Triggering from Alternative Sets and Projection of Pragmatic Presuppositions

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Abstract

This paper takes up the problem from Stalnaker (1974) of deriving the pragmatic presuppositions of verbs such as *know*, *stop* and *win* as conversational implicatures, without hypothesizing a semantic presupposition. I interpret data discussed by Karttunen (1969), Chierchia and McConnell-Ginet (1990), Simons (2001) and others as indicating that there is a distinct group of "soft" presupposition triggers whose pragmatic presuppositions, though systematic, are also context-dependent and easily suspendable. These are distinguished from "hard" presuppositions triggers like *it*-clefts and *too* which on the assumptions of this paper introduce semantic presuppositions. These distinctions are defended in sections 1 and 2. Sections 3 and 4 review and criticize proposals from Stalnaker (1974) and Simons (2001) for deriving the pragmatic presuppositions of soft triggers as conversational implicatures. Section 5 introduces the hypothesis that the pragmatic presuppositions of soft triggers come from alternatives to lexical meanings, such as the alternative *lose* to *win*. A pragmatic presupposition is derived as the default assumption that some alternative is true. In section 6, the default existential presupposition of intonational focus is attributed to the same process. Section 7 proposes a systematic pragmatic derivation of a conversational implicature, using a specific default axiom called G, and a general pragmatic process of enrichment reasoning. Sections 8, 9, and 10 address the projection problem for the pragmatic presuppositions of soft triggers. It is shown that projection data for these triggers is the same as what is seen for hard triggers, which would seem to favor an analysis using semantic presuppositions. The puzzle is resolved by replacing G with a default generalization L which refers to the local information states manipulated by compositional semantics in dynamic compositional theories. Section 9 also considers general issues of the interface between pragmatics and compositional semantics. Section 11 shows that the derivation using L also deals with projection data for focus.

1. Introduction

This paper is about the presuppositions of verbs like *know* and *stop*. Example (1) has a factive implication that the cat is on the mat, and a belief implication that John believes that the cat is on the mat. *Implication* is used as neutral cover term for presuppositions, logical entailments, and conversational implicatures.

(1)   John knows that the cat is on the mat.

(2) gives two possibilities for the lexical entry of *know*. In (2a), the two implications are written in as entailments by making them conjuncts. In (2b) I use the partial operator ∂ from Beaver (1995) as a presupposition operator on the factive implication. This makes the factive implication p a semantic presupposition.[1]

(2)   a. $p \wedge x$ believe p

          b. $\partial p \wedge x$ believe p

I assume that *semantic presuppositions* are encoded in the semantic values of sentences, using truth value gaps or definedness of a file change potentials.[2] A *pragmatic presupposition* of an utterance is a proposition p such that in making the utterance, the speaker communicates that he takes p to follow from the current common ground of shared information (Stalnaker 1974). Typically, if a sentence S has a semantic presupposition p, and a speaker asserts S, then the speaker pragmatically presupposes p.

Stalnaker (1974) introduced the project of using the lexical representation (2a) without a semantic presupposition, and deriving the pragmatically presupposed status of the factive implication by conversational reasoning. I think this project is attractive for what I call *soft triggers*, which are presupposition triggers where the presuppositional behavior is weak and easily suspendable. Karttunen (1969) mentioned that it is easy to suspend the factive implication of *discover*. In typical utterances, (3a) does not pragmatically presuppose that the

speaker has not told the truth. The same holds for (3b) and (3c). (The examples are from Karttunen (1969).)

(3)   a. Did you discover that you had not told the truth?

     b. If I discover later that I have not told the truth, I will confess it to everyone.

     c. It is possible that I will discover later that I have not told the truth.

Stalnaker pointed out that the pragmatic presupposition of *discover* correlates with contextual factors and indexicality. I will illustrate this with examples from Chierchia and McConnell-Ginet (1990). (4a) tends to presuppose that Loren is now in New York. But if we switch to the first person as in (4b), the presupposition drops out. Stalnaker takes this as evidence for a pragmatic derivation of the presupposition. And in fact, I find the presupposition even in (4a) weak or optional.

(4)   a. If Pavarotti discovers that Loren is now in New York, he will be angry.

     b. If I discover that Loren is now in New York, I'll be angry. (Pavarotti is speaker.)

Now I will review a variety of lexical items which I consider soft triggers, mainly following the presentation of data in Simons (2001). These soft triggers typically generate pragmatic presuppositions, but they are pragmatic presuppositions which are relatively easy to suspend.

Aspectual verbs like *stop* and *continue* pragmatically presuppose the truth or falsity of their complements at a time immediately preceding their eventuality time. The presupposition of (5a) is that right before January 1, John smoked. The angle sign marks the pragmatic presupposition. (5b) shows that the presupposition survives negation, and (5c) shows that it survives conditionalization. (5d) is an example where the presupposition is suspended. Suppose you receive in the mail a brochure addressed to resident which says (5d).

Intuitively, there is no implication that the authors of the brochure take it as common ground that you ever smoked. This connects with the fact that the authors of the brochure have very little information about you. (Example (5d) is modified from Kadmon (2001).)

(5)   a.   John stopped smoking on January 1.

           > Right before January 1, John smoked.

    b. John didn't stop smoking.

    c. If John stops smoking, Mary will buy him a camera.

    d. In a brochure addressed to resident:

       If you stopped smoking in 2001, you are eligible for a payment from the Tobacco Indemnity Fund.

I already discussed factives. (6a) and (6b) intuitively presuppose that Mary is having an affair, and in (6c) the presupposition is suspended.

(6)   a. John knows that Mary is having an affair.

    b. John doesn't know that Mary is having an affair.

    c. John suspects Mary is having an affair. He doesn't know she is.

Another group of soft triggers are achievement verbs like *win* which imply a preparatory activity. (7a) seems to presuppose that Alberto participated in the race; this is supported by (7b), where the presupposition survives negation. This presupposition goes away in (7c): we can use it immediately after Alberto has won the 2002 race, without assuming that he is going to participate in the 2003 race.

(7)   a. Alberto won the race.

    (1) Alberto didn't win the race.

      > Alberto participated in the race.

    c. If Alberto wins the 2003 Falmouth Roadrace, he will have more Falmouth Roadrace victories than anyone else in history.

Notice that in this case, the context does not rule out Alberto's participating in the 2003 race, it just suggests that the speaker may be ignorant about the matter.

2. Differences in suspendability

In this section, I will look at the differences in suspendability between soft and hard triggers. (8) is another example of the suspension of the presupposition of *stop*. Intuitively, (8) does not presuppose that John used to smoke. (9) is a similar example with *continue*. Intuitively, it does not presuppose that John will miss the first meeting. However without the disjunction, *John will continue missing meetings* presupposes that he missed meetings before.

(8)   John either stopped smoking, or started smoking.

(9)   After the first meeting, John will either continue missing meetings, or continue attending them.

(10) shows how (9) can be analyzed using local accommodation (Heim 1982, 1983). The idea is to fill in the presupposition in each of the conjuncts, so that in each conjunct the presupposition of *continue* is locally satisfied. With this representation the global context does not have to satisfy the presuppositions. This fact follows from the general theory of presupposition projection proposed by Heim, assuming the representation with local accommodation. In this analysis, this is the reason we intuit that the presuppositions in (9) do not project.

(10)   John will either *(have missed the first meeting and)* continue missing meetings, or *(have attended the first meeting and)* continue attending them.

I would like to question this analysis by replacing the soft trigger *continue* with the hard trigger *too* in (11). The example is quite bad. In this scenario, if we pay attention only to the first two meetings, *John will continue missing meetings* and *John will miss the second meeting too* are equivalent in their assertions (that he does not attend the second meeting) and their presuppositions (that he did not

attend the first meeting). In the same way, *John will continue attending meetings* is equivalent in its assertions and presuppositions to *John will miss the second meeting too*.

(11)   # After the first meeting, John will either miss the second meeting too, or attend the second meeting too.

Let us repair (11) by local accommodation, exactly like we did in (10). (12) is the locally accommodated version of (11), and here the presupposition of *too* is locally satisfied in each conjunct.

(12)   After the first meeting, John will either *(have missed the first meeting and)* miss the second meeting too, or *(have attended the first meeting and)* attend the second meeting too.

The problem now is that if both *continue* and *too* have semantic presuppositions, why is there such a difference in the possibility for local accommodation? Why should it be so much easier to locally accommodate the semantic presupposition of *continue*?

I assume that hard triggers do introduce a semantic presupposition. Since local accommodation is not possible with the hard trigger *too* in (11), we should not analyze the soft trigger *continue* with a semantic presupposition and use local accommodation to deal with (9).

In (13), I try to improve (11) by adding context which supplies more overt antecedents for the propositions presupposed by the two occurrences of *too*. The example (13a) is still bad.

(13)   John will either attend the first meeting, or miss it.
         a. #? And he will either attend the second meeting too, or miss the second meeting too.
         b. And he will either continue attending meetings, or continue missing them.

In addition to *too*, I regard *also, even, again*, negative polarity *either*, and the *it*-cleft as hard triggers.[3] My hypothesis is that hard triggers encode semantic presuppositions in their semantic values, and that the pragmatic presuppositions triggered by soft triggers are easily suspendable and dependent on linguistic and extra-linguistic context because they do not come from semantic presuppositions. Soft triggers *could* be analyzed using semantic presupposition and local accommodation, but that isn't the right analysis, because we need to distinguish hard triggers from soft triggers.[4]

Stalnaker (1974) advocates this hypothesis, or suggests investigating it, except that he leaves it open whether there are semantic presupposition triggers. Chierchia and McConnell-Ginet (1990) and Simons (2001) advocate the hypothesis, and they think there are semantic presupposition triggers.[5] To develop the hypothesis theoretically, one needs to find analysis of the triggering behavior of soft triggers which does not rely on semantic presuppositions. In the next two sections, I will review proposals for this made by Stalnaker and by Simons.

3. Stalnaker's analysis of *know*

Stalnaker (1974) gives an outline of an analysis of *know* which I will partially paraphrase, and partially quote. We assume that both the factive implication of *know* and the belief implication are simple entailments. Consequently, *know* has two conceptually different entailments.   Stalnaker basically says that it is confusing for a speaker to use *know* in a context where both of the entailments are at issue. Suppose a speaker used *know* and pragmatically presupposed neither the factive entailment nor the belief entailment. ("Suppose a speaker were to use x knows P in a context where P is in doubt or dispute.") Then he would be "saying in one breath something that could be challenged in two different ways. He would be leaving it unclear whether his main point was to make a claim that P" (i.e. to assert the factive implication), "or to make a claim about the epistemic

situation of x" (i.e. to assert the belief implication). If the speaker did that, he would be violating the presumption of being orderly, not confusing the listener, and not violating the reasonable expectations of the listener.

Both the speaker and hearer can be expected to recognize that it would violate maxims of conversation to use *know* in a context where both entailments are at issue. The hearer can be expected to infer that the speaker assumes the contrary, i.e. that one of the entailments is taken for granted. This gives a pragmatic presupposition that the factive entailment is true, leaving the belief entailment as the speaker's main point.

There are a couple of objections to Stalnaker's suggestion. First, the reasoning does not explain why the factive entailment rather than the belief entailment comes out pragmatically presupposed. For an utterance of (14), the above reasoning leads us to expect *either* a factive pragmatic presupposition that Mary and Bill are having an affair, or a belief pragmatic presupposition that John believes Mary and Bill are having an affair.

(14)   John knows that Mary and Bill are having an affair.

The choice between the two possibilities would presumably be made on the basis of plausibility in context. But clearly, only a factive presupposition is observed.

A second point is that Stalnaker's reasoning should apply to any verb with two conceptually distinct entailments. In (15), *sell* has two distinct entailments. The transfer entailment is that ownership of the bike went from John to Bill. The counter-transfer entailment is that ownership of some money went from Bill to John. By Stalnaker's logic, it would be confusing for the two entailments to both be pragmatically asserted. So, one of them should come out pragmatically presupposed. We either have a transfer presupposition (Bill got the bike) or a counter-transfer presupposition (John got the money). But our intuitions are that the two entailments are asserted, and neither of them is presupposed. This is supported by (16), where the sentence is conditionalized, and neither implication survives.

(15)   John sold his bike to Bill.

(16)   If John sold his bike to Bill, you can't use it now.

     # Transfer presupposition: Ownership of the bike went from John to Bill.

     # Counter-transfer presupposition: Ownership of some money went from Bill to John.

     Finally, there are pairs with reversed assertions and presuppositions. (17) and (18) both have a factive implication (Mary and Bill are having an affair) and a belief implication (John believes they are). For *know*, we want the factive implication to come out presupposed, and for *be right*, we want the belief implication to come out presupposed. It is difficult to see how one can make (17) and (18) come out differently, if both have representations like (19) without a semantic presupposition.

(17)   John is right that Mary and Bill are having an affair.

(18)   John knows that Mary and Bill are having an affair.

(19) $p \wedge x$ believe p

(20)   a. semantically presuppositional *know*: $\partial p \wedge x$ believe p

     b. semantically presuppositional *be right*: $\partial[x$ believe $p] \wedge p$

The consequence of this argument is that *know* and *be right* have to be distinguished somehow in their lexical meanings, in order for their pragmatic presuppositions to come out differently. This can easily be done with semantic presuppositions, as in (20). But conceivably, the difference is the additional implication of *know* which has to do with justification for belief, and which is not present with *be right*. In section 5, I will instead suggest that the distinction between *know* and *be right* is that they have different alternatives: the alternative to *be right* is *be wrong*, and the alternative to *know* is *be unaware*.[6]

4. Simons' analysis

Simons (2001) takes the same perspective on the problem of soft triggers as the one I have presented here, and in particular, wants to try to derive the pragmatic presupposition of soft triggers conversationally. She proposes a derivation using two generalizations or principles, which are stated and illustrated below.

(21) Question raising principle (QR)

  If A says S, and S embeds q, then A raises the question whether q.

(22) Interpretation principle (IP)

  If A raises the question whether q, and q asymmetrically entails p, then A believes p.

The question raising principle is a principle about a speaker implicitly raising questions of discussion. It says that if A uses a sentence S which has a sub-clause q, then A implicitly raises the question whether q. (23) is an illustrative example. The sentence S of QR is (23a), and the embedded clause q is (23b). According to the principle, in using (23a), a speaker A implicitly raises the question (23c). In (23d), this question is given in semantic terms as a set of propositions.

(23) a. John says it is raining.   (=S)

  b. It is raining.   (=q)

  c. Is it raining, or not raining?

  d. {rain, ¬rain}

I think that in this case, question raising has some plausibility. At least often, a speaker of (23a) would intend for (23c) to be a topic of discussion. One can object that in other cases, a speaker might have reason to use a sentence embedding a clause q while not wanting to raise the question whether q. Suppose you are scheduled for an operation. When you arrive for it, it develops that your specialist is just leaving on a trip, and he tells you (24a). In this case your specialist does not want to raise the question (24b); instead the motivation for embedding the information about Dr. Plotkin in a non-restrictive relative clause

seems to be to background it, so that you will accept it uncritically.

(24)   a. The operation will be performed by my colleague Dr. Plotkin, who is a
        very experienced surgeon.

        b. Is Dr. Plotkin a very experienced surgeon?

In (25), principle QR is applied to an example with *know*.

(25)   A: If John knows Mary is having an affair, then he will avoid the dinner.

        S = [if John knows Mary is having an affair, then he will avoid the dinner]
        q = John knows Mary is having an affair
        S embeds q

        _____ .

        A raises the question whether *q*.

S is A's entire statement, and *q* is the embedded clause *John knows Mary is
having an affair*. Since A uses S and S embeds *q*, according to principle QR, A
raises the question whether *q*.

  In Simons' derivation, principle QR chains together with the second axiom,
the Interpretation Principle. It says that if A raises the question whether *q*, and *q*
asymmetrically entails *p*, then A believes *p*. Let us assume this axiom, and see
how it applies to (25). By virtue of the decomposition of *know* I am assuming, q
is of the form $p \wedge p'$, where *p* and *p'* are as defined in (26). $p \wedge p'$ entails *p* by
propositional logic, but because *p'* is logically independent of *p*, *p* does not entail
$p \wedge p'$. That is, *q* asymmetrically entails *p*.

(26) p = Mary is having an affair
        p' = John believes Mary is having an affair

Now we can reason as in (27), chaining together the interpretation principle with
the conclusion of question raising.

(27)   Where q = John knows Mary is having an affair,
        A raises the question whether q   Conclusion of (25)

Where p = Mary is having an affair,

q asymmetrically entails p	Logic related to (26)
A believes p	IP
A believes Mary is having an affair	Definition of p

This illustrates Simons' derivation of the pragmatic presupposition of *know*. The derivation can be criticized in several ways, some of which are pointed out by Simons. First, as in Stalnaker's derivation, there is a problem of not predicting which entailment comes out pragmatically presupposed. In the logic above, p and p' are symmetric, so a parallel proof derives p' as a pragmatic presupposition. This problem was noticed by Simons (p. 443), where she points out that a derivation along the above lines fails to predict which entailment of *stop* comes out pragmatically presupposed.

Second, I am skeptical that the Interpretation Principle has any general validity. Consider a version of the *sell* argument from section 3. In (28), A explicitly raises the question whether John sold his bike to Bill. *John sold his bike to Bill* has, as asymmetric entailments, that ownership of the bike went from John to Bill, and that ownership of some money went from Bill to John. But in this case it is not necessary or even typical that the speaker A either believes that ownership of the bike went from John to Bill, or that ownership of some money went from Bill to John.[7]

(28)   A: Did John sell his bike to Bill?

Simons gives this motivation for IP:

"As a first stab, it seems likely that the relevant relation is (non-mutual) entailment. After all, in all of the cases that we have considered, the proposition that displays the projection behavior is an entailment of the embedded clause. The significance of entailment seem straightforward: if P entails Q, then Q is necessary for the truth of P. So it would make sense to establish the truth of Q before wondering about P."

I do not find this reasoning very convincing. One could just as well say that it makes more sense to try to establish the truth of the more general point P, if one can get away with it. I doubt that the logical relation of entailment could decide with any generality whether P or Q becomes a topic of conversation. It is more a matter whether P or Q fits better into a particular context or particular argument.

Third, I think the derivation using QR and IP is insufficiently tied in with a general theory of pragmatics. It is somewhat unclear how these principles would get invoked in conversational reasoning which would derive a conversational implicature.

Finally, there is the problem that the implication which is derived is in fact not a pragmatic presupposition, but an implicature about the beliefs of the speaker. The conclusion in (27) is that A believes Mary is having an affair, not that this information is entailed by the common ground. So, the derivation does not in fact produce a pragmatic presupposition.

Simons (p. 445) notices this issue, and reacts as follows:

"On the view of presupposition now most standard in the literature, presuppositions are thought to be propositions which must be entailed by the presumed common ground of the discourse participants. However, if at least some presuppositions are derived by the kind of mechanism which gives rise to other conversational inferences (i.e. conversational implicatures), then it is more appropriate to view them as propositions which the addressee can infer the speaker to believe on the basis of what the speaker has said, plus the assumption that the speaker is behaving cooperatively. On this picture, the derivation of the presupposition may require the speaker and addressee to share certain assumptions (e.g. that the speaker is behaving cooperatively), but the presuppositions themselves are neither required nor expected to be entailed by the common ground."

It seems to me that the notion of presupposition being advocated here is exactly the standard notion of conversational implicature. On this terminology, even literal content would be presupposed, because (by virtue of the maxim of quality) a speaker conversationally implicates the he believes the literal content of his utterance. This is an odd conclusion which effectively denies that there is a genuine phenomenon of presupposition, understood in Stalnaker's sense.

On the empirical side, my position is that the implications of soft triggers *are* in fact presupposed in the standard sense. If this is correct, it is a defect in Simons' analysis that it does not derive a presupposition.

5. Lexical Alternatives

I want to take advantage of the fact that the verbs we are talking about have intuitively obvious alternatives. The alternative to *stop* is *continue*, the alternative to *win* is *lose*, and so forth:

(29)

verb	*alternative*	*Q*
stop	continue	*{stop, continue}*
win	lose	*{win, lose}*
be right	be wrong	*{be right, be wrong}*
know	be unaware	*{know, be unaware}*

In the right hand column of the table, I group the verb and its alternative into an alternative set Q. I think of Q as equivalent to the propositional alternative set (usually written C) which is used in alternative semantics of focus (Rooth 1992). (To avoid confusion, I will not use the notation C for alternative sets, because later on, I want to use the notation c for information states.) My hypothesis is that soft triggers contribute an alternative set Q to a discourse representation, but not the semantic presupposition that some alternative is true. Optionally, a speaker can pragmatically presuppose that some alternative in Q is true.

Consider example (30), which I assume refers to a contextual reference time *r*. The assertion is that John stopped smoking at *r*. The corresponding alternative is that John continued smoking at *r*.

(30)   John stopped smoking.

   Q = {John stopped smoking (at r), John continued smoking (at r) }

   Some proposition in *Q* is true:

   John stopped smoking at r $\vee$ *John continued smoking at r*

   $\equiv$ *John smoked right before r*

Both alternatives are simple propositions, and encode no semantic presuppositions. Each alternative entails that John smoked right before the reference time *r*. In general, to pragmatically presuppose that some alternative is true is to pragmatically presuppose the disjunction of the alternatives. The disjunction is in this case equivalent to *John smoked right before r*. So, if the speaker pragmatically presupposes that some alternative is true, he pragmatically presupposes that John smoked right before *r*, which is the observed presupposition for (30).

(31) shows how the derivation works for *know* and *be right*. Both have the same denotation, without a semantic presupposition, but they have different alternatives: the alternative for *x know p* is $p \wedge \neg x$ *believe p* (i.e. *unaware*), while the alternative for *x be right that p* is $\neg p \wedge x$ *believe p* (i.e. *be wrong*). When we take the disjunction of the alternatives, we get *p* for *know*, and *x believe p* for *be right*. These are the pragmatic presuppositions we want.

(31)

	denotation	alternative	disjunction
x know p	$p \wedge x$ believe p	$p \wedge \neg x$ believe p	p
x be right that p	$p \wedge x$ believe p	$\neg p \wedge x$ believe p	x believe p

Semantic approaches to presupposition have been criticized for stipulating results in lexical entries. Although I am suggesting a more pragmatic approach, it has the same degree of stipulation as semantic ones. To get different results for *know* and *be right*, I have to assume that the different alternatives are lexically encoded. Even if one ultimately wants to say that alternatives are to some extent contextually constrained (which seems plausible), there would have to be different lexical representations for *know* and *be right* to get different alternative sets in the two cases. I don't find the hypothesis that alternative sets are included in lexical representations very problematic, particularly since alternative sets are used elsewhere in semantics, namely in the semantic of questions and focus. This is a topic which I turn to in the next section.

There is a certain similarity between my hypothesis that soft triggers introduce alternative sets, and Simons' question raising principle. A set of alternative propositions is a question. Thus according to both my hypothesis and Simons' question raising principle, an embedded soft trigger introduces a question. However, the questions are different. For Simons, the question introduced by *x knows p* is

$$\{\, p \wedge believe(x,p), \neg\, [p \wedge believe(x,p)]\,\},$$

because this is the question *whether x knows p*. For me, the question introduced by *x knows p* is

$$\{\, p \wedge believe(x,p), p \wedge \neg believe(x,p)\,\},$$

with a narrower scope for the negation.

6. It-clefts and intonational focus

The analysis I suggested connects with Rooth's (1999) comparison of *it*-clefts and intonational focus. In his football pool scenario, a betting contest called a football pool is held in the department, where people bet on the outcome of football games. Consider the exchange below.

(32)   A: Did anyone win the football pool this week?

B: Probably not, because it's unlikely that Mary$_F$ won it, and she's the only person who ever wins.

Rooth's observation is that focus on *Mary* does not give an existential presupposition 'someone won the football pool' which projects to the top level. This is clear because A's question indicates that A does not know whether someone won, and so it is not common ground that someone won. In (33), we change the example by substituting an *it*-cleft for intonational focus. The result is quite bad, and this can be attributed to the *it*-cleft producing a semantic presupposition that projects to the top level. This presupposition is in conflict with the first thing that B says, namely *probably not*, meaning that probably nobody won the football pool.

(33) A: Did anyone win the football pool this week?

B: #Probably not, because it's unlikely that it's Mary$_F$ who won it, and she's the only person who ever wins.

(34) is a representation for (32) which includes focus interpretation in the framework of Rooth (1992). By virtue of the semantics of focus and of focus interpretation, *Q* is constrained to be a set of propositions of the form 'x won the football pool'. This set is introduced by focus interpretation. Because focus does not express an existential presupposition, there is no semantic presupposition that someone won the football pool. Notice by the way that the scope of the focus is the embedded sentence, but focus is justified non-locally, by A's question.

(34) [probably not, because it's unlikely that [[Mary$_F$ won it]~Q]]

Rooth uses these data as an argument against analyses where intonational focus introduces a semantic existential presupposition. Instead, he says, focus just introduces an alternative set. Extending this point, we can say that focus introduces an alternative set, which is turned into a pragmatic existential presupposition if the speaker pragmatically presupposes that some alternative is true. This explains why one often has feeling that intonational focus gives rise to

an existential presupposition. Exactly like with the soft triggers, this presupposition is optional and occurs only when it fits into the context. So, we can regard focus as another soft trigger, which sometimes gives a pragmatic presupposition and sometimes not, depending on context.

7. Pragmatics of the derivation

I want to say that when an alternative set is around in the discourse representation, a speaker can optionally make the pragmatic presupposition that some alternative is true. This sounds plausible enough, but more has to be said about it, because it does not fall out of the logic of communication that arbitrary pieces of information can be presupposed at the whim of the speaker. Why isn't the presupposition something different, such as some alternative being false, or every alternative being unpleasant?

The answer I will develop has to do with the typical role of alternative sets in discourses and conversations. Typically, when a question (or equivalently, a set of alternative propositions) is under discussion, it is taken for granted that some alternative is true, and the participants in the conversation are trying to establish which one it is, or to narrow down the possibilities. One case of this is alternative sets which are introduced as the semantic values of questions. On Hamblin's (1973) semantics for questions, the question *who ate the last piece of cake* introduces the set of propositions

$$\{ \, x \text{ at the last piece of cake} \mid x \text{ is a person} \}$$

as the semantic value of the question. In most cases where the question is used, it would be taken for granted that some alternative is true.

This typical role for alternative sets in discourse makes it possible for a speaker to pragmatically presuppose that some alternative is true, because in a context where the presupposition is plausible, the speaker can expect the hearer to recognize his intention to make the assumption.

I assume there is a general pragmatic phenomenon of communicated assumption of default scenarios. Participants in conversations are aware of certain defaults, and a speaker can intend for a hearer to recognize an intention that a default is in force. A hearer will assume that the speaker intends to communicate the defaults together with the literal content when the defaults fit well into the specific context of use. Checking fit with the context includes checking consistency with the common informational ground and the literal content of the sentence, but also a more general evaluation of the plausible intentions and plans of the speaker. I will use the term *pragmatic enrichment* for this general process.

One case of pragmatic enrichment is conjunction buttressing (Atlas and Levinson 1981). This is the enrichment of conjunctions of eventive sentences with causal and temporal predications. A speaker of (35a) will usually be understood as communicating that the falling-over event followed the bumping event and was caused by it, in addition to the literal content.

(35)   a. John bumped into me and I fell over.

        b. John bumped into me. I fell over.

        c. But not because he bumped into me.

There are a couple of theoretical formulations of pragmatic enrichment. Atlas and Levinson (1981) and Levinson (2000) suggest a Grice-style maxim called the I-principle, which I quote from Levinson.

(36)   *I-Principle* (Levinson 2000, p. 114)

    Speaker's maxim: the maxim of Minimization. "Say as little as necessary"; that is, produce the minimal linguistic information sufficient to achieve your communicational ends (bearing Q in mind).

    Recipient's corollary: the Enrichment Rule. Amplify the informational content of the speaker's utterance, by finding the most specific interpretation, up to what you judge to be the speaker's m-intended point, unless the speaker has

broken the maxim of Minimization by using a marked or prolix expression. Specifically:

a. Assume the richest temporal, causal and referential connections between described situations and events, consistent with what is taken for granted.

b. Assume that stereotypical relations obtain between the referents or events, unless this is inconsistent with (a).

c. Avoid interpretations that multiply entities referred to (assume referential parsimony); specifically, prefer co-referential readings of reduced NPs (pronouns or zeros).

d. Assume the existence or actuality of what a sentence is about if that is consistent with what is taken for granted.

In the recipient's corollary, items a. and b. are generalizations of conjunction buttressing.

According to the I-implicature hypothesis, the understood temporal and causal relations are not part of the literal content of (35a) or (35b), but are added by pragmatic application of the maxim (36). A status as a conversational implicature is supported by the fact that the enrichment can be cancelled by the addition of (35c).

Levinson's statement of the enrichment seems unnecessarily and implausibly strong. It is not clear why one should think that the *most* specific extension of literal meaning which is consistent with everything else should necessarily be the communicated information. Nevertheless, the general idea that literal content is amplified with additional information which fits into the context is convincing. The picture is supported by the fact that the same pattern of reasoning comes up in non-linguistic behavior. For instance, in the scenario (37a), A is understood as silently communicating the information (37b) by non-linguistic (or partially non-linguistic) means.

(37)   a. A to B: Why don't you borrow my bike?

(A hands B a key)

b. This is the key to the lock on my bike.

As I have already said, I think that the whole process is guided by a system of defaults. At a very general level little more need be said than that speakers and hearers assume that literal content is to be amplified by application of default axioms and generalizations. In addition, one needs an account of how default axioms apply in interaction with contextual information and literal content, and an account of the competition between defaults. These matters might be addressed with a default logic, as extensively investigated by Asher and Lascarides (1993, 2003). At the specific level, one needs to hypothesize specific default axioms which are responsible for enrichment implicatures.

My lesson from this consideration of a general framework is that the pragmatic presupposition of soft triggers should be based on a default generalization which interacts with hypotheses about linguistic form and content to generate defeasible implicatures. I will introduce and illustrate the generalization by looking at specific examples involving *know*. As an expository notation, in (38)-(41) I write a description of the alternative set Q into the logical form, next to the sentence which is headed by *know*. This corresponds to the hypothesis that the lexical entry for *know* includes a representation of a set of alternatives, each of which is obtained by combining a contrasting function (either *unaware* or *know*) with the same arguments as are used for *know* in building the propositional denotation. (In this case, these arguments are the complement denotation *rain*, and the subject denotation *j*.)

(38)   assertion: John knows it is raining.

alternative: John is unaware it is raining

Q = {John knows it is raining, John is unaware it is raining}

= { *rain* $\wedge$ *j believe rain, rain* $\wedge$ $\neg$*j believe rain* }

disjunction of alternatives: *rain*

(39)   John knows it is raining.

[[John knows it is raining]

$Q = \{$ *rain* $\wedge$ *j believe rain, rain* $\wedge \neg$ *j believe rain* $\}$]

(40)　　John doesn't know it is raining.

　　　[not [[John knows it is raining]

$Q = \{$ *rain* $\wedge$ *j believe rain, rain* $\wedge \neg$ *j believe rain* $\}$]]

(41)　　If John knows it is raining, he won't go outside.

　　　[If [[John knows it is raining]

$Q = \{$ *rain* $\wedge$ *j believe rain, rain* $\wedge \neg$ *j believe rain* $\}$]

　　　[not [he will go outside]]]]

The effect of these representations is that the alternative set *Q* is made available at the discourse level. In each example, *Q* consists of the two propositions *rain* $\wedge$ *j believe rain* and *rain* $\wedge \neg$ *j believe rain*. At the discourse level, the alternative set *Q* is interpreted as a question under discussion.

(42) is the generalization about questions under discussion which will support an enrichment implicature. I assume that Q is a true generalization, and one which is known by participants in conversations, so that it can be used in enrichment reasoning. In (43), I specialize (43) to cover specifically those questions which are contributed as alternative sets by constituent clauses.

(42)　*Generalization Q*

　　If Q is a question under discussion in an utterance context with informational ground c, then typically, c entails that some element of Q is true.

(43)　*Generalization G*

　　If ψ is uttered in a context with informational ground c and ψ embeds a clause φ which contributes an alternative set Q, then typically c entails that some element of Q is true.

In these statements, *c* denotes the global informational common ground for an utterance. In the simplest formal model, *c* is simply the strongest proposition which the conversational participants take for granted. Equivalently, one can

think of c as the conjunction of all the propositions which the participants take for granted.

Suppose any of the sentences (38)–(41) is uttered in a context with informational common ground c. Each of these sentences has a sub-clause which contributes the alternative set $Q=\{rain \land j\ believe\ rain,\ rain \land \neg j\ believe\ rain\}$. The application of the default generalization G generates a cancelable implicature that c entails that some alternative is true, which I will write $c \vDash some(Q)$. In this example, this amounts to a pragmatic presupposition that it is raining.

What is the general theoretical status of the derivation I have proposed? The notion of conversational implicature in the theory of pragmatics refers to communicated information which goes beyond literal semantic content. A core case of conversational implicature is the scalar quantity implicature illustrated in (44). A speaker who uses (44a) will normally be understood as conveying the additional information (44b), which is known as a conversational implicature of (44a). Or more accurately, the speaker of (44a) is normally understood as conveying the additional information (44c), which leaves open the possibility that the speaker is uncertain whether John left some parts of the questionnaire undone or not.

(44) a. John completed part of the questionnaire.

b. > John did not complete all of the questionnaire.

c. > The speaker does not believe that John necessarily completed all of the questionnaire.

My derivation for $c \vDash some(Q)$ shares the criterial properties of defeasibility and calculability with scalar quantity implicatures, and other core cases of conversational implicature. Calculability is the property of being derived in a systematic way by reasoning about literal meaning, speaker's intentions, discourse structure, and so forth. Enrichment reasoning using G has the status of a calculation of the information $c \vDash some(Q)$. Defeasibility of the implicature

results from the default status of generalization G. Although G holds stereotypically and in most cases, it does not always hold. In the presence of contrary information (in particular if the discourse context makes the added information implausible) the implicature can be suspended.

For these reasons, it is appropriate to call $c \vDash some(Q)$ a conversational implicature of utterances of the sentences (38)-(41). The implicature has a presuppositional status, because it states a condition on the global common ground c. This contrasts with most implicatures, which have an asserted status. For instance, it is clear that the scalar implicature in (44) is additional information the speaker conveys, rather than information he suggests is already a consequence of the common ground.

That conversational implicatures can have a presupposed status has been pointed out by Kadmon:

"On the terminology I have adopted, these implications are in fact pss [presuppositions]. That is because the intuition is not merely that it is implied that [a certain proposition] is true, but rather that it is implied that the proposition in question is being taken for granted."
--- Kadmon (2001), p. 210.

Note that in the formal model, being taken for granted is formalized as being entailed by the common ground c. In contrast, ordinary conversational implicatures relate to another complex of attitudes including the belief attitude of the speaker.

Grice's work on conversational implicature introduced the notion of a *generalized* conversational implicature, which is a conversational implicature which is derivable without reference to properties of a particular context (Grice 1967, 1975). Levinson (2000) argues that generalized conversational implicatures (GCIs) should be given a distinguished theoretical status. Since my derivation of the pragmatic presupposition of *know* relies on general properties of topical

questions in discourse, the implicature of *know* and other soft triggers on my account are GCIs, if this indeed is a distinct theoretical category.

Theories of pragmatics have suggested general patterns of derivation for implicatures, such as quantity implicatures (Grice 1967, Grice 1975, Horn 1972) and relevance implicatures (Sperber and Wilson 1986). Putting aside differences between an account based on defaults and one based on the I-principle, my derivation of the pragmatic presupposition of soft triggers falls into the class of I-inferences in the typology offered by Levinson (2000). He characterizes informativeness reasoning from the recipient's perspective as "what you haven't bothered to say, you expect me, the recipient, to supply" (Levinson 2000, p. 121). In these terms, a speaker of a sentence which embeds *John knows it is raining* uses a logical form which presents the alternative set {*rain* ∧ *j believe rain, rain* ∧ ¬*j believe rain* }, but he does not bother to say that he assumes a common ground which entails that some alternative in the set is true. But the speaker expects the recipient to supply the information, because alternative sets in discourse typically have this property.

Summarizing the technical proposal of this section, a soft trigger contributes an alternative set to the discourse representation. Such alternative sets are typically interpreted as topical in the discourse. There is a default axiom that the informational common ground for an utterance entails the disjunction of such an alternative set. The pragmatic presupposition of the soft trigger is derived by enrichment reasoning, based on the default generalization. The presupposition has the theoretical status of a conversational implicature, and is suspendable (and therefore soft in my descriptive terminology) because of the default character the generalizations Q and G about alternative sets.

8. Compositional interactions

There is a group of observations about the presupposition projection which are considered characteristic of semantic presupposition, because simple and

explanatory accounts of them have been given in compositional semantic accounts using semantic presupposition (Karttunen 1973, 1974, Heim 1983). One case is the transformation of presuppositions in conditionals. In isolation, (45) presupposes that John has twins; this presupposition q' comes from the definite description.[8] In a conditional context (46), the presupposition q' is transformed to $p \rightarrow q'$, where p is the assertion of the if-clause (in this case, that John has children).[9,10]

(45)   Mary does not like John's twins.

     > John has twins.   (presupposition q')

(46)   If John has children, then Mary will not like his twins.

     > If John has children then he has twins.   (presupposition $p \rightarrow q'$)

This transformation of presuppositions is explained in a dynamic compositional account using semantic presuppositions (Heim 1983). The potential problem for my analysis is that when we check similar examples with soft triggers, the data come out in the same way, with conditional weakening of the presupposition. Here is an example with *stop*.

(47)   John has stopped smoking Luckies.

     > At some past time, John smoked Luckies.

(48)   If John ever smoked, then he has stopped smoking Luckies.

     > If John ever smoked, then at one time he smoked Luckies.

It seems clear to me that the presupposition that John used to smoke Luckies is conditionally weakened in the way shown in (48). Imagine it is taken for granted that John is one of a group of friends who, if they ever smoked, started smoking as teenagers, and started with Luckies. Then the stronger presupposition that John once smoked is not supported in context, but the weaker one in (48) is supported. Sentence (48) is fine in this context, which indicates that the presupposition has been conditionally transformed. If conditional weakening is characteristic of

semantic presupposition, this behavior appears to be evidence for a semantic treatment of the presupposition of *stop*.

Another compositional interaction is trapping by bound variables in quantified contexts. This is discussed in van der Sandt (1992); see also the discussion of the argument in Beaver (1997). In (49), the subject of *stop* is a quantified noun phrase *everyone in the house*. As a consequence, the alternatives generated by *stop* have a bound variable in them, as shown in the description of Q in the last part of the labeled bracketing.[11]

(49)   Everyone in the house stopped smoking.

    [everyone in the house]$_2$
        [e$_2$ stopped smoking Q = { x$_2$ smoke before r and x$_2$ stop smoking at r,
                        x$_2$ smoke before r and x$_2$ smokes at r}]]

The problem for my analysis is that there is no single value for Q at the utterance level. This makes it unclear how the pragmatic derivation from section 7 should deal with the example, since it talks about alternative sets which are topical at the discourse level.

These two problems (presupposition projection and trapping by bound variables) are similar, because they involve interactions with compositional semantics. Accounts which assume lexical semantic presuppositions have the resources to deal with them, because they manipulate denotations which encode presuppositions. Furthermore, since the problems have to do with what is happening at embedded levels in the sentence, they seem to involve compositional semantics, rather than pragmatics. And finally, these phenomena have been analyzed in the literature on semantic presupposition, and some of the analyses of presupposition projection are compellingly simple. How could a pragmatic account do as well?

I will deal with this puzzle by formulating the pragmatic account in dynamic semantic terms, taking advantage of the same dynamic compositional interactions which are used in semantic accounts of presupposition projection.

I take it as axiomatic that the basic communicative act which is involved in pragmatic presupposition relates to a global common ground. To make a pragmatic presupposition is to communicate that one believes the common ground to have such-and-such entailments. Thus making a pragmatic presupposition is a global communicative act. On the other hand, in the case of the compositional phenomena above, it seems that one has to consider what information is available in a local compositional context. This is what semantic theories do when they check semantic presuppositions against a local information state (Heim 1983, 1991). This creates a tension between the global and local information levels.

To resolve the tension, I will use a strategy one could call *think locally, act globally*. The strategy is also used in David Beaver's work on accommodation (Beaver 1994). Whether some alternative is true will be checked against a local context, instead of a global context. But the act of making a pragmatic presupposition will still be global.

In the examples below, c is the global context (an information state or file) for the sentence which embeds *know*, and d is the corresponding local context for the clause headed by *know*. The local context d is determined by c and by compositional semantic rules. The point of the examples is to argue that in typical uses in a global context c of a sentence S embedding *know*, the corresponding local context d for *know* entails that some proposition in the alternative set determined by *know* is true. This will be abbreviated $d \vDash some(Q)$. These examples will motivate a generalization similar to G which refers to both a global common ground c and a local information state d. This generalization L will replace G in enrichment reasoning.

The first example (50) is a negation. In this compositional environment, *know* introduces the alternative set Q given at the end in the labeled bracketing. The fourth line gives the compositional semantic rule for negation from Heim (1983). When the rule is applied to this case, φ is the clause headed by *know*. The local context for *know* is read off the file change rule: it is the expression on

the left of '+' in the sub-expression $(c + \varphi)$. In other words, the local context for *know* in this case is the global context *c*. This is stated on the bottom line in the example.

(50)   John doesn't know it is raining.

[not [John know it is raining

$Q = \{\ rain \wedge believe(j,rain),\ rain \wedge \neg believe(j,rain)\}\ ]]$

File change rule: $c+ \neg\varphi = c - (c + \varphi)$

d=c

I assume that, typically, the alternative set *Q* in such examples is construed as topical at the discourse level, and that as above, when an alternative set is topical, it is typically presupposed that some alternative is true. Putting these together, in a typical use of such negated examples, we have $c \vDash some(Q)$, where *c* is the global context. Since the local context *d* for *know* equals the global context *c*, $d \vDash some(Q)$.

Notice that in this reasoning, it is important that *Q* is (or can be) interpreted as a topical question, even though it is introduced in an embedded position. This connects with what I said about the focus example (32), where an alternative set introduced at an embedded level is justified at the discourse level, in that case by the question.

 In the next example, *know* is embedded in the *if*-clause of a conditional. The reasoning is as in the previous example. In the file change rule for the conditional from Heim (which actually is a dynamic rule for a material implication), the local context *d* for φ is the global context *c*. Reasoning as before, in typical uses of sentences with this kind of embedding for *know*, $d \vDash some(Q)$.

(51)   If John knows it is raining, he won't arrange to go out for lunch.

[if [John knows it is raining

$Q = \{ rain \wedge believe(j,rain), rain \wedge \neg believe(j,rain)\}$]

[he won't arrange to go out for lunch]]

File change rule: $c+$ if φ then $\psi = c - (c + \varphi - c + \varphi + \psi)$

$d = c$

In this reasoning, it is important that Q, which is introduced as an embedded position, can be a topic of conversation at the global level. I think that in this case, it is plausible to maintain that in a conversation where (51) is used, Q is a question under discussion at the discourse level.

In (52), *know* is in the main clause of the conditional, instead of the *if*-clause. I think that intuitively, the alternative set Q has the same status as in the previous examples: the example fits into a discourse where Q is topical, and typically it would be assumed that some alternative is true.

(52)   If John has been outside, he knows it is raining.

[If John has been outside

[he knows it is raining

$Q = \{ rain \wedge believe(j,rain), rain \wedge \neg believe(j,rain)\}$]]

$d = c + $ John has been outside

In this case, I do not want to say that it is necessarily typical of uses of sentences with this general pattern of embedding that some alternative in Q is true. The reason is that in examples like (53), it is debatable whether Q is topical at the discourse level, and it is clear that at the discourse level, it is not presupposed that some alternative is true. That is, it is not presupposed that it is raining.

(53)   If it is raining, then John knows it is raining.

So, I will say something weaker to cover (52): when *know* is embedded in the main clause of a conditional, then frequently the associated alternative set Q is

topical in the discourse, and it is assumed that some alternative is true. In such cases, we can reason as follows. The file change rule for the conditional is

$$c+ \text{ if } \varphi \text{ then } \psi = c - (c + \varphi - c + \varphi + \psi)$$

and therefore the local context for ψ is $c + \varphi$, i.e. $c+$*John has been outside*. In a context where Q is topical and where the global information state c entails that some alternative is true, we also have $c+$*John has been outside*$\vDash some(Q)$. Since d = *John has been outside*, $d \vDash some(Q)$. This reasoning relies on d being an extension of c.

Taken together, these examples support the following generalization.

(54)   If ψ is uttered in a context with informational ground c and ψ embeds a clause φ of the form *x knows p*, then typically, the local context d for φ entails that some proposition in the alternative set $\{p \wedge believe(x,p)$, $p \wedge \neg believe(x,p)\}$ is true, that is $d \vDash some(Q)$.

As I have justified it, the generalization follows from the alternatives suggested by *know*, not from a semantic presupposition of *know*. I am assuming that *know* has no semantic presupposition.

Let us return for a moment to (53). This is an example where it is *not* particularly plausible that Q (the question whether it is raining and John believes it is raining, or it is raining and John does not believe it is raining) is a question under discussion at the discourse level. Nevertheless, a use of (53) is an positive case for the generalization (54). Because of the file change rule stated above, the local context d in this case is $c + $ *it is raining*. This entails the disjunction of the propositions in Q (that is, $d \vDash some(Q)$, as required in (54)), because this disjunction is simply the proposition that it is raining. This kind of example is a positive case for the generalization (54) for compositional-semantic reasons, not because of any typical properties of the global context. Notice by the way that

(53) is a classic case of presupposition filtering, for a theory where *know* has a semantic presupposition.

Now I want to derive the pragmatic presupposition. Basically, I want to argue that the situation of the local context *d* entailing *p* is so typical that it carries over to other cases. Suppose that a speaker A uses any of the sentences S above which embed *x know p*. The hearer B is unsure whether the global context *c* is such that the corresponding local context *d* for *x know p* entails *p*. But B takes A's utterance as an indication that A thinks the global context is like that. B silently accommodates the assumption.

A speaker can expect a listener to reason in this way. That is, a speaker can expect a listener to assume that, in the absence of evidence to the contrary, the global context *c* is such that the corresponding local context for *x know p* entails *p*. This gives a default pragmatic presupposition that the global context for S is such that the corresponding local context for *x know p* entails *p*.[12]

To restate this as enrichment reasoning, we need a default axiom which captures the dependency between c and d. This default axiom is (54). Here is a statement in general form.

(55)   *Generalization L*:   If a sentence ψ is uttered in a context with common ground c and ψ embeds a clause φ which contributes an alternative set *Q*, then typically c is such that the corresponding local context d for φ entails that some element of *Q* is true.

The phrase "corresponding local context" refers to the correspondence between global and local contexts which is established by compositional semantics. Given a fixed disambiguated LF and a global context c, the local context d is uniquely determined. So even though L mentions a local context, it is still a constraint on the global context c. Therefore it can be used in enrichment reasoning to generate a presuppositional conversational implicature. Using L

instead of G will have consequences for the specific pragmatic presupposition which is generated. The consequences are worked out in the next section.

But first some more about L. When I justified it, I looked just at examples involving *know*. Similar examples can be given with other soft triggers. And in the positive cases I looked at, some(Q) was either entailed by the global common ground, or was entailed by the local information state *d* for compositional-semantic reasons. There are other cases (to which we turn immediately) where some(Q) is entailed by the local information state *d* because of a combination of information in the common ground, and information which is added by compositional semantics. These are another bunch of positive cases for the generalization. And as with G, it could even be that L is just a robust statistical generalization for which no general justification such as the one I attempted above can be given. All that matters for my derivation is that the generalization L is assumed by speakers and hearers, so that it can be used in enrichment reasoning.

9. The compositional contribution to pragmatically triggered presuppositions

Here is the conditional weakening example which was discussed earlier, where we see the projection behavior which we used to think was characteristic of semantic presupposition.

(56)   If John ever smoked, then he has stopped smoking Luckies.
        > If John ever smoked, then at one time he smoked Luckies.

By the method of the previous section, we derive the following condition on a common ground *c*.

(57)   *c* is such that the corresponding local context *d* for *he has stopped smoking Luckies* entails that John once smoked Luckies.

Using the compositional derivation for (56), we find that the corresponding local context *d* is *c* + *John once smoked*. So, the condition is equivalent to (58).

(58)	Constraint on c derived by enrichment reasoning using Generalization L and the logical form of (56).

c + *John once smoked* entails that John once smoked Luckies

Notice first that this is a presuppositional conversational implicature. It is presuppositional because it describes an entailment of the global common ground c. In Stalnaker's conception, pragmatic presuppositions are precisely communicated constraints on common grounds. For this consequence to come out, it is crucial that even though L also refers to a local information state, it is interpretable as a default constraint on the global common ground. Second, (58) is a conversational implicature because it is communicated information going beyond literal content, which is derived in a systematic way using conversational reasoning.

(58) agrees with the presupposition which is perceived intuitively. It is also the same presupposition which is derived on an account which says that *stop* encodes a semantic presupposition in its lexical meaning. I assume that hard triggers like clefts do introduce semantic presuppositions, and for them presupposition projection looks the same as for soft triggers. So, the analysis derives the same projection behavior for hard and soft triggers. The reason this happens is that both the semantic and pragmatic derivations check something (either the truth of a semantic presupposition, or some alternative being true) against a local context d which is obtained (in exactly the same way in the two cases) from a global context c and dynamic compositional semantics.

There is discussion in the literature which says that this result is desirable. Chierchia and McConnell Ginet (1990) say that semantically and pragmatically triggered presuppositions should be filtered or transformed in the same way by dynamic compositional semantics:

(CM)   While there can be two sources of presuppositions, we would expect that their projection properties are the same since the context-change potential of non-atomic sentences is independent of how the presuppositions of atomic sentences are triggered. (Chierchia and McConnell-Ginet 1990, p. 313)

There is perhaps something puzzling about what Chierchia and McConnell-Ginet suggest here. The pragmatic reasoning which derives conversational implicatures is reasoning about utterances. This is particularly clear in the case of reasoning about common grounds, which are features of utterance context. How could dynamic compositional semantics, which assembles denotations of parts of an utterance into an utterance denotation, have the chance to filter a presupposition which is derived from conversational reasoning about an utterance denotation?

It would be a mistake to think that this point is automatically countered by the fact that current theories use dynamic semantic objects for both compositional semantics and pragmatics, or that the information states which are used in dynamic compositional semantics are sometimes called "hypothetical contexts." The *d*'s of the previous section are information states used in compositional semantics; they are not utterance contexts. Therefore pragmatic arguments do not automatically apply to them in the same way as they apply to common grounds.

Kadmon (2001, p. 216) expresses an opinion related to (CM):

(K) Secondly, if you want to ask **why** it is that the conversationally triggered pss [presuppositions] of complex sentences should systematically involve local contexts, that question is independent of simply applying the filtering projection theory in order to predict the right pss. After all, when we applied filtering to conventionally triggered pss, that didn't explain why they systematically involved local contexts, either. We never used the mode of triggering in order to explain why the local contexts were crucial.

Thirdly, on further reflection, it does not seem so strange that conversationally triggered pss should depend on their local context. After all, each clause is uttered in its local context – isn't it natural to assume that it is required to be relevant in that local context?

I mainly disagree with Kadmon's reasoning here. I do think that dynamic compositional theories explain or rationalize projection behavior for semantic presuppositions, as was originally claimed in Heim (1983). In particular, that framework gives a deep explanation for sensitivity to local contexts. The file change rule (59) for the material implication states the semantics of the construction, but also determines local contexts for φ and ψ. The syntax of this file change formula together with the interpretation of semantic presupposition as a definedness condition of the file change potentials denoted by clauses makes the sensitivity to local context and the specific filtering behavior fall out. In this sense the architecture of the dynamic framework for semantic presupposition explains why local contexts are crucial.

(59) $c + $ if φ then $\psi = c - [c+\varphi - c+\varphi+\psi]$

Notice that this point is not harmed by the argument in Soames (1989) against the claim in Heim (1983) that the specific projection behavior of lexical items is derivable from their non-presuppositional compositional semantics. It is possible to write down other file change rules for the material implication which correspond to the same operations on truth values or on propositions, but which have different local contexts for the constituent clauses, for instance (60).

(60) $c + $ if φ then $\psi = c - [c+\varphi - c+\psi]$

With the different file change rules, we get different presupposition projection behavior, because the local contexts are different. This is a counterexample to the claim in Heim (1983) that projection behavior follows from non-presuppositional

meaning, but does not matter for the point I am making here. Also with the second file change rule for *if-then*, presupposition satisfaction and transformation are sensitive to local information states. So, contrary to Kadmon, semantic presupposition theory *does* provide an explanation for sensitivity to local contexts in filtering behavior.

Second, I do not agree that "each clause is uttered in its local context" in the same way that a sentence is uttered in an utterance context. Local information states in dynamic semantics are devices which are used for stating compositional semantics---they do not have the status of contexts of utterance. For instance, I would not see the sense in saying that the utterance of ψ in the context *if φ then __* takes place in a context where the speaker takes it as granted that the speaker and hearer's common store of information entails φ. Instead, I would think that the context of utterance for ψ in this case is roughly the same as the context of utterance for *if φ then ψ*, perhaps with some slight additions, such as the information that *if φ then__* has just been uttered. But I should not overemphasize this objection, since my account does use the notion of a local context for an embedded clause containing a soft trigger. This is the information state which is obtained by updating the assumed global information state with the function from global contexts to local contexts which is determined by compositional semantics.[13] If we wanted to, we could adopt Kadmon's language, and say that the embedded clause is uttered in this context. The only point is that this local context does not have the same status as a global common ground, so there is no reason to expect that pragmatic reasoning would apply to it in the same way that pragmatic reasoning applies to global common grounds.

Summing up, I do not agree with Chierchia and McConnell-Ginet and Kadmon that current theories of semantics and pragmatics generate general expectations that pragmatic presuppositions which do not have an origin in semantic presuppositions should be transformed in the same way by compositional semantics as semantic presuppositions, or that pragmatic

presuppositions which do not have an origin in semantic presuppositions should be systematically sensitive to local contexts.[14]   If anything, I think the general expectation created by current theories of semantics and pragmatics is the opposite. Of course, I *have* proposed a theory which predicts parallel filtering/transformation behavior for semantic presuppositions and the pragmatic presuppositions generated by enrichment reasoning using L. But this prediction depends on the specifics of the derivation, and in particular on the formulation of L.

My solution to the compositional puzzle is significantly different from what is suggested in (CM).   In my solution, the pragmatics does not generate a presupposition which is filtered or transformed by compositional semantics. Instead, the pragmatic logic is artfully set up so that the pragmatic presupposition which is generated in the first place is already sensitive to compositional semantics.   This explains how my solution avoids the problem I stated about (CM), namely that it does not make sense for compositional semantics to filter presuppositions which are generated by pragmatic reasoning about utterances. In the derivation using L, compositional semantics does not, strictly speaking, filter or transform presuppositions which have been pragmatically generated.   Instead, as in standard models of the semantics-pragmatics interface, semantics is the input to pragmatics, and aspects of the semantics have consequences for what is derived pragmatically.

There is one way in which my model of the semantics/pragmatics interface is non-standard: the derivation assumes that a lot of the compositional semantics is visible to pragmatics. Generalization L refers to an embedded information state *d*. If we just have the semantic value of the sentence (a certain dynamic proposition or file change potential), it is not possible to apply the condition, because to apply it, one has to find the *d* which corresponds to the global *c*. It seems that to apply the condition, one has to have access to something like a structured proposition (Lewis 1972) which stores the pieces from which the semantic value is composed.

This structured dynamic proposition is used to find the local context d for the soft trigger, given the global context c. Here the semantics is being used to supply a function from global contexts to local contexts, rather than just the function from global input information states to global output states which is the semantic value of a sentence in dynamic semantics. This idea is developed in the next section.

The discussion above of the interaction between compositional semantics and conversational implicature is clouded by Chierchia's more recent work on scalar implicature (Chierchia 2004). He argues that scalar implicatures (or whatever one calls them, implications which look like scalar implicatures) can be generated in embedded contexts where they are not motivated by global scalar reasoning. These embedded scalar implicatures are then compositionally modified. (61) and (62) are examples quoted from Chierchia's paper.

(61)   (Right now) Mary is either working at her paper or seeing some of her students.

> Mary is either working at her paper or seeing some (though not all) of her students.

(62)   John knows that some students are waiting for him.

> John knows that some though not all students are waiting for him.

Sauerland (2004) shows that some of Chierchia's data can be accommodated in a classic approach, where scalar implicatures are generated at a global level by checking entailment relations between the denotation of a root sentence to the denotations of alternative assertions. This becomes possible when the appropriate set of alternatives to sentences with Boolean connectives are considered. For instance it is necessary to consider *p* an alternative to *p or q*. However, it is not clear that this approach would extend to all of Chierchia's data.

Chierchia proposes an algorithm which generates certain strengthened meanings by a recursive procedure which manipulates alternative denotations. He is frank in pointing out that this procedure has not been motivated by systematic pragmatic reasoning:

What emerges from these considerations is that if we look at it more closely, the idea that implicatures are computed globally (after the root sentence has been assigned its basic meaning by the grammar) seems to face empirical difficulties. Hence, it seems wrong to take such an idea as the null hypothesis, in spite of its many prima facie desirable features. In all of the cases we have discussed above, one can try various moves, if one feels that the globalist view ought to be preserved. But we need theories of implicature more articulated than those currently available in order to assess the actual viability of the globalist view, rather than taking it for granted. (Chierchia 2004, p. 47)

So, Chierchia is proposing an empirically motivated theory which, in the form that he is proposing it, is not derived from any pragmatic logic of the standard global sort. From one point of view, this could be seen as undermining my discussion above of how the theory proposed in this paper fits in with general accounts of compositional semantics and conversational implicature. Chierchia's proposal says that there are recursive processes which generate what look like implicatures by a process which is not reducible to global pragmatics. If this was right, it would make the views (CM) and (K) more plausible, and it would not be correct to argue against these views based on the premise that conversational implicatures must be derived by global pragmatic reasoning. On the other hand, Chierchia's proposal can be regarded as incomplete, because it has not yet been tied in with a general pragmatic theory, and so it is not possible to say whether it tends to support or tends to undermine my proposal for deriving pragmatic presuppositions using enrichment reasoning. Perhaps it would be possible to identify a default generalization similar to L which would make Chierchia's algorithm for scalar strengthening fall out. In that case, these scalar implicature phenomena would fit in with my proposal and my assumptions about the semantics-pragmatics interface, rather than undermining them.
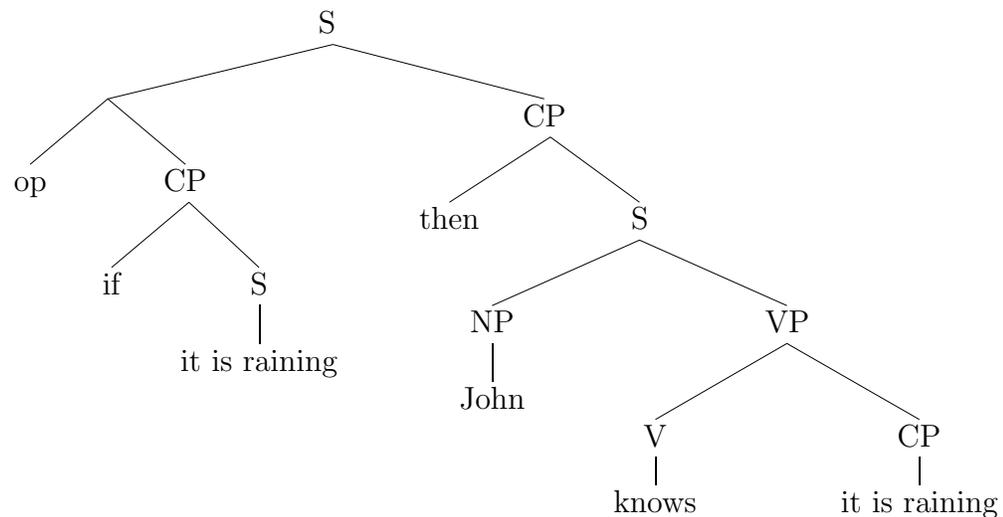
10. Local contexts in a detailed derivation

This section develops a detailed derivation of the example repeated in (63). The goal is to explore the question of how much semantic information the pragmatics must have to apply generalization L, and also to check that the analysis using alternatives discussed in earlier sections can be put together with the dynamic framework mentioned in Section 9.

(63)   If it is raining, then John knows it is raining.

(64) is the compositional structure I will use.   There are two CP clauses, which are arguments of an implicit operator *op* which has the conditional meaning.

(64)

```
                               S
              ┌────────────────┴────────────────┐
              │                                 CP
        ┌─────┴─────┐                   ┌────────┴────────┐
       op           CP                 then               S
              ┌──────┴──────┐                    ┌────────┴────────┐
             if             S                   NP                 VP
                            │                    │          ┌──────┴──────┐
                      it is raining            John          V            CP
                                                             │            │
                                                           knows    it is raining
```

To state the semantics, I will use the file increment notation for dynamic semantic rules from Heim (1983) and Heim (1991).   The semantics for *know* will be based on the semantics for *believe* from Heim (1991).   This semantics is stated in (65), and some notation is reviewed in (66).   The plus operation '+' combines an information state (file) on the left with an information-state function (file change potential) on the right to produce another information state.   The semantics for *believe* is stated in terms of a set of epistemic alternatives $b_{x,w}$ for the individual x in a world w.   The lexical semantics for *believe* defined in (65) preserves those

worlds w in c such that incrementing $b_{x,w}$ with the file change potential ψ which is the denotation of the complement sentence eliminates no worlds. Heim (1991) argues that this rule does a good job of predicting the presupposition-projection properties of *believe*.

(65) Context change rule for *believe*

   $c + x$ believe $\psi = \{w|c(w) \wedge b_{x,w}+\psi=$same$\}$

(66) $b_{x,w}$ set of epistemic alternatives for x in w

                           (a set of possible worlds)

   $d +\psi =$ same   abbreviation for $d +\psi =d$

                           (updating d with ψ eliminates no worlds)

   $d +\psi \neq$ same   abbreviation for $d +\psi \neq d$

                           (updating d with ψ eliminates some worlds)

The earlier discussion of *know* and its alternative used the representations in (67). We want to put these representations into dynamic form, using the semantics (65) for the *believe* component. All that is necessary is to insert the factive implication into the context change rule for *believe*. This is done by substituting $\psi(c)(w)$, or equivalently $[c+\psi](w)$ for $c(w)$. (68a) is the resulting context change rule for *know*. Keeping constant the conjunct which represents the factive implication, while negating the other conjunct, results in the file change rule (68b) for the alternative to *know*.

(67) a. *know*

       $p \wedge x$ believe p

   b. alternative to *know*

       $p \wedge \neg[x$ believe p$]$

(68) a. Context change rule for *know*

       $c + x$ believe $\psi = \{w|\psi(c)(w) \wedge b_{x,w}+\psi=$same$\}$

b. Context change rule for alternative to *know*

$$c + x \text{ believe } \psi = \{w | \psi(c)(w) \wedge b_{x,w} + \psi \neq \text{same}\}$$

Inserting appropriate lambda binders in (68a) lets us work out the derivation for the main clause in (63). The alternative meaning for the clause is given at the bottom. This comes from using the denotation for the alternative to *know* in place of the denotation of *know* in the compositional derivation.

(69)   Derivation for *John knows it is raining*

$$\lambda c \lambda w [c(w) \wedge \mathbf{rain}_w \wedge \lambda w'[b_{\mathbf{j},w}(w') \wedge \mathbf{rain}_{w'}] = b_{\mathbf{j},w}]$$

$$\mathbf{j} \qquad \lambda x \lambda c \lambda w [c(w) \wedge \mathbf{rain}_w \wedge b_{x,w} + \lambda d \lambda w'[d(w') \wedge \mathbf{rain}_{w'}] = \text{same}]$$

$$\lambda \psi \lambda x \lambda c \lambda w [\psi(c)(w) \wedge b_{x,w} + \psi = \text{same}] \qquad \lambda d \lambda w'[d(w') \wedge \mathbf{rain}_{w'}]$$

alternative: $\lambda c \lambda w [c(w) \wedge \mathbf{rain}_w \wedge \lambda w'[b_{\mathbf{j},w}(w') \wedge \mathbf{rain}_{w'}] \neq b_{\mathbf{j},w}]$

The next step is to apply a dynamic semantic rule for the conditional. (70) repeats the context change rule from Heim (1983) for *if-then* (or in the tree (64), for *op*). This can be understood as a dynamic material implication. When we combine it with the results from (69), we get the derivation (71) for the compositional structure (64).

(70)   Context change rule for *if-then*
$$c + \text{if } \varphi \text{ then } \psi = c - [c + \varphi - c + \varphi + \psi]$$

(71)   Semantic derivation for *if it is raining, then John knows it is raining*

$$\lambda c [c - [\lambda w [c(w) \wedge \mathbf{rain}_w] - \overbrace{[\lambda w [c(w) \wedge \mathbf{rain}_w]}^{d} + \psi_{\text{know}}]]$$

$$\lambda \psi \lambda c [c - [\lambda w [c(w) \wedge \mathbf{rain}_w] - [\lambda w [c(w) \wedge \mathbf{rain}_w] + \psi]] \qquad \psi_{\text{know}}$$

$$\lambda \phi \lambda \psi \lambda c [c - [c + \phi - c + \phi + \psi]] \qquad \lambda d \lambda w [d(w) \wedge \mathbf{rain}_w]$$

global to local function: $\lambda c \lambda w [c(w) \wedge \mathbf{rain}_w] \qquad (= \lambda c.d)$

The lambda term at the top in (71) names the denotation of the compositional structure; it is a certain function from information states to information states. The

bracketed term labeled *d* is the "local context" for the denotation of the clause headed by *know*. Operating syntactically, we can read off a function from global common grounds to local information states from this lambda term as the function λ*c.d*. This function is given at the bottom in (71).

(72) gives the semantic types for phrases in (69) and (71) which we get if we assume that files are propositions. The clause headed by *know* has the type (st)st, which is the type of functions from propositions to propositions. The alternative to the clause has the same type. (73) works out the type of the alternative set Q, and the operator **some** which quantifies over the alternative set. The alternative set Q is a characteristic function of a set of alternatives.[15] Since an alternative has type (st)st, this type is ((st)st)t. The operator **some** in **some**(Q) turns Q into a file change potential (function from propositions to propositions). This operator is defined at the bottom in (73).

(72)   The denotation for a clause is a function from information states to information states.

Information states are propositions, type st.

A dynamic clause denotation has type (st)st, a function from propositions to propositions.

Semantic types in the trees above:

c,d	st
rain	st
know	((st)st)e(st)st
ψ_know	(st)st
alternative	(st)st

(73)   Q   ((st)st)t

some(Q)   (st)st

some   (((st)st)t)(st)st

some = $\lambda Q \lambda d \lambda w \exists \psi [Q(\psi) \wedge \psi (d)(w)]$

These definitions allow us to find **some**(Q) for the Q corresponding to the alternatives in (73)**:**

(74)   **some**(Q) = $\lambda d \lambda w[d(w) \wedge \textbf{rain}_w]$.

Now we can check whether a particular global common ground c_0 satisfies the pragmatic presupposition generated with L. We read off the global-to-local function $\lambda c \lambda w[c(w) \wedge \textbf{rain}_w]$ from the representation (71). That function is applied to c_0, to find the local context $\lambda w[c_0(w) \wedge \textbf{rain}_w]$ for the clause which introduces the alternative set. Finally, that the local context entails the disjunction of the alternatives is tested by checking whether updating with **some**(Q) eliminates any worlds.

(75)   **some**(Q)(local context) $= \text{some}(Q)(\lambda w[c_0(w) \wedge \textbf{rain}_w])$

$$= \lambda w[d(w) \wedge \textbf{rain}_w] \, (\lambda w[c_0(w) \wedge \textbf{rain}_w])$$

$$= \lambda w[c_0(w) \wedge \textbf{rain}_w \wedge \textbf{rain}_w]$$

$$= \lambda w[c_0(w) \wedge \textbf{rain}_w]$$

$$= \text{local context}$$

No worlds are eliminated, so in this case any c_0 satisfies the presupposition. This verifies that the pragmatic presupposition produced by enrichment reasoning using L is in this case a trivial one. Speaking loosely, we could say that the pragmatic presupposition **some**(Q) has been compositionally filtered. But as was stated in section 9, the logic is really that the pragmatic presupposition which is generated in the first place is a trivial one. Another way of looking at the result is that any use of (63) is one which is in agreement with default generalization L.

What information is used in this pragmatic derivation? When I read off the global-to-local function, I looked at the expressions to the left of '$+\psi_{\text{know}}$' in the lambda term at the top of the tree in (71). This procedure referred to the syntax of the lambda term at the root node, and it would not be possible to find the global-to-local function using only the semantic object named by that lambda term. Notice that part of the structure which was used came from the lexical entry

of *know*. If one wanted to restate the procedure in semantic terms, one would have to refer to structured propositions in the sense of Lewis (1972), or in fact structured dynamic propositions. And the structuring would have to extend into lexical entries.

So the analysis has both classic and non-classic features. The classic ones are: Stalnaker's definition of pragmatic presupposition is preserved; there are no pragmatic presuppositions or conversational implicatures in embedded positions; conversational reasoning operates with the output of compositional semantics; and there is a calculation of the presupposition as a conversational implicature. The non-classic feature is that for the derivation to work, more than just the semantic object (proposition or file change potential) denoted by a sentence has to be visible to the pragmatics. To apply L, one has to be able to find the local context d which corresponds to a given global context c. So the compositional semantics has to make available a correspondence between global and local information contexts. I conjectured that this can be accomplished with a structured meaning.

I do not find this change in the semantics-pragmatics interface necessarily objectionable, because I assume that speakers have some kind of access to the LFs of the sentences they use, which gives some kind of indirect access to structured meanings. But certainly, the new model should be recognized as a less constrained one, because it allows for the pragmatics to do more, and in particular, it allows enrichment reasoning to exploit a larger class of default generalizations.

11. The filtering argument for focus existential presupposition

Section 6 said that focus (as analyzed in alternative semantics) is a soft trigger. In the version of alternative semantics from Rooth (1992), the semantics of the focus feature F in a logical form contributes an alternative set Q, without any semantic presupposition that some element of Q is true. But the assumption

some(Q) can be added by pragmatic enrichment, by the same logic which applies to lexically triggered alternative sets.

In studies of the semantics of focus, there is an argument about whether the semantics of focus includes a semantic presupposition some(Q). I already mentioned Rooth (1999), who claimed that there is no semantic existential presupposition, because the presupposition some(Q) is context-dependent and cancelable.

Recently, the question has been raised again by Geurts and van der Sandt (2004), who argue for a semantic existential presupposition of focus. They give a new argument for this position based on projection behavior, based on example (76). Just as the presupposition that Fred has a wife is filtered in (76a), they observe, the presupposition that someone stole the tarts is filtered in (76b).

(76)   a. If Fred has a wife, then Fred's wife stole the tarts.

    b. If someone stole the tarts, then [Fred's wife]$_F$ stole the tarts.

The point can be strengthened by constructing an example where the existential presupposition is conditionalized, rather than completely filtered. In (77a), the presupposition that someone opened the vault is weakened to (77b). This weakened presupposition might be satisfied because it is taken for granted that the Trust Company keeps all its money and valuables in the vault, so that it could not be robbed without the vault being opened.

(77)   a. If Abner and Lana robbed the Trust Company, then she$_F$ opened the vault.

    b. If Abner and Lana robbed the Trust Company, then someone opened the vault.

    c. If Abner and Lana robbed the Trust Company, then it was she who opened the vault.

Notice that the same conditional weakening is seen with the cleft in (77c). It is usually claimed that clefts have semantic existential presuppositions (e.g. Karttunen and Peters 1979 and Rooth 1999), so in the presupposition projection seen in conditionals, focus is similar to the cleft.

The conditional weakening data for focus and the parallel behavior of the cleft seem to favor the view that focus is associated with a semantic existential presupposition, because projection behavior is parallel to what is seen in clear cases of semantic presuppositions. This is Guerts and van der Sandt's argument.

The argument about focus that I have gone through, which seems to favor a analysis with a semantic existential presupposition for focus, is parallel to the argument regarding soft triggers presented in section 9, where it was observed that projection behavior for soft triggers such as *stop* was the same as the projection behavior seen with hard triggers. Since focus is now being analyzed as a soft trigger, the same solution using dynamic semantics should work as a response to the Geurts and van der Sandt's argument.

It is appropriate to apply the analysis by referring to the focus interpretation operator rather than the focus feature itself, because it is the focus interpretation operator which introduces the alternative set. And so, strictly speaking, it is the focus interpretation operator which is a soft trigger. In the representation (78), the focus interpretation operator is adjoined to the main clause, so that Q is constrained to be a set of propositions of the form '*x* opened the vault'.

(78)   If Abner and Lana robbed the Trust Company, then [[she$_F$ opened the vault]~*Q*]

The generalization which supports a derivation of a pragmatic presupposition is (79). It is a special case of the generalization L, which I claimed applied to all soft triggers. When (78) is used in a context with common ground c, an enrichment implicature that c is typical in the sense of (79) is generated. By working through the compositional semantics which determines d in terms of c,

we obtain the constraint (80a) on *c*. Since Q is the alternative set described in (80b), this is equivalent to the weakened presupposition (77b).

(79)   Typically, when a sentence ψ which embeds a structure $[\varphi\sim Q]$ is used in a global context *c*, the corresponding local context *d* for $[\varphi\sim Q]$ satisfies $d \vDash some(Q)$.

(80)   a. $c \vDash$ [Abner and Lana robbed the Trust Company $\rightarrow$ some(Q)]

        b. Q $=$ {p| $\exists$x[p $=$ x robbed the Trust Company]}

The result of this investigation is that the pragmatic derivation of focus existential presuppositions, in its dynamic version, predicts the filtering behavior seen in (76) and (77). So, contrary to Geurts and van der Sandt's conclusion, to cover these data it is not necessary to assume that focus directly expresses an existential presupposition.

12. Outlook

In this section, I will mention possible extensions and revisions of my proposal, without going into any depth about them.

My analysis had two parts. In sections 5, I presented the idea that soft triggers introduce alternatives, and suggested that these were responsible for a pragmatic presupposition (specifically, the disjunction of the alternatives). Sections 8 and 9 actually derived a pragmatic presupposition, using enrichment reasoning. The two parts are linked by the default generalization L, which refers to logical forms with alternative sets.

The two parts are separable. If we concentrate on one soft trigger (let's say *know*) the second part of the analysis requires the generalization (81), which here is formulated to omit reference to alternative sets.

(81)   If ψ is uttered in a context with informational ground c and ψ embeds a clause φ of the form *x knows p,* then typically c is such that the corresponding local context d for φ entails p.

If (81) was true for some other reason independent of alternative sets, then the second part of the analysis (including the part about compositional transformation of presuppositions) would still go through.   Maybe (81) is just a statistical generalization, which is known by people and therefore can be used as a basis for enrichment reasoning.   After all, all kinds of specific facts like the fact that keys are usually used to open doors are supposedly a basis for enrichment reasoning. And people are good at noticing specific generalizations and using them in everyday life – maybe better than they are at noticing general generalizations.   I think this alternative line of analysis could be taken seriously.   And consequently, the second part of the theory (the part about the pragmatic derivation and filtering effects) should be considered the deeper one.

I do however find the idea that lexical alternatives are involved in the data I have been analyzing compelling.   In section 5, I said that the alternatives were lexically stipulated. This move is necessary to make the distinction between *know* and *be right*.   But it could be that the full story is some mixture of lexical stipulation and pragmatic inference.   In literature on focus, it is commonly observed that alternatives to focused items may be pragmatically determined, based on fit with the context.   The same factor could be at play in alternatives for soft triggers. This suggests the possibility that different pragmatic presuppositions (coming from different contextually determined alternative sets) could show up in different contexts.

If one stays with the idea that alternatives are lexically specified, the natural place to try to give more substance to the lexical stipulation is in morphology. Throughout the paper, in the semantics I have effectively been working with a decomposed lexical entry for *know*, which analyzes "x know p" as "p is right (i.e. true) and x believes p".   This suggests that morphologically, *know* is a compound

of two roots.   Suppose the overt root √know is a near synonym of *believe*, while a root RIGHT with semantics λp[p is right] is null.   Second, suppose that alternatives are generated in the position of the overt root, by negating it. This would explain why "p is right" remains constant in the alternative. The predicate "be right" would be complementary, with √right as the overt root, and BELIEVE being a null root, which either is a compound with √right, or comes from somewhere else in the syntax. These ideas are summarized below.

(82)   Morphology   Alternative

know   [√know RIGHT]   [[NOT √know] RIGHT]
be right   [BELIEVE √right]   [BELIEVE [NOT √right]]

I did not investigate the question of whether all alternatives can generate pragmatic presuppositions. In some sense, *man* is an alternative to *woman*, and this contrast is culturally, psychologically and perhaps linguistically enshrined. But this contrast seems not to generate pragmatic presuppositions, in the absence of focus:

(83)   If John is living with a woman, Mary won't continue to be interested in him.

In the absence of focus, I think there is no tendency at all for this sentence to presuppose that John is living with a man or woman.

Lastly, the hypothesis that soft triggers introduce alternatives would be strengthened if it could be shown that alternatives are used in *other* pragmatic ways.   Perhaps (84), which is a sentence used by Senator Feinstein of California, is an example of this kind.

(84)   The committee's report does not acknowledge that the intelligence estimates were shaped by the administration. In my view, this remains an open question that needs more careful scrutiny.

(85) shows how the example works out on my analysis.   In the understood context, p is not really presupposed, because Senator Feinstein says in the next

sentence that p is an open question. However, she seems to be making some modalized suggestion, such that p might be true, or p is probably true.

(85)   p = the intelligence estimates were shaped by the administration

assertion: p $\wedge$ the report says p

alternative: p $\wedge \neg$ the report says p

some(Q) = p

13. Conclusion

This paper has proposed an articulated theory of presupposition triggering and projection for a group of "soft" presupposition triggers including intonational focus and the verbs *stop*, *know*, and *win*. It is hypothesized that soft triggers introduce sets of propositions called alternative sets into grammatical representations. Second, a default generalization L is hypothesized about alternative sets, global common grounds, and the local information states made available by compositional semantics. A general pragmatic process of enrichment reasoning generates an implicature using L and logical forms with alternative sets, which is the observed pragmatic presupposition of sentences embedding soft triggers. The implicature is a pragmatic presupposition, because it is a constraint on the common ground for a conversation. Because of the default character of L, the implicature is suspendable. Because L refers to information about local information states provided by compositional semantics, the derivation predicts compositional transformation of presuppositions. At the same time, the derivation evades the paradox of compositional semantics transforming a pragmatically generated implicature. The implicature which is generated by pragmatic enrichment reasoning using L is compositionally sensitive, and so strictly speaking, there is no process of an output of the pragmatic module being transformed by the compositional-semantic module of grammar.

Endnotes

[1] Both versions are a naive lexical semantics for *know*, since they do not entail anything about the source of *x*'s belief that *p*. I hope this does not affect the arguments I will make, but it might.

[2] The default account of semantic presuppositions which I have in mind is Heim's file change theory, Heim (1983). In the beginning part of the paper this is not important, but in section 8, I will make crucial use of a dynamic compositional semantics. The framework for pragmatic presupposition which is assumed throughout is the one proposed in Stalnaker (1974).

[3] Negative polarity *either* is exemplified in *John didn't attend either*. There are examples of suspension with *it*-clefts, but I assume these have a different character, involving discourse subordination. See Chierchia and McConnell-Ginet (1990) for discussion of the following example.

   A. Was it you who let the cat out the back door?
   B. No, it wasn't me who did it, because I haven't been in the kitchen. And it wasn't Sally who did it, because she just arrived. In fact I suspect nobody did it. The cat sometimes gets out through the window.

[4] Or if both hard and soft triggers have semantics presuppositions (or if neither do), one has to find another explanation for the difference in suspendability. Bill Ladusaw (in a question after my talk at SALT XII) and Mats Rooth independently pointed out to me that most hard triggers are adverbs which express no meaning apart from the presupposition. Here is one way of making something of this in an account which assumes semantic presuppositions for both soft and hard triggers. To use one of these presuppositional adverbs, while intending a representation where the presupposition is locally accommodated and thereby turning the presupposition into an assertion, is a very indirect and complicated way of introducing asserted information. Because they are so indirect and complicated, such representations are not used. Another point is that most or all hard triggers associate with focus. Maybe the fact that the focus itself requires a contrasting antecedent places additional constraint on the representation, with the effect (somehow) that it is harder to suspend the presupposition. Abbott (2004) and Beaver (2004), which react to or build on Abusch (2002), discuss hypotheses along such general lines.

[5] Kadmon (2001) takes a different position: she argues, first, that it is hard to draw a clean line between hard and soft triggers, and second, that it does not matter much for theoretical issues like presupposition filtering and accommodation whether presuppositions are semantically or pragmatically triggered. See the second half of Section 9 for discussion of the latter point.

[6] Fillmore (1971) points out similar pairs, such as *accuse* and *criticize*, which have assertions and presuppositions permuted in various ways. I think none of his examples are completely symmetric.

[7] Notice that the facts are different if *sell* has a contrastive stress. In this case, A can be understood as conveying (and in fact, presupposing) that ownership of the bike went from John to Bill. I discuss such data in section 6.

[8] Actually, it is not clear that the definite description is a hard trigger, since it's presupposition is suspendable, as has frequently been noted:

(i) It is not true that John's girlfriend does not like his children, because he has none.

If the definite description has the properties of a soft trigger, this is an apparent problem or gap in my analysis, because no analysis for definite descriptions using alternative sets suggests itself. See Abbott (2004) for some further discussion.

[9]I am deliberately calling this phenomenon a transformation of presuppositions, rather than filtering, because this better describes our current understanding of the phenomenon. The filtering terminology does not apply well to all cases, for instance to the presupposition-projection behavior of *believe* (see Heim 1991 and Section 10).

[10]The twins examples are from Heim (1983), who attributes them to personal communication from Stanley Peters. Although the scenario is not the most natural one, I find the judgments clear.

[11] There is work to do in making this representation semantically sensible, since the values for Q have to be allowed to vary with the choices of x_2. I expect that this can be resolved by quantifying Q inside the scope of *everyone*, perhaps with an existential quantifier.

[12] Notice that, although I used lexical alternatives to obtain (54), at this point in the argument, the important thing is that in typical uses, the global context c is such that the corresponding local context for the soft trigger entails the presupposition of the soft trigger. The argument would work just as well if there were another reason for this, which did not have to do with alternatives. For aspectual verbs like *stop*, and in fact for all soft triggers which entail a change of state, I think there is another possibility, which uses the fact that we are better informed about the past than the future. One could try to argue that, in typical uses of *John stopped smoking (at r),* it is common ground whether John smoked before r or not, simply because people are typically well-informed about facts up to a certain point in time.

[13] See section 10 for an example of such a function from local to global contexts, and of how this function is involved in the pragmatic derivation.

[14] This formulation has to be so complicated because utterances of sentences with semantic presuppositions are typically accompanied by pragmatic presuppositions. Pragmatic presuppositions with this origin would automatically be compositionally transformed (or have the appearance of it), because the semantic presupposition is compositionally transformed.

[15] In my notation there is association to the right, so (st)st is grouped as (st)(st), and so is the type label of a function from information states to information states. For readers who prefer type labels written with commas and more brackets, the type label for **some** in that notation is $\langle\langle\langle\langle s,t\rangle,\langle s,t\rangle\rangle,t\rangle,\langle\langle s,t\rangle,\langle s,t\rangle\rangle\rangle$.

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