says that the propositions that a sentence presupposes are just those that must be entailed by the common ground of any context that is to admit that sentence. This notion of presupposition relies on a notion of "common ground": Roughly, the common ground of a context of utterance is the conjunction of all those propositions that the interlocutors take for granted in that context (either because they are permanently shared beliefs in their community, or because they have been established in the course of the preceding conversation)[7].

Of course there is also the possibility that some of the examples in our list involve conventional implicatures, and others involve admittance conditions. This option has been explored by Stechow (1981) and Soames (1983, 1989).

Let us clarify for one kind of example what each of the two views amounts to. Suppose, for example, we have a context whose common ground contains (i.e. entails) the information that John was at the party. (For the sake of brevity, I will often say that "the context entails" a certain proposition when I mean that the common ground at that context entails it.) In this context, I utter the sentence (12).

(12)   Bill was at the party too.

According to the conventional- implicatures- view, this sentence carries the information that Bill was at the party (its content) and also the information that someone else was at the party (its presupposition). If the conversation proceedes in the most ordinary, uneventful way (i.e. nobody challenges my utterance), both pieces of information will be added to the common ground, giving rise to a new common ground that is the conjunction of the old one with these two propositions. Of course the addition of the presupposition happens to be redundant here, since it was already entailed by the old context. But that doesn't hurt.

According to the admittance- conditions- view, things proceed as follows: When (12) is uttered in the context we are considering, we first check whether the common ground entails that someone else than Bill was at the party. By assumption, it does. This being so, it will admit the sentence, which means we can go ahead (in the uneventful case, at any rate)

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[7]See Stalnaker's papers (1972, 1973, 1974, 1979) for explication of this concept (there called "speaker's presupposition").

to add to it the content of the sentence, viz. that Bill came to the party, thereby forming a new common ground. The net effect is the same as in the conventional implicatures story: According to either, we wind up with a new context that entails everything that the old one did plus that Bill was at the party.

We might expect the two views to diverge when the same sentence is uttered in a context that <u>doesn't</u> yet entail John's or anyone else's having been at the party. Let's assume a common ground that is neutral in this respect, one that neither entails that someone other than Bill was at the party, nor that noone other than Bill was there (nor does it entail either that Bill was or that he wasn't there). The conventional- implicatures- story will not really change under this assumption: we still add both the content and the presupposition to the common ground. Only this time the addition of the presupposition isn't redundant.

What happens according to the admittance- conditions- view? We check whether the context entails the presupposition, which it doesn't. It will therefore not admit the sentence and we are stuck. Hopefully somebody will say something like: "What do you mean, 'too'?" and thereby give the speaker a chance to back up and fill in the missing presupposition so that the conversation can proceed.

Which view makes the right empirical predictions? It seems that the second story might happen, but there are also many cases where a "missing" presupposition doesn't prevent things from proceeding as smoothly as ever. The defenders of the first view have collected many convincing examples of this kind. For instance, if I walk into a meeting and say:

(13)   Sorry to be late. My car broke down,

nobody is going to reply: "What do you mean 'your car'? You never told us that you had one." People will simply accept the news that I have a car along with whatever else I am telling them, just as the first view would predict[8].

But defenders of the second view have not been unaware of such cases either. Lewis writes[9]:

"[...] it's not as easy as you might think to say something that will be unacceptable for lack of required presuppositions. Say something that requires a missing presupposition, and straightway that presupposition springs into existence, making what you said acceptable after all. (Or at least, that is what happens if your conversational partners tacitly acquiesce -- [...])".

This sort of spontaneous addition of a proposition to the common ground, prompted by the very utterance that would otherwise not be admitted, is called "accommodation". If accommodation is assumed to be freely available as a remedy for missing presuppositions, the second view becomes more difficult to distinguish empirically from the first. In fact,

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[8]See Gazdar (1979) for this and similar examples.

[9]Lewis1979.

some have concluded that it reduces the second view to vacuity and is therefore tantamount to conceding its defeat.[10]

This conclusion is premature, for at least two reasons. The first reason is this: Even if the two views now make identical empirical predictions about every single example, they may still differ in their implications for the formulation and solution of the projection problem. Indeed, one of the central theses of the present paper is that the second view has a clear advantage over the first in this respect. But only the completed paper will bear this out.

The second reason can be spelled out right now. It has to do with a principled limitation that the conventional implicatures view imposes on the sorts of things that a sentence can presuppose[11].

Take a closer look at the word *too* in our example (12). We assumed so far that it contributes the presupposition that someone other than Bill was at the party, i.e. an existential proposition. But that was really an oversimplification. Notice how strange it is if I say to you out of the blue:

> (14)   John went to Harvard too.

Your reaction will surely be "What do you mean 'too'?" You may not say it loud, but you will at least wonder silently which other Harvard alumnus (or alumni) I was thinking of. Of course you know as well as I do that thousands of people have gone to Harvard. So the proposition that <u>someone</u> besides John went there is presumably part of our common ground. But as your reaction shows, the presence of just that existential proposition doesn't seem to suffice; something more seems required for (14) to really fit in smoothly.

In light of this example, it seems more accurate to say that (14) requires a context that entails, for some particular (individual or group) x that is salient in the context of utterance and presupposed to be distinct from John, that x went to Harvard. What the common ground is supposed to entail is not an existential generalization, but a singular proposition. The appearance of indefiniteness results form the fact that no particular such proposition is required, but any one of a certain kind will do. A context where it is merely taken for granted that there exist Harvard alumni is not good enough to admit (14). A context where another Harvard alumnus has just been mentioned, on the other hand, will be appropriate, as will be one where the speaker or the audience are known to be Harvard alumni.

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[10]Gazdar 1979.

[11]Stalnaker (1973) seems to have been the first to make this point, though the particular argument I will use here relies on the discussion of *too* in Soames (1989), where he in turn acknowledges Kripke. (Stalnaker based his argument on assumptions about the presuppositions of personal pronouns; cf. below for a presuppositional analysis of pronominal deixis and anaphora along his lines.) Incidentally, Soames (1989) asserts that my approach in Heim (1983b) is incapable of accommodating the analysis of*too* that I am about to sketch. I cannot imagine why he thinks that.

Two things follow from this refined picture of the presupposition of *too*. For those that hold the view that presuppostions are admittance conditions, the refinement explains why (12) in our second scenario above is not as easily rescued by accommodation as, e.g., (13). The problem with (12) is that the audience, however cooperative and willing to accommodate it may be, doesn't know <u>which</u> proposition among the many that would make (12) admissible it is supposed to add[12]. (13), by contrast, leaves no room for such insecurity. The missing presupposition is fully determined by the sentence; it has to be that the speaker has a car.

For the view of presuppositions as conventional implicatures, the refined analysis of *too* creates a serious problem: What <u>is</u> the conventional implicature of a sentence with *too?* We have seen that the utterance does not simply convey an (often redundant) existential generalization. Is there any other particular proposition that comes as part of the message? If not, then, as Stalnaker pointed out, this situation is not describable within the conventional- implicatures- view; but it is perfectly easy to characterize in terms of admittance conditions, and therefore provides a strong argument for viewing at least some so-called presuppositions as admittance conditions rather than conventional implicatures.

Upon more careful reflection, it does seem possible, however, to identify the presupposition of (14) with some one proposition: Take something like the proposition that there is, in the current utterance context, some unique contextually salient individual (or group) that is presupposed to be distinct from John and have gone to Harvard. (This is a proposition about the context, a kind of metalinguistic proposition, if you will.) It is plausible to assume that this proposition will be entailed by the common ground of a context if and only if this context also provides a salient individual x about which its common ground entails that x ≠ John and x went to Harvard. Why not call this proposition the conventional implicature of (14). This maneuver feels a little artificial, but we have to concede for the time being that it is a way of defending the CI view against the objection under consideration here.

Before leaving this topic, it is worth surveying a few more examples of presupposition-inducing items that have been argued to be similar to *too*: while their presuppositions have traditionally been described as existential propositions of various kinds, closer inspection indicates that they require contexts that entail one of a certain set of singular propositions instead. The examples that follow are adapted from Kripke, as reported by Soames.

(15)   We will have pizza on John's birthday, so we shouldn't have pizza again on Mary's birthday.

Suppose you hear this from a speaker whom you know well enough to know that he and his family, like most of the population, consume pizza rather frequently, but you don't happen to know when John and Mary have their birthdays. As Kripke observes, you will

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[12]Soames (1989) observes for an analogous example that the presupposition of *too* isn't accommodable as smoothly as e.g. that of (13).

spontaneously infer from this utterance that John's birthday precedes Mary's. This inference seems due somehow to the presence of *again* in the sentence; if *again* had been left out, it would have been just as easy to imagine the birthdays in the opposite temporal order. One would hope that the presupposition induced by *again* somehow can be shown to be indirectly responsible for this inference. However, this is not possible if *again* is analyzed as it usually is in the presupposition literature: According to that usual analysis, *We will have pizza again on Mary's birthday* presupposes the proposition that we will have had pizza some time before Mary's birthday. (Assuming that, for whatever reason, *shouldn't* acts as a 'hole' here, this is then also the presupposition of *we shouldn't have pizza again on Mary's birthday*.) Now this proposition is of course entailed by the common ground, simply because the speaker is known to be a regular pizza eater. There seems to be no pressure to accommodate any further assumptions, in particular not anything about the temporal location of John's birthday with respect to Mary's. So we have no explanation for the spontaneous inference observed above.

Suppose, on the other hand, that the presupposition of *again* amounts to the requirement that a particular proposition among a certain set be entailed by the common ground. For the sentence at hand, suppose that *we shouldn't have pizza again on Mary's birthday* calls for a context in which some occasion t is salient and the common ground entails about it that at t we have pizza and t precedes Mary's birthday. Under this analysis, we expect that the hearer of (15) will need to identify an appropriate contextually salient occasion of pizza eating, and of course the one that immediately comes to mind is the one mentioned in the first sentence, viz. John's birthday. This will do if only it can be presumed to lie before Mary's birthday, so what is more natural than to accommodate this missing bit of information. In other word, a reanalysis of the presuppositional meaning of *again* analogous to the one we contemplated for *too* will help us explain the observation that (15) invites an inference concerning the temporal order of the two birthdays, and this, of course, argues in favor of such a reanalysis.

In a similar vein, consider (16).

(16)   John is cooking. He will stop (cooking) when tomorrow's football game starts.

This utterance invites the spontaneous inference that John is engaged in one single protracted cooking activity that started before the speech time and will continue through the night. Why should this inference, which isn't all that plausible pragmatically, arise? According to the standard analysis of *stop,* the second sentence of (16) should presuppose that John will be cooking during an interval prior to and adjacent to the beginning of tomorrow's football game. If (16) is uttered out of context, there is certainly nothing that will establish this proposition, so it has to be accommodated. But if that's all that is accommodated, why the suggestion that John keeps cooking between now and then? Again, there is no explanation unless we change the analysis of *stop*. Suppose what *John will stop cooking at t* really requires is a context with a salient cooking event by John about which it entails that extends right up to t. Under this assumption, we can explain the inference: The

obvious candidate for a salient event of John cooking is the one mentioned in the first sentence of (16). The information that this event extends right up to the beginning of tomorrow's football game is then a natural one to accommodate in order to make the context fit the requirement of *stop* fully. This explains the inference and thereby receives empirical support. (See Soames 1989 for analogous examples and argumentation concerning the presupposition of *still*.)

In sum, *too* is by no means an isolated case among presupposition inducing items; quite a few of them, upon closer inspection, impose requirements on the context that are not naturally characterized from the conventional implicatures perspective because they don't correspond to a fixed proposition to be entailed.

3. Cancellability

Another issue about which there has been disagreement is whether presuppositions can ever be cancelled. This issue cuts across the two views just outlined of what presuppositions are, although what exactly is meant by "cancellation" depends on whether one is talking about conventional implicatures or about admittance conditions.

What would it mean for a conventional implicature to get cancelled? It would mean that under certain conditions, a sentence to which the grammar assigns the presupposition p may be uttered without conveying the information that p. Gazdar (1979) and Soames (1979) argue that cancellation of conventional implicatures is a pervasive phenomenon, and that it will happen spontaneously whenever a conventional implicature is inconsistent with the common ground. Suppose, for instance, that the sentence (17) presupposes (as a matter of grammar) that France has a king.

(17)   I didn't talk to the king of France.

Suppose further that I utter (17) in a context where it is well established that France doesn't have a king, or even a context where this has just been pointed out in so many words. What will happen? According to the cancellationists, the presupposition simply drops by the wayside. All that the utterance conveys in this context is thus the information that is its content, i.e. presumably that I didn't talk to anyone who was king of France.

This seems a realistic account of how sentences like (17) can be used, at least sometimes. However, the general claim that cancellation will step in and avert the threat of inconsistency wherever it arises is very implausible at first sight. Consider the affirmative variant of (17).

(18)   I talked to the king of France.

This too presupposes, qua sentence, that France has a king. But if I tried to utter it in a context where it is explicitly agreed upon that France has no king, there would be a clearly felt contradiction. The same goes for all other examples in our initial list. I cannot say without contradicting myself "John made this observation too" (with focus on "John", as before) and affirm in the same breath that nobody else made this observation. It doesn't

seem to be an accident that we had to choose a negated example such as (17) to give a plausible illustration of cancellation.

The cancellationists, of course, have an answer to this objection.[13] According to them, all the simple affirmative sentences we have been considering happen to have contents that entail their presuppositions. For example, the content of (18) is that there is (exactly) one king of France and I talked to him. So the presupposed existence of a king of France is simultaneously asserted in (18), and since entailments of the asserted content are not presumed to be cancellable even under the threat of inconsistency, an utterance of such a sentence in a context which entails the falsity of its presupposition will be irredeemable. If we add a negation to it, however, the presupposition stays the same as with the affirmative sentence, but the content becomes the negation of the embedded content, and hence no longer entails the presupposition. Therefore, if the presupposition conflicts with the common ground and is cancelled, there will be no contradiction.

Other proponents of the view that presuppositions are conventional implicatures, notably Karttunen & Peters (1979), have held the opposite opinion on the cancellability issue. According to them (and to Grice, who they follow in this), it is precisely the fact that they cannot be cancelled that distinguishes conventional from conversational implicatures. As we just saw, this is in line with apparent fact as far as simple affirmative sentences are concerned. But it also predicts that the scenario we described for sentence (17) should not be possible. Karttunen & Peters circumvent this dilemma by positing an ambiguity in natural language negation. There is one reading of *not* ("ordinary" negation), where it works just as assumed above, i.e. it negates the content but leaves the presupposition unaltered. If this reading is chosen, then it is indeed impossible to assert (17) and agree at the same time that France has no king. But there is also another reading of *not* (so-called "denial" or "metalinguistic" negation), which always yields a sentence devoid of any presuppositions. Under this reading of (17), the grammar simply doesn't associate it with the presupposition that France has a king in the first place. So there is no problem, even if the grammatically assigned presuppositions can never be cancelled.

Both views have been defended quite well by their respective proponents. I will leave it open here which is more persuasive and return to the matter in the context of my own proposal below.

Let us next ask what cancellation would amount to for admittance conditions. In connection with the view of presuppositions as admittance conditions, we have already seen one mechanism that serves to avert a potential breakdown of the conversation, viz. the mechanism of accommodation. But this is not to be confused with cancellation. Accommodation is not a way of getting rid of an admittance condition; quite to the contrary, it is a way of complying with it. However, one can easily imagine situations where this remedy will not suffice. Suppose the common ground not only fails to entail the required presupposition, but actually entails its negation. Accommodation of the sort we have seen

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[13]Gazdar 1979

so far would consist of adding the missing presupposition, but this would make the sentence admissible only at the cost of making the common ground inconsistent, so it is not an available remedy. Is it then possible to simply cancel the requirement, that is, to waive it? Karttunen (1974) and Stalnaker (1973) have maintained that no; Soames (1989), on the other hand, says yes[14]. Plausible examples of cancellation of admittance conditions are the same ones that we considered above in connection with the cancellability question for conventional implicatures. E.g. it seems to be possible to use (17) in a context where it is assumed that France has no king. If it is indeed an admittance condition of that sentence that the common ground must entail that France has a king, then there is no other way to save such an utterance than by cancelling this requirement. Alternatively, one might adopt the view that negation has a denial reading and thereby deny that (17) carries the offending admittance condition in the first place. These are basically the same options as we outlined for the conventional implicatures view. Or so it seems. We will see below that the view of presuppositions as admittance conditions, if spelled out approriately, actually offers a third way of dealing with examples like (17). [This third way will be "local accommodation" in the sense of Heim (1983); the corresponding section of this ms. remains unwritten.]

II. Two approaches to the projection problem

Before I present my own view, I will briefly review the major features and a few well-known shortcomings of some currently available approaches to the projection problem. This survey cannot do justice to all existing proposals, but I do hope to have chosen a representative sample. I also don't aim for exhaustive coverage of all the objections that have been raised to the proposals mentioned here.[15]

1. The "Plugs, Holes, and Filters" approach

This approach emerged through a series of papers starting with Karttunen (1973) and culminating in Karttunen & Peters (1979). I refer to this as the Plugs, Holes, and Filters (or PHF) theory[16]. Recall that these authors think of presuppositions as conventional implicatures. (While I am discussing their proposal, I will therefore use the terms "presupposition" and "(conventional) implicature" interchangeably.) The projection problem presents itself to them as the task of specifying a compositional assignment of certain propositions that represent their conventional implicatures to the sentences of the language, analogous to the familiar task of providing a compositional mapping of sentences to propositions representing their truthconditional contents. The usual method for the latter

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[14]Soames's term for cancellation of admittance conditions is "de jure accommodation" -- in contrast with "de facto accommodation", which corresponds to my accommodation simpliciter.

[15]For more extensive discussion, I recommend especially Soames (1982, 1989).

[16]See e.g. Gazdar 1979 and Soames 1979, 1982, 1989.

task involves assignments of appropriate non-propositional "contents" to the non-sentential expressions (e.g. properties to VPs). Analogously, Karttunen and Peters also assign non-propositional "implicatures" to those expressions.

To illustrate more concretely what is at stake and how the PHF theorists go about it, consider again these three sentences.

(1)   The king has a son.

(2)   The king's son is bald.

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

Central to their analysis is the assumption that the grammar of English supplies three pieces of information in the lexical entry for each basic expression: The first piece pertains to the item's contribution to content. For the word *if*, let's say this is the information that *if* expresses the truth function material implication. Call this the "content value" of the item. The second piece specifies what the item contributes in the way of presuppositions, its "presupposition value". For *if*, we presumably have the information that it contributes nothing at all. A less trivial case in this respect is *the*, whose presupposition value determines at least that the common noun phrase *the* combines with is presupposed to have a non-empty extension. The third piece of information, finally, becomes relevant only for items that are functors rather than arguments, and it concerns the item's permeability for the presuppositions of its arguments. This is called the "heritage value". For *if*, a functor taking two propositional arguments, this is roughly the information that *if* "lets through" the full presupposition of its left argument, as well as as much of the presupposition of its right argument as isn't entailed by the content of the left one. More perspicuously:

(19)   If A has p as its content and p' as its presupposition, and B has content q and presupposition q', then the presupposition of *If A, B* is the proposition p' & (p -> q').

To complete the account of the examples above, we must also specify the content, presupposition, and heritage values of the all the other words, and we must state the composition rules by which phrasal constituents receive analogous triples of values on the basis of the values assigned to their parts. All this is pretty straightforward for the example at hand and is spelled out precisely in Karttunen & Peters (1979). The reader can consult that work to verify that the predictions concerning our examples are as follows: (1) presupposes that there is a king, (2) presupposes that there is a king and he has a son, and (3) presupposes that there is a king. The main burden of bringing about just these prediction obviously rests on the heritage value, as described in (19), that the lexicon assigns to *if*.

The most serious objection that has been raised against this approach is that it merely describes the projection facts instead of explaining them. This criticism already appeared in Karttunen (1974), and then more forcefully in Gazdar (1979). As the latter points out, the three components of each lexical entry are stipulated independently of each other; no principles are given by which to derive any one of them from the other two. The

theory thus implies, implausibly, that someone who learns the word *if* has to learn not only which truth function it denotes and that it creates no presupposition of its own, but moreover that it has the heritage value (19). It also implies, contrary to what is presumably attested, that in another language there could well be a lexical item whose content and presupposition values are identical to those of English *if* while its heritage value is different.

The PHF theory has also been criticized on purely descriptive grounds. Gazdar spends a great deal of effort to invalidate in particular its predictions about conditionals[17]. A typical one of his examples is (20).

(20)   If I go to bed with her, then Maria's children get jealous.

He claims that according to Karttunen & Peters's analysis, which incorporates the stipulation (19) above, (20) should presuppose the truth of (21), but that in fact it presupposes (22).

(21)   If I go to bed with her, then Maria has children.

(22)   Maria has children.

But as Soames points out[18]:

"This is unfair. What these examples show is that temporal reference must somehow be incorporated into the statement of presuppositions. Note that the potential presupposition corresponding to the definite description in (A84a) is not (A84b), but rather (A84c).

(A84c) a. If Maria has a baby next month, then *her child* may be part of the medical school's longitudinal study.

b. Maria (now) has a child.

c. Maria will have a child.

Similarly, the correct interpretation of [Karttunen & Peters's] conditional presupposition [(21)] is (A85), not (A86).

(A85) I go to bed with Maria at time t → Maria (already) has children at t

(A86) I go to bed with Maria at time t → Maria will have children later

The only reasonable grounds for believing (A85) are truth functional. Since the speaker cannot be regarding its antecedent to be false, a theory of presupposition incorporating [Karttunen & Peters's] mechanisms correctly predicts utterances of [(20)] to presuppose that Maria (now) has children."

I have nothing to add to this, except to point out that Soames considers every single one of Gazdar's alleged counterexamples to Karttunen & Peters's treatment of conditionals, and none of them survives his scrutiny.[19]

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[17]Gazdar 1979, pp. 113-116.

[18]Soames 1982, p. 543.

This is not to say that the PHF analysis gets all the facts right. Two much discussed types of examples that seem to create systematic difficulties are disjunctions like (23) whose disjuncts carry contradictory presuppositions, and conditionals like (24) in which a presupposition originating with the antecedent fails to get inherited by the conditional as a whole[20].

(23)   He either just stopped or just started smoking.

(24)   If I later realize I haven't told the truth, I will tell you.

(19) would seem to predict that (24) presupposes that the speaker hasn't told the truth. For (23), the predictions depend on the heritage value of *or*. If, as Karttunen & Peters propose on the basis of other examples, this is as in (25), then (23) should presuppose exactly what it asserts.

(25)   If *A* has content p and presupposition p', and *B* has content q and presupposition q', then the presupposition of *A or B* is the proposition (q v p') & (p v q').

With these as with other prima facie counterexamples, it is not clear whether they undermine primarily the PHF approach to the projection problem, or rather some other assumption of Karttunen & Peters, e.g. their decision on cancellablity, or (in the case of (23)) their particular choice of heritage value for *or*. But it is fair to say that admitting cancellation would weaken the theory, and that a more successful heritage value for *or* has yet to be proposed.

Last, but not least, the PHF analysis has been faulted for its predictions about sentences with modal operators and propositional attitude verbs[21]. For instance, examples like (26) suggest that *possibly* has the heritage value typical of "holes", i.e. *possibly S* presupposes whatever S does. But this fails to predict the disappearance of the presupposition that John has children in (27) and (28).[22]

(26)   Possibly Boris regrets insulting the king of France.

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[19]See Appendix A7 of Soames 1982, pp. 538-544. Gazdar's examples and variants thereof have been reiterated elsewhere in the literature, e.g. in Lerner & Zimmermann (1981) and van der Sandt (1984), but Soames's objections seem to apply to all examples that I have seen and have never, to my knowledge, been rebutted.

[20]Both types of examples have been around for a long time. (23) apparently was first discussed by Hausser (1973) and Wilson (1975), (24) by Karttunen (1971). On their status as counterxamples to Karttunen & Peters 1979, see Gazdar 1979 and Soames 1979, 1982.

[21]See again Gazdar 1979, Soames 1979, 1982.

[22]Examples once again from Gazdar 1979.

(27)   It is possible that John has children, and it is possible that his children are away.

(28)   Possibly John doesn't have children, but possibly his children are away.

Verbs of saying often seem to behave as "plugs" (viz. *x tells y that S* does not inherit any presuppositions from S), yet we normally do read (29) as suggesting that the speaker has a camera and that it is suitable for something other than color (presumably black and white).

(29)   The repairman didn't tell me that my camera was suitable for color too.

Again, no amount of such examples will suffice to strictly falsify the basic approach. Who knows what improved heritage values an ingenious defender might come up with to accommodate each new counterexample. But this only brings home what we said initially: The main defect of this approach is its lack of explanatory ambition.

2. The Refined Cumulative Hypothesis

Gazdar's counterproposal to the Plugs, Holes, and Filters approach returns, in a sense, to the earliest and simplest treatment of the projection problem, Langendoen & Savin's "cumulative hypothesis". The cumulative hypothesis says that any sentence, whatever its complexity and its structure, simply presupposes all the presuppositions of its elementary constituent sentences. It is obvious that this won't work as it stands. But if Gazdar is right, it isn't as far off after all as Karttunen and almost everyone else in the field assumed at the time of his writing. Gazdar maintains that all apparent counterexamples to the cumulative hypothesis are instances of presupposition cancellation. This is a strikingly simple idea, and it would be very welcome indeed if the projection problem could be trivialized in this way.

As we noted above, Gazdar assumes that presuppositions can in principle be cancelled, and that this will happen whenever it is necessary to prevent the common ground from becoming inconsistent. The example we used above to illustrate the phenomenon involved an utterance of a sentence with presupposition p in a context which entailed not-p. The sentence was (17), which we took to presuppose (qua sentence) that France has a king.

(17)   I didn't talk to the king of France.

To flesh out the context of utterance, we assumed that everyone knew that France had no king and that, in fact, the speaker had just explicitly reconfirmed this. Since the presupposition of (17) could not be added to such a context without making it inconsistent, it had to get cancelled.

Conflict with an immediately preceding assertion is about the most blatant kind of inconsistency that one can imagine. A somewhat more subtle kind arises if, for instance, the presupposition of an utterance conflicts with some conversational implicature that this same utterance conveys, or if the presuppositions contributed by the various parts of the sentence uttered contradict each other. Will these situations also force the presupposition to get cancelled?

An example of the latter type seems to be (23), repeated from above.

(23)   He either just stopped or just started smoking.

Since the left disjunct contributes the presupposition that he has been smoking, but the right disjunct contributes the opposite presupposition that he hasn't been smoking, both could not be consistently added to the common ground. It is plausible that cancellation will come to the rescue here as much as in the example with (17). Indeed, our intuition is that an utterance of (23) will convey neither that he has nor that he hasn't been smoking[23].

As a simple example of presupposition cancellation under pressure from a conflicting conversational implicature, consider (30)[24].

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

Suppose the common ground preceding the utterance of (30) is neutral on the question whether or not the war is over. (30) is a conditional, and it is a general fact about (indicative) conditionals that they conversationally implicate that the speaker doesn't yet know the truth value of the antecedent. (Presumably this follows from Gricean maxims.) (30) therefore implicates that, for all the speaker knows, the war may not be over. On the other hand, (30) as a sentence carries the presupposition that the war is over (at least this is predicted by the PHF analysis as well as by the cumulative hypothesis). Now the speaker would be defeating himself if he uttered something that both conveys his belief that the war may _not_ be over and carries the message that it _is_ over. Either the conversational implicature or the presupposition must be cancelled if such an utterance is to make sense. Our intuition here is, once again, that the presupposition gets cancelled: (30) does not commit the speaker to the belief that the war is over. And it seems eminently plausible to assume that this cancellation happens precisely because an inconsistent picture of the speaker's state of information would otherwise result.

Examples like these suggest that presupposition cancellation is a much more pervasive phenomenon than it might at first seem, and that quite a few prima facie exceptions to generalizations about presupposition projection might not be exceptions after all if one could abstract away from the effects of cancellation. Realizing this, Soames and Gazdar independently of each other[25] undertook to develop precise accounts of the conversational mechanisms governing presupposition cancellation and to exploit them in explaining away apparent irregularities and complications in the rules for presupposition projection. Their analyses coincide for a wide range of examples, but their overall conclusions differ. Gazdar, as I already noted, maintains that, once we give proper recognition to the pervasiveness of cancellation, the cumulative hypothesis is all we need to

[23]See Gazdar 1979, pp. 146-7, and Soames 1979 for more explicit versions of this approach to examples like (23).

[24]Example originally due to Wilson, analysis here follows Gazdar 1979, p.146.

[25]Soames: unpubl. MIT diss. 1976, parts of which revised and published 1979; Gazdar: unpubl. diss. Univ. of Reading, 1976, revised and published as Gazdar 1979.

solve the projection problem. Soames concludes that, even with cancellation figured into the picture, we still need construction specific inheritance rules of basically the sort employed in the PHF theory.

Gazdar's conclusion may be prettier, but the facts are on Soames's side. A serious problem for Gazdar arises, for example, with his treatment of conditionals. Let us see first what he does with simple cases like our (3) above, and then check how far it generalizes to other examples.

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

Under the unrefined cumulative hypothesis, this would have to presuppose both that there is a king and that he has a son. Since it does not in fact presuppose that the king has a son, Gazdar must provide some rationale for why that presupposition would be cancelled. The reason is, according to him, a conflicting conversational implicature: As we already noted with a previous example, it would be misleading to utter a conditional whose antecedent is already taken to be true. By uttering (3), the speaker therefore indicates that, as far as he knows, the king may not have a son. But then he cannot at the same time expect his audience to accept for a fact that he does have one. To resolve this conflict, the presupposition is cancelled.

So far so good. But as Soames points out[26], this treatment will not generalize to analogous examples like (31).

(31)   If the king has a son over thirty, the king's son is bald.

Intuitively, this still doesn't commit the speaker to the presupposition that the king has a son. But this time, the relevant conversational implicature is that, for all the speaker knows, the king may not have a son over thirty. This happens to be perfectly consistent with his knowing for a fact that he has a son, so there is no plausible excuse for why the latter proposition should not survive as a presupposition.

Quite generally, Gazdar makes the right prediction only for those conditionals where the content of the antecedent is <u>equivalent</u> to some presupposition of the consequent. If the antecedent is strengthened, so that its content <u>asymmetrically entails</u> the presupposition in question, he incorrectly predicts that the presupposition survives. Additional examples that show this to be wrong are (32)[27] and (33).

(32)   If Sam paid the bill promptly, his payment is in the mail now.

(33)   If you watch this movie, you will never watch a movie again.

According to Gazdar, (32) should presuppose that there is a payment of Sam's, i.e. that Sam paid. (32) (because of the *again*) should presuppose that you have watched or will watch at least one movie. Examples of this type are of interest particularly because they work

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[26]Soames 1976, pp. 379f.; also Soames 1979, 1982, 1989.

[27]Soames 1976 loc. cit.

perfectly well under the PHF analysis (see the heritage value for *if* as specified above). Soames therefore concludes that a theory of presupposition cancellation must complement, but cannot replace, a system of non-trivial projection rules of more or less the sort that Karttunen & Peters envisaged.

Having shown, thus, that not all prima facie exceptions to the cumulative hypothesis can be analyzed as instances of cancellation, Soames still does agree with Gazdar that presuppositions are cancellable and that they will give way not only to conflicting assumptions already in the common ground or entailed by the content of the current assertion, but also to conflicting conversational implicatures. Notice that the latter is somewhat surprising: Conversational implicatures are known to be cancellable themselves, so one would expect them to make way for conflicting presuppositions at least as easily as the other way round. But in all the examples analyzed by Gazdar and Soames, the conversational implicature wins out over the presupposition. Why should this be so?

This is not a puzzle that we couldn't live with. More troublesome for Gazdar and Soames is the existence of examples in which a presupposition is not as easy to get rid of as they would predict. Consider again a conditional, this time with an antecedent whose content is <u>asymmetrically entailed by</u> a presupposition of its consequent[28].

(34)   If John has children, his sons are bald.

(35)   If John has children, he will bring along his 4-year old daughter.

(36)   If he ever watched a movie, he didn't watch Star Wars again.

(37)   If Atlantis exists, then the UN ambassador of Atlantis has been keeping a low profile.

Gazdar and Soames predict all of these to presuppose, in effect, nothing. For instance, (34) should not presuppose that John has sons, because there is a conflicting conversational implicature to the effect that the antecedent might be false, i.e. that John might not have any children at all. Defenders of the Gazdar/Soames approach have actually used this very example to support their position, claiming that in their intuitive judgment (34) presupposes nothing, and in particular doesn't presuppose what Karttunen & Peters would predict, viz. that if John has children, he has sons. I am inclined to contest this judgment, but since this is seldom a fruitful strategy of debate, let us first look at some other examples and then return to (34) in the light of what we have learned from those.

For (35) likewise, the Gazdar/Soames prediction is that it presupposes nothing, for reasons fully analogous to those in (34). But this example sounds much weirder: It makes one wonder how a speaker that doesn't even know whether John has any children at all can take for granted that, if he did have children, one of them would be a 4-year old girl. I think this judgment shows that (35) presupposes exactly what the PHF analysis predicts, viz. that if John has children, he has a 4-year old daughter. The weirdness judgment is due to the

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[28]Stanley Peters, pers. comm.

fact that it is hard to see how anyone could have grounds for believing this conditional without also having grounds for the falsity of its antecedent or the truth of its consequent. An analysis that predicts (35) to presuppose nothing has no explanation for the weirdness.

(36), too, is predicted by Gazdar and Soames to presuppose nothing, as the presupposition associated with *again* also gets cancelled by the conversational implicature that the antecedent might be false. This one is even weirder. Again, this is plausibly explained under a theory where (36) presupposes that if he watched any movie, he watched Star Wars, since this is such an unlikely proposition to take for granted. (And moreover, one would then prefer an anaphoric pronoun in the place of "Star Wars".) The cancellation theory throws no light on why there should be anything amiss.

(37) is yet another example of the same logical type, with the consequent's presupposition asymmetrically entailing the antecedent. Gazdar/Soames predict once again that it presupposes nothing, and this one indeed sounds quite natural out of the blue. What makes it different from the previous two? It seems to me that (37) is natural because it is natural to take for granted that countries generally are represented in the UN, hence that if Atlantis existed, it too would be represented there and thus have a UN ambassador. Notice that an entailment of the conditional I just wrote, i.e. that if Atlantis exists, it has a UN ambassador, is precisely what (37) is predicted to presuppose under Karttunen & Peters's theory. So once more, it is their theory which leads to an explanation of the judgment: the utterance feels natural precisely to the degree that its putative conditional presupposition feels uncontroversial.

What, then, about (34)? I think that there, too, intuitive judgment does not after all conflict with Karttunen & Peters's prediction that the sentence presupposes a conditional, viz. that if John has children, he has sons. Although there aren't really any rational grounds for taking this for granted, it certainly has a much higher probability of being true, and has stereotype on its side on top of it. (The statistical probability of at least one son among 2 or more children is rather high, 75% for 2 children, 87.5% for 3, etcetera; and quite apart from statistics, the stereotypical family has a mixture of boys and girls.) The cancellationists can get away with their prediction in this particular example, but in light of the other examples we have seen, this seems best attributed to the relatively uncontroversial content of the presupposition rather than to its being absent.

In sum, cancellation doesn't seem quite as pervasive as Gazdar and Soames predict. This doesn't yet show that the phenomenon doesn't exist, but it certainly reinforces the conclusion, already suggested by Soames's arguments against Gazdar, that a dramatic simplification of the projection problem cannot be expected to fall out from a theory of presupposition cancellation.

Let me finally mention a problem that seems to arise with any version of the cumulative hypothesis, whether refined by the addition of a concellation mechanism or not: How do you determine the presuppositions of quantified sentences, such as (38) and (39)?

(38)   Most smokers share an office with someone who smokes too.

(39)   Most first-year students share an office with someone who smokes too.

The word *too* presumably introduces a presupposition for the elementary sentence it is in, i.e. the relative clause in (38) or (39). But what is that presupposition and how does it get "projected up" in building up the matrix sentence? If we just look at the simple sentence that contains the *too*, i.e. the relative clause *who smokes too*, what it presupposes does not seem to be a proposition, but rather something that will yield different propositions for different variable assignments, i.e. something like the open proposition that someone other than x smokes, where x is the variable corresponding to *who*. The naive cumulative hypothesis would now predict that this presuppostion becomes a presupposition of (38) and (39) as a whole, and the refined cumulative hypothesis would predict that it does so unless it gets cancelled. The naive cumulative hypothesis is either false or meaningless here, since clearly neither (38) nor (39) presuppose the sort of thing that depends on a variable assignment to determine a proposition. But the refined version isn't right either, because (39), at least, does seem to have some non-trivial presupposition. If accumulation and cancellation are the only mechanisms for presupposition projection, a complex sentence can never presuppose anything other than a conjunction of some (proper or improper) subset of the presuppositions of its parts. But the presuppositions of quantified sentences don't seem to be characterizable in such a simple way. It is no coincidence that Gazdar and his followers have never applied their approach to such examples. All existing treatments of presupposition projection in quantified sentences are within frameworks like that of Karttunen & Peters, which permit you to write projection rules performing all sorts of composition operations on the input presuppositions, not just conjunction and cancellation.

III. Presupposition projection and context change

1. The projection problem for admittance conditions

Both of the attempted solutions to the projection problem that I discussed in the preceding sections were developed by people who viewed presuppositions as conventional implicatures (the "CI view" of section I.2 above). We will now ask what the projection problem would amount to, and how it might be approached, if one were to approach it from the "AC view", i.e. from a perspective according to which presuppositions are admittance conditions. Presumably, a solution to the projection problem would then consist in a compositional system of rules that determine an admittance condition for each complex sentence on the basis of the admittance conditions of its immediate constituents.

It is not obvious that the difference between the CI view and the AC view should have any bearing on one's conception of the projection problem at all. It certainly need not if one assumes that the admittance conditions of each sentence are always characterizable in terms of a certain proposition that the context must entail to admit it. If this is so, then there is a one-to-one correspondence between admittance conditions and propositions, and the compositional assignment of admittance conditions to all the sentences in the language can therefore be accomplished by means of a compositional assignment of certain propositions

to all these sentences. In other words, any solution to the projection problem that someone might propose under the CI view could be trivially reinterpreted so as to fit with the AC view. It seems that the task of devising a compositional assignment of such propositions to the sentences of the language is not affected by the exact role that these proposition are supposed to play in a theory of language use.

However, the AC view of presuppositions also suggests an alternative perspective on the projection problem that has no natural analogue under the CI view, as Stalnaker (1973) and Karttunen (1974) were the first to point out. If presuppositions are thought of as admittance conditions, there are two quite different ways in which one might even formulate the projection problem. Suppose (for a concrete case) we observe that a certain sentence *B* normally calls for a context that entails[29] the proposition p, whereas another sentence that contains *B* as a part, say *If A, B*, merely calls for a context that entails a weaker proposition q. (An illustration is our old example *If the king has a son, the king's son is bald*. Let this be *If A, B*. So *B* is *the king's son is bald*, p is that there is a king who has a son, and q is that there is a king. q is weaker than p in the sense of being asymmetrically entailed by it.) Trying to explain this observation, we might ask ourselves: "What general rule will determine the proposition q on the basis of the proposition p and the contents of *A* and *B*?" and answer perhaps as in (40)

(40)   If *A* calls for a context that entails s, and *B* calls for a context that entails p, then *If A, B* calls for a context that entails the proposition s & [[*A*]] -> p]. (Where [[*A*]] is the content of *A*.)

(see Karttunen & Peters). The answer here is phrased in terms of the AC view, but neither question nor answer rely in any essential way on the identification of presuppositions with admittance conditions. On the other hand, we might ask a different question: "How come a context that merely entails q suddenly becomes good enough to admit *B* if you first utter *If A,..?*" (In our example: "How come a context that merely entails that there is a king becomes good enough to admit *the king's son is bald* if you prefix it by *If the king has a son,.. ?*") An answer then might say something like (41) (see below).

(41)   An utterance of *if A* in a context c brings about a new context c' = c & [[*A*]], which in turn serves as the context for the subsequent utterance of *B*.

In contrast to the first, the second question and answer rely on the AC view of presuppositions essentially.

To get used to this alternative perspective on the projection problem, it is most effective if we first look at a type of "admittance condition" which is not normally[30] discussed under the heading of "presupposition", but rather of "context dependency" or

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[29]"context entails" as short-hand for "common ground of the context entails"

[30]Stechow 1981 is an early exception: he discusses this as an example of what he calls "contextual presupposition." Soames (1989) later introduced the term "expressive presupposition".

"indexicality". A sentence with the first person singular pronoun *I* in it, such as (42), is not appropriate in all conceivable contexts of utterance.

(42)   I have always paid the rent.

For instance, (42) could not felicitously appear in a letter signed by two people. The rule appears to be roughly this: A utterance of the NP*I* requires a context in which exactly one person counts as the utterer.[31]   This seems to be an admittance condition, or at any rate, something of the same general nature.

Suppose now we raised a projection problem for this type of condition: If you embed *I* into sentences of arbitrary complexity, what admittance conditions will apply to those sentences and how will they depend upon the admittance conditions of their parts? People concerned with *I* do not normally ask this question; but not because the question wouldn't make sense, but because the answer is so simple and obvious: Any sentence, however constructed and however complex, that contains an *I* anywhere embedded in it is subject to the same rule: it requires a context where exactly one individual counts as utterer. In other words, this particular example of an admittance condition conforms to the Cumulative Hypothesis in its simplest form.

But things are not equally simple for all context-dependent expressions. Take a third person pronoun, as in (43).

(43)   She paid the rent.

An utterance of the NP *she* seems to require a context in which there is some unique maximally salient female individual[32]. This is another admittance condition of sorts, but apparently one with a somewhat more complicated projection behavior. When the *she* appears in an elementary sentence like (43), that sentence appears to require a context which supplies some unique maximally salient female. But the same cannot be said of certain more complex sentences containing *she*, for instance (44).

(44)   I shared the room with a police officer, and she paid the rent.

A context that is appropriate for (44) as a whole need not provide a maximally salient female. Much less does a context that is to fit the requirements of (45).

(45)   Whenever I shared the room with a police officer, she paid the rent.

Of course, one could simply assume that the *she* in (44) and (45) is not the same as that in (43): (43) contains the indexical *she* that is subject to the admittance condition we formulated above, but (44) and (45) contain anaphoric *she*, a homophone with a quite different semantics and not subject to that condition in the first place. On this view, of

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[31]See Kratzer 1978 for detailed discussion of this rule.

[32]Again, we will not go into the question here what exactly the context must be like to fit this requirement. It might be a matter of comparative salience rankings of individuals in the context and/or of the utterer's intentions.

course, (44) and (45) have no bearing on the question how the admittance condition on indexical *she* projects, and we may maintain, as in the case of *I*, that any sentence containing indexical *she* requires a context that furnishes a unique female. But there is no obvious good reason for such a move, especially not since the purported ambiguity of *she* seems to carry over to a lot of other indexical locutions.

So let us take things at face value and acknowledge that (44) and (45) pose a non-trivial projection problem for an admittance condition. How, then, would we go about solving it? If we want to use one of the available approaches that I discussed in the first part of this manuscript, we will have to identify the admittance condition for *she* with a certain proposition. This should be some proposition that the common ground of a context entails if and only if that context furnishes a maximally salient female. One can presumably find such a proposition; say the proposition that some female individual is maximally salient. (Here I presume, as seems reasonable, that whenever the requirement imposed by *she* is met by a context, it will be in the common ground that it is.) Suppose we call this proposition the "presupposition" or "conventional implicature" of sentence (43) (and other simple *she*-sentences like it) and try to predict when and how it is projected up to more complex sentences containing (43). What would e.g. the PHF theory or the cancellation-based theories reviewed above lead us to say about (44)?

Does the PHF account of conjunction predict that the "presupposition" we just assigned to (43) doesn't survive as a presupposition of (44) as a whole? I think not. For it to do so, one would have to assume that the content of the first conjunct, *I shared the room with a police officer,* entails that some female is maximally salient. But that doesn't seem right: this proposition entails nothing having to do with salience. -- To make a cancellationist account work for (44), one would need to assume that the utterance of this first conjunct somehow carries a conversational implicature to the effect that the speaker doesn't want to prejudge the question whether there is or isn't a maximally salient female. This doesn't seem quite right either.

We could pursue this further, but the reader may well be wondering what for. Why force the treatment of pronominal anaphora into the Procrustean bed of theories of presupposition projection when everybody else has been thinking about it quite successfully in much more straightforward terms? When I utter the first conjunct of (44), so the familiar story[33] goes, and you believe what I say, you will also conclude that there is probably some one police officer who is causally responsible for the truth of what I said and for my confidence in it. This police officer thereby becomes salient in the context of our conversation. Therefore, the context within which the second conjunct is uttered does fit at least part of the requirement associated with *she*: it makes a maximally salient human available. That this human is moreover female is presumably an assumption that is easily added by way of accommodation, and so the admittance condition for the second conjunct is

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[33]This story is basically that of Lewis 1979; but see also Kripke, Stalnaker, Kratzer, and many others for very similar accounts.

met and all is well. From the point of view of this story, the question of how the admittance condition concerning *she* should be "blocked" from "projecting up" to sentence (44) doesn't even arise. Another question is asked instead: What in the utterance of (44) garantees that this admittance condition is met? And the answer to this question consists of an account of how the first part of the utterance causes the context to change in such a way as to make it hospitable for the second. The issue is not seen as one of making the admittance condition disappear, but rather as one of showing how it is fulfilled.

It may not be too surprising that we have found current theories of presupposition projection to be unsuited to account for the phenomenon of anaphoric uses for indexicals. After all, this is not the way that anyone has ever approached that phenomenon. However, the point we just made about *she* carries over to a number of presupposition-inducing items that certainly a lot of people have thought to come within the sphere of competence of such theories. I have in mind in particular the item *too,* as well as *again, still,* perhaps *stop,* and maybe others. Recall that when we first weighed the relative merits of the 'admittance conditions' vs. the 'conventional implicatures' view of presuppositions we considered in I.2. above, we took a closer look at a simple sentence with *too* and saw that its 'presupposition' couldn't really be identified with any one proposition that a context had to entail in order to admit it. The admittance condition for *Bill was at the party too* did not seem to be that the context entail that somebody besides Bill was at the party; but rather that it provide some salient individual (or group) x and entail about this x that x ≠ Bill and x was at the party.

Now notice that this is reminiscent of precisely the kind of obstacle that we ran into above when we tried to force the 'projection' behavior of admittance conditions for indexicals into the mold of the conventional approach to presupposition projection: The admittance condition of *she paid the rent* also doesn't naturally correspond to some proposition that the context needs to entail. More importantly here, even if we did cook up some proposition to represent the presupposition associated with this indexical, that proposition didn't seem to get 'filtered' and /or 'cancelled' correctly as we looked at indexicals embedded in complex sentences. Now my point here is that if it didn't work for *she*, it won't work for*too* either (nor for *again, still,* or *stop,* if Kripke is right). Consider (46).

(46)   John was at the party, and Bill was at the party too.

As we just said, the admittance condition for *Bill was at the party too* is that the context must provide some salient individual (or group) x and entail about this x that x ≠ Bill and x was at the party. Here is a proposition that a context will entail if and only if it meets this requirement: the proposition that there is some salient individual which is presupposed to be different from Bill and to have been at the party. Now the content of *John was at the party* doesn't entail that proposition; nor does uttering that sentence conversationally implicate that the speaker disbelieves or wishes to remain agnostic about it. Therefore, this putative presupposition is neither predicted to get filtered nor to get cancelled in (46), and its failure to surface as a presupposition of the whole therefore remains unaccounted for.

The analogy between *she* and *too* suggests that (46) might be more fruitfully analyzed along the lines of the standard story that we told above for (44). (This is presumably what Kripke is driving at in the following suggestion attributed to him by Soames[34] "... the content of the presupposition of a sentence or clause containing 'too' ... may vary with, and be dependent upon, the preceding discourse or conversational context. The idea is that this presupposition creating element may, in some way, be anaphoric to other elements in the discourse or context.")   And indeed, such a story makes good sense: When I utter the first conjunct of (46), and you believe what I say, not only will the information that John was at the party thereby become part of the common ground, but also John will have become salient through my reference to him. Presumably, it is also taken for granted that John is not Bill. (Normally, the use of proper names presupposes that the interlocutors have some acquaintance with their bearers; if not, this distinctness assumption is easily accommodated.) The context as it is after the assertion of the first conjunct therefore meets exactly the requirement that we are taking to be imposed by the *too* in the sequel. Once again, all is well, and we see clearly why the initial context for (46) didn't already need to fit this requirement; in other words, why (46) as a whole seems to presuppose nothing.

To sum up this section, we have seen that there are at least some kinds of admittance conditions, including some associated with items traditionally discussed under the heading of 'presupposition', whose 'projection' behavior seems to defy an account within standard approaches to the projection problem for presuppositions. A more natural way of thinking about the behavior of these items and their admittance conditions invokes context change and the systematic contribution that previous parts of an utterance make towards shaping a context that will admit subsequent parts. Now if all presuppositions can be construed as admittance conditions, then this kind of thinking perhaps could and should be extended to all instances of the so-called projection problem for presuppositions. In other words, it might be feasible and fruitful quite generally to adopt a different perspective on that problem: Instead of trying to devise an algorithm that will determine admittance conditions for complex sentences on the basis of those for their part, one might try to spell out how each component of a complex utterance contributes towards changing the context in such a way that each elementary sentence will be admitted at the point where it is evaluated. This is precisely what Stalnaker and Karttunen urged more than a decade ago in work that we will now examine.

2. Stalnaker and Karttunen on context change and presupposition projection

I let them speak for themselves, starting with Stalnaker.

"..., on the projection or compositional problem. This is the problem of how the presuppositions required by a complex sentence relate to the presuppositions required by its component clauses. If presupposition is regarded as a semantic relation, then this problem, say for sentences of the form "<u>A</u> and <u>B</u>," will be a problem of determining the

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[34]Soames paraphrasing Kripke, n.54, 1989.

truth value of a sentence of that form when one or another of the conjuncts lacks a truth value. Examples discussed by Morgan and Karttunen show that the proper account of the matter would be complicated, and would have some surprising consequences-- for example that conjunction is not in general symmetric; the inference from "$\underline{A}$ and $\underline{B}$" to "$\underline{B}$ and $\underline{A}$" does not always preserve truth.   On the other hand, if we regard presupposition from the perspective I am suggesting, the problem looks quite different; it concerns the way that pragmatic presuppositions, or background assumptions, change in the course of a conversation.   Here is one obvious principle about how pragmatic presuppositions change: after some proposition has been asserted, the the speaker may reasonably presuppose it in subsequent conversation until it is denied, challenged, retracted or forgotten. If one asserts a proposition using a conjunctive sentence, then according to this simple and obvious principle, the presuppositions will change in the middle of the assertion. The first conjunct will be added to the initial presuppositions before the second conjunct is asserted.

Now the following generalization about the presuppositions required by conjunctive sentences follows from, and is explained by, the simple pragmatic principle given above: a conjunctive assertion requires all the presuppositions required be the first conjunct, and also all the presuppositions required by the second conjunct except those (if any) entailed by the first conjunct*. Thus "John has children and all of his children are asleep" does not require the presupposition that John has children, even though the second conjunct does require this presupposition. This is exactly the generalization proposed by Karttunen on the basis of examples.   The pragmatic account of presupposition gives a natural intuitive explanation for a rule which, on the semantic account, looks ad hoc. More important than this, the pragmatic account separates the semantic question of the truth value of a conjunction from the pragmatic question of the presuppositions it requires. Because we have made this separation, we can reconcile the semantical symmetry of the conjunction operation with the asymmetry of conjunctive assertions with respect to the presuppositions they require. "A and B" says exactly the same thing as "B and A," but the first way of saying it may require different presuppositions than the second.   The analogous problem for disjunctive and conditional statements is not quite so straightforward, but I expect that a reasonably natural explanation for the facts can be given using plausible assumptions about the way background assumptions change in the course of a conversation.

[Note*:] This is an oversimplification. Any presupposition required by the second conjunct, but entailed by the first conjunct conjoined with any other initial presupposition is not required by the sentence as a whole. But this qualification is included in Karttunen's account, as well as explained by the pragmatic account."

(Notice that when Stalnaker speaks of a sentence S "requiring the presupposition" p, he means, in our terminology, that S is admitted only by contexts whose common ground entails p.)

And here is Karttunen. (In interpreting this quote within the present discussion, read "proposition" wherever Karttunen writes "logical form". A "context" for Karttunen is basically a set of propositions, i.e. the set of all those that are common ground. In other words, this notion is comparable to ours.)

"(1)   Surface sentence A pragmatically presupposes a logical form L, if and only if it is the case that A can be felicitously uttered only in contexts which entail L.

[...], what can we say about presuppositions of complex sentences formed form A and B by means of embedding and sentential connectives? This is the notorious

"projection problem" for presuppositions (...). For instance, what are the presuppositions of "If A then B"?

Intuitively it would seem that sentential connectives such as *if...then* do not introduce any new presuppositions. Therefore, the set [of logical forms presupposed by "If A then B"] should be either identical to or at least some proper subset of the combined presuppositions of A and B. [...] However, I found that when one pursues this line of inquiry further, things become very complicated. Consider the examples in (3).

(3) (a) If Dean told the truth, Nixon is guilty too.

(b) If Haldeman is guilty, Nixon is guilty too.

(c) If Miss Woods destroyed the missing tapes, Nixon is guilty too.

In all of these cases, let us assume that the consequent clause "Nixon is guilty too" is interpreted in the sense in which it presupposes the guilt of someone else. The question is: does the compound sentence as a whole carry that presupposition? In the case of (3a), the answer seems to be definitely *yes*, in the case of (3b) definitely *no*, and in the case of (3c) a *maybe*, depending on the context in which the sentence is used. For example, if the destruction of the tapes is considered a crime, then Miss Woods would be guilty in case she did it, and (3c) would be a conditional assertion that Nixon was an accomplice. In this context the sentence does not presupposes that anyone is guilty. But in contexts where the destruction of the tapes in itself would not constitute a crime (3c) apparently does presuppose the guilt of someone other than Nixon.

These examples show that if we try to determine the presuppositions of "If A then B" as a particular subset of the joint presuppositions of A and B, the initial simplicity of that idea turns out to be very deceptive. In reality it is a very complicated enterprise. The kind of recursive principle that seems to be required is given in [(4b)].

(4) [...] $X \cup \{A\}$ is the result of adding the logical form of A to X.

(b) The presuppositions of "If A then B" (with respect to context X) consist of

(i) all of the presuppositions of A (with respect to X) and

(ii) all of the presuppositions of B (with respect to $X \cup \{A\}$) except for those entailed by the set $X \cup \{A\}$ and not entailed by X alone.

[...]

So much for the background. What I want to show now is that there is another way to think about these matters, and about presuppositions of complex sentences in particular. Let us go back for a moment to the attempted pragmatic definition in (1). The point of that definition is that the presuppositions of a sentence determine in what contexts the sentence could be felicitously used. A projection method, such as [(4b)], associates a complex sentence with a class of contexts by compiling a set of logical forms that must be entailed in any context where it is proper to use the sentence. Thus we say that the sentence "If A then B" can be felicitously uttered in context X only if X entails all of the logical forms in the [set defined in (4b)].

There is another, much simpler, way to associate complex sentences with proper contexts of use. Instead of characterizing these contexts by compiling the presuppositions of the sentence, ask what a context would have to be like in order to satisfy those presuppositions. Of course, it is exactly the same problem but, by turning it upside down, we get a surprisingly simple answer. The reason is that we can answer

the latter question directly, without having to compute what the presuppositions actually are.

The way to go about this is the following. We start by defining, not presupposition, but a notion of *satisfaction of presuppositions*. [...] For all cases where A is a simple, non-compound, sentence, satisfaction is defined as in (5).

(5)   Context X *satisfies-the-presuppostions-of* A just in case X entails all of the basic presuppositions of A [...].

[...]

For compound sentences we define satisfaction recursively by associating each part of the sentence with a different context. [...] For conditionals, satisfaction is defined in (7).

(7)   Context X satisfies-the-presuppositions-of "If A then B" just in case (i) X satisfies-the-presuppositions-of A, and (ii) X∪{A} satisfies-the-presuppositions-of B.

[...] For conjunctions, that is, sentences of the form "A and B", satisfaction is defined just as in (7). For disjunctions, sentences of the form "A or B", we have "~A" instead of "A" in part (ii).

[...], the class of contexts that satisfy-the-presuppositions-of "If A the B" by principle (7) is the same class of contexts that entail all of the presuppositions assigned to this sentence by [(4b)].

[...] we could look at satisfaction of presuppositions in an even more general way. [...] by our definition a given initial context satisfies-the-presuppositions-of a complex sentence just in case the presuppositions of each of the constituent sentences are satisfied by a certain specific extension of that initial context. [...] In compound sentences, the initial context is incremented in a left-to-right fashion giving for each constituent sentence a *local context* that must satisfy its presuppositions. We could easlily define a notion of local context separately and give the following general definition of satisfaction for all compound sentences.

(17)   Context X satisfies-the-presuppositions-of S just in case the presuppositions of each of the constituent sentences in S are satisfied by the corresponding local context.

[...] Note that in this new framework [...] the distinction between cases like (3a) and (3b) is of no particular importance. What is required in both cases is that the presupposition of the consequent clause contributed by the word *too* be entailed by the current conversational context as increment with the logical form of the antecedent. In the case of (3b), we recognize that this condition is met, no matter what the initial context is like, by virtue of the particular antecedent. In (3a) it appers that the antecedent does not contribute anything towards satisfying the presuppositions of the consequent, at least, noy in contexts that immediately come to mind. Hence we can be sure that the presuppositions of the consequent are satisfied in the incremented context just in case they are already saitsfied initially. It seems to me now that this is a much better way of putting it than to talk about presupposition being "shared" by the compound in (3a) and being "cancelled" or "filtered away" in (3b) [...]. Such locutions can be thrown out with the projection method that gave rise to them.

[...] The best solution to the projection problem is to do away with it. The moral of this paper is: do not ask what the presupposition[s] of a complex sentence are, ask what it takes to satisfy them."

There are several points to attend to in these quotes: First, both authors explicitly endorse a conception of presuppositions as admittance conditions and take pains to stress that their approach to the projection problem crucially exploits this.

Second, both contrast the technical and intuitive simplicity of their proposals with what they perceive to be relatively complicated and unrevealing alternative accounts in the contemporary literature of the early seventies. Of course, what they say there does not as it stands apply to more recent treatments of the projection problem (such as those reviewed briefly in the last section and a number of others). In particular, Karttunen's suggestion that projection rule systems of the conventional kind (i.e. those that calculate a proposition for each complex sentence) are necessarily technically complex and cumbersome does not really hold up against more recent versions, e.g. those of Karttunen & Peters (1979), Gazdar (1979), and Soames (1982). Likewise, Stalnaker's complaint that the alternative to the approach he favors forces one to adanbon classical logic (e.g. give up symmetry for *and*) does not apply to any of the above-mentioned. (Actually, I think that this kind of objection is of questionable validity in the first place.) So if we want to adopt the "context change" approach on more solid grounds than its intuitive appeal, we must provide our own arguments to establish that it still compares favorably with its competitors. Some initial reasons for being less than satisfied with what is on the market were already mentioned in the last section, but we have yet to see whether the perspective urged by Stalnaker and Karttunen will get us any further with the problems that we have seen there. So far, only the consideration involving *too* and similar items that we offered in section III.1. can stand as an argument in favor of their proposals.

There is another argument that at least Stalnaker seems to be making: While conventional approaches to the projection problem require that one stipulate the projection behavior of each connective, his approach permits one to derive the pertinent empirical predictions from mere commonplace assumptions about the dynamics of conversation. With *and* meaning what it does, it seems plain that somebody asserting *A and B* thereby asserts *A* and asserts *B*. And given the linear sequence of the conjuncts in the sentence and the fact that utterances are performed and processed in time, it seems equally plain that he asserts *A* first and *B* thereafter. These are all the assumptions that are required to predict the projection facts for *and*-conjunctions; they imply that the context that is to fit the presuppositional requirements of *B* is that which results from the assertion of *A*. Notice that if this reasoning is correct and generalizes beyond the special case of *and*, it provides a strong justification to prefer the approach under consideration here over any competitor that appeals to rules and principles specifically concerned with presupposition projection. This point is worth scrutinizing in some detail, and I devote the next section to that.

3. What explains context change rules?

_____ From both of the quotes above, it emerges clearly that the solution of the projection problem stands and falls with the completion of one task: to characterize somehow, directly or indirectly, how the context is changed by the utterances of complex sentences of all kinds, what each component of the utterance contributes to this change, and which stage in

the step-by-step evolution of the context is the relevant one for the admittance of each elementary constituent. The feasiblity and explanatory appeal of Stalnaker's and Karttunen's program therefore depends crucially on whether this task can be accomplished elegantly and with a minimum of stipulation.

Stalnaker's discussion of *and* creates the impression that it is a pretty trivial task, but as he himself acknowledges, things are less plain for other connectives, not to speak of sentence embedding verbs and other devices for compounding sentences. It is instructive in this regard to take a close look at Karttunen's paper, which covers a much wider range of constructions. When Karttunen first presents his proposal, he certainly doesn't make it sound like the assumptions from which he derives the projection behavior of each connective are in any sense obvious. For example, his (7), which serves to predict presupposition projection in conditionals, is explicitly acknowledged to be a stipulation (in fact, part of a recursive definition of the relation 'X satisfies-the presuppositions-of S' for all S of the language). The remarks on *and* and *or* right below it also indicate that statements like (7) are a matter of item-by-item stipulation. A little later, he suggests that some simplification could be achieved by breaking these stipulations down into a general principle, viz. (17), and a part that defines what counts as 'local context' for each constituent of the construction in question. E.g. (7) could be reduced to something like (47), given (17).

(47)   If the local context for "If A then B" is X, then the local context for A is X and the local context for B is X∪{A}.

Still, this appears to be a stipulation specifically about the connective *if...then*, and each of the other connectives needs its own equally idiosyncratic clause of this kind. For instance, based on the observation that the presuppositions of the right hand clauses seem to get 'filtered away' in (50a) and (51b), but not in (50b) and (51a), Karttunen assumes (48) for *and* and (49) for *or*.

(48)   If the local context for "A and B" is X, then the local context for A is X and the local context for B is X∪{A}.

(49)   If the local context for "A or B" is X, then the local context for A is X and the local context for B is X∪{~A}.

(50)   (a)   John came, and Bill came too.

        (b)   John didn't come, and Bill came too.

(51)   (a)   Either John came, or Bill came too.

        (b)   Either John didn't come, or Bill came too.

At this point, Karttunen's program looks somewhat disappointing: If there is no independent rationale for why we should assume (47) instead of, say, (52) or (53),

(52)   If the local context for "If A then B" is X, then the local context for A is X and the local context for B is X.

(53)   If the local context for "If A then B" is X, then the local context for A is
        X∪{B} and the local context for B is X.

then in what sense have we (borrowing Stalnaker's words) "give[n] a natural intuitive
explanation" for what would otherwise have been attributed to an ad hoc projection rule?
The point here is of course that (52) and (53), while being no more complicated or
obviously unnatural than (47), would predict totally different presupposition projection facts
for conditionals. In fact, one might suspect (as Gazdar charged in his book, and as it
appears that even Karttunen was later persuaded to concede) that these definition clauses for
what counts as local context are just another way of replicating the stipulated heritage values
in the Plugs, Holes, and Filters theory reviewed above; in other words, that every heritage
value one might concoct corresponds to some empirically equivalent way of defining 'local
context'.

        If we wanted to deduce at least some aspects of rules like (47), (48), and (49) from
deeper principles or independent evidence, in what direction should we look? Two
possibilities come to mind: explore to what extent these rules are predictable form the <u>linear
order</u> of the constituent clauses, and to what extent they might follow from facts about each
connective's <u>truthconditional meaning</u>. Notice that Stalnaker exploits both of these in his
story about *and*. He appeals to the meaning of *and* to deduce that asserting "A and B"
involves aserting A and asserting B, and he holds linear order responsible for the fact that
the content of A is added to the common ground <u>before</u> that of B, rather than, say, the other
way round or simultaneously. Unfortunately, as one takes a closer look at presupposition
projection in disjunction and conditionals, neither linear order nor truthconditional meaning
seem to impose very narrow constraints on how context change seems to proceed.

        As for linear order, Karttunen makes a remark in passing (just above his (17)) that
points to the possibility of grounding at least some aspects of his definition of 'local context'
in the independently observable left-to-right order of constituent clauses within a compound
sentence. We might read into this a potential explanation for why rules like (52) and (53)
above should not be attested: Following (53), the consequent would be added to the initial
context first, before the antecedent is considered; this is the opposite of the linear order in
which antecedent and consequent appear in the sentence. (52), too, can be seen of violating
linear order in a way: this rule in effect tells us to increment to initial context with both
clauses simultaneously. Perhaps we can formulate a principle here that will tell us how
linear order constrains the available choices for the definition of 'local context'?

        But if one takes a closer look, the exact relevance of linear order becomes rather
doubtful. For one thing, if-clauses do not always appear at the beginning of the sentence:

(54)   Nixon is guilty too, if Haldeman is guilty.

This sentence appears to have the same presuppositions as Karttunen's (3b), namely none,
suggesting that linear order is not the crucial factor here. One might speculate that perhaps
subordination relations play a role, and linear order matters only where two clauses are
hierachically on a par. But things get even messier as we look at more examples. Karttunen

himself says in a footnote: "It is possible that the principle for disjunctions, and perhaps that for conjunctions as well, should be sym[m]etric." He cites the sentence (55),

(55)   Either all of Jack's letters have been held up, or he has not written any.

noting that this seems to argue for a treatment of *or* that determines local contexts as follows:

(56)   If the local context for "A or B" is X, then the local context for A is
        X∪{~B} and the local context for B is X∪{~A}.

But if we can have (56), there is no principled reason why we shouldn't have (52).

Another feature of Karttunen's rules for determining local contexts that one feels should follow from something else, rather than be stipulated, is this: When we compare the rules for the various two-place connectives, we see 'X∪{A}' (or 'X∪{B}') show up in some, but 'X∪{~A}' (or 'X∪{~B}') in others. For example, (48) and (49), the rules that Karttunen initially suggests for *and* and *or* (before taking into account complications such as example (55)) differ minimally in this respect. Could it just as well be the other way round? Here one has a gut feeling that the truth-functional meanings of *and* and *or* have something essential to do with this difference, but what exactly is the connection?

As far as *and* is concerned, the meaning of this connective suffices to ensure that, one way or another, asserting "A and B" has the effect of adding both A and B to the initial context. There also seems to be no reason why either ~A or ~B should get added. In fact, they would just get in the way and make the resulting context contradictory. So at best we could add these negations just to remove them again right away. One might say it is not surprising that that isn't how it works. -- But why on earth does one add ~A in the course of the context change induced by "A or B"? It is surely not the case that asserting "A or B" involves asserting ~A; "A or B" doesn't entail ~A (nor, of course, does it entail A, B, or ~B). No reasoning of the sort that Stalnaker applied to the case of "A and B" will give us any rationale for why there should be an intermediate step at which ~A has been added. (The same point applies to other connectives, in particular *if...then*. Someone who asserts "If A then B" doesn't assert any of A, ~A, B, or ~B, so we have no obvious explanation why there should be a stage at which A has been added to the initial context.)

In my 1983 paper, I was less cautious than Karttunen or even Stalnaker and claimed that if one only spelled out the precise connection between truthconditional meaning and rules of context change, one would be able to use evidence about truthconditions to determine the rules of context change, and in this way motivate those rules independently of the presupposition projection data that they are supposed to account for. I was rightly taken to task for this by Soames (1989) and Mats Rooth (pers. comm. 3/27/1987). I quote from Rooth's letter:

"You say that [...] the recursive rules for context change potentials -- e.g. the definition of the CCP for [If A, B] in terms of the CCPs of A and B -- do the work of Karttunen and Peters's heritage and content properties, while being motivated purely by getting content right (...). The CCP rule for "if" (where + is CCP application, & is boolean conjunction, and - is boolean negation) is:

C + (If A, B) = C & -(C+A & -((C+A) + B))

It seems to me that there are lots of other semantic rules which get the truth conditions right, for instance

C & -(C+A & -(C+B)), or

C & -(C+A & -(W+B)),

where W is the set of worlds, i.e. the context with no information. To verify this, one has to know what it is for two CCPs to be truth-conditionally equivalent. I think an appropriate criterion for rules which introduce no new presuppositions is:

Two two-place CCP rules R1 and R2 are truth-conditionally equivalent iff for all contexts C, CCPs A and B such that R1(A,B)(C) and R2(A,B)(C) are defined, and worlds w, w is an element of R1(A,B)(C) iff w is an element of R2(A,B)(C).

[...] Using the fact that the CCPs we are talking about are conjunctive (for any CCP A, there is some proposition A' such that for all C such that the left hand side is defined, C+A = C&A') and some boolean equivalences, one can demonstrate the truth conditional equivalence of the rules above. Yet the three rules plainly encode different heritage properties -- the second one is a pure "hole". I think the criticism generalizes beyond the artificial material implication case."

Soames argues similarly.