Conflicting Presuppositions and the Proviso Problem

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1 Conflicting Presuppositions

Conflicting presuppositions seem to sometimes cancel each other out. For instance, consider the following sentences, first discussed by Liberman (1973):

(1) Either John met the president of Slobovia or he met the king.

Taken separately the presupposition of either disjunct is just the existential presupposition of the definite description: for the left disjunct that there is a president of Slobovia for the right disjunct that there is a king of Slobovia.[1] Neither of these presuppositions, however, seems to be a presupposition of the entire sentence.[2]

In order to determine the presupposition of the entire sentence in terms of the presuppositions of its parts and how they are put together we ought to consult our favorite theory of *presupposition*

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[1]For simplicity I ignore the uniqueness aspect of the presupposition of a definite description.

[2]To try to show that what's going on in (1) is not an artifact of its particular structure, it's worth looking at another example with the same presuppositions made in a different form:

(i) Either John was annoyed to discover that Slobovia has a president, or he got to meet with the king.

It seems to me that (i) exhibits the same presuppositions (and lack of them) as (1). In addition, the phenomenon does not have anything particular to do with *disjunction* as far as I can tell. The same effect shows up in conditionals:

(ii) If John didn't meet the president of Slobovia, then he met the king.

The one fact which gives me pause is that if you negate (1) in certain ways then the sentence gets much stronger presuppositions (Philippe Schlenker and Nathan Klinedinst both pointed this out to me):

(iii) John didn't meet either the president or the king of Slobovia.

Here it seems we need to assume that Slobovia has both a president a king. I wish I knew why this was so, but I'm not sure yet whether it threatens the proposal of this paper.

projection. The problem is *no existing theory of presupposition projection actually can capture the presupposition of (1).* I won't go through all the details of the major theories of presupposition projection here but I'll summarize what predictions they make in cases where expressions with presuppositions are embedded in a disjunction as in (1). There are two basic kinds of projection rules for disjunction: symmetric rules and asymmetric rules.[3] By symmetric rules, I mean rules according to which the presuppositions of a sentence of the form $\alpha \vee \beta$ is the same as the presupposition of a sentence of the form $\beta \vee \alpha$. Since it seems like (1) has the same presuppositions if you switch the order of the disjuncts we may as well confine ourselves to symmetric theories of presupposition projection through disjunction.[4]

For illustrative purposes consider the presuppositions of (1) on the so-called *cumulative* hypothesis according to which complex expressions simply inherit all the presuppositions of their parts. We can state the projection rule of the cumulative theory in terms of a function P that goes from sentences to presuppositions:

$$P(\alpha \vee \beta) = P(\alpha) \& P(\beta) \tag{i}$$

According to this rule, (1) presupposes that there is a president and a king of Slobovia, which is obviously a far stronger presupposition than we actually find, since (1) would be fine in contexts in which there is no president or king.

Luckily there are more refined theories on the market. On the one hand, there is the tradition of Karttunen and Peters (1979), Schlenker (2006, 2008a, 2009) and Chemla (2008). Although these theories all treat presuppositions in very different ways, at the end of the day, they make the same prediction for the projection of presuppositions through disjunction.

$$P(\alpha \vee \beta) = (\neg\alpha \supset P(\beta)) \wedge (\neg\beta \supset P(\alpha))^5 \tag{ii}$$

Applying this rule we can state the presuppositions of (1) as follows:

(2) (If John didn't meet the president then there is a king) and (If John didn't meet the king then there is a president)

This presupposition is too strong. Although (2) is entailed by (1) it doesn't seem to be presupposed by it. For instance, if one were to deny (1) one would not take for granted that if John didn't meet

[3]See Schlenker (2008a, 2009) and Rothschild (2008) for more discussion of symmetric versus asymmetric rules. While symmetric rules are extremely controversial for many types of connectives, such as conjunctions, they have long been accepted for disjunction (e.g. Karttunen and Peters, 1979; Soames, 1982).

[4]Indeed, none of the asymmetric theories will do much good since all predict of (1) that it presupposes that there is a president of Slobovia, an obviously bad prediction.

[5]I discuss how to derive these rules from Schlenker's and Chemla's theory in Rothschild (2008).

the president then there is a king (for one reason one could deny (1) is that one could know there is a president and John didn't meet him). But it's the mark of presuppositions that they persist under denials, so (2) cannot be a presupposition of (1).[6]

There is another class of theories, including trivalent theories, as well as symmetric dynamic systems, that yield a slightly different rule for the presupposition of disjunctions. Their rule can be stated as follows:

$$P(\alpha \vee \beta) = ((P(\alpha) \& (\neg\alpha \supset P(\beta))) \vee (P(\beta) \& (\neg\beta \supset P(\alpha))) \tag{iii}$$

Unfortunately, as this is strictly stronger than the previous rule, it will suffer from exactly the same problems.

2 Cancellation

Since Soames (1982) the most commonly accepted treatment of conflicting presupposition is as cases where potential presuppositions are cancelled and thus fail to arise. On this view, independently developed by Gazdar (1979), presuppositions generation come in two parts: first, there is some general mechanism to generate all the *potential presuppositions* of an expression and second, there is a mechanism that decides which of the potential presuppositions to actually allow to become *actual presuppositions*.

Gazdar (1979) and Soames (1982) proposed that potential presuppositions will fail to be actualized when they violate conversational conditions of the sentence.[7] While they had different stories about the potential presuppositions,[8] any of the relevant proposals outline above might violate conversational conditions, and so, on the cancellation story, not be realized. If the presuppositions triggered in the disjunct do not arise because they would violate some conversational condition, then we should expect (1) not to have any presuppositions.

The only problem is that it is plausible to think that that (1) *does* have a presupposition namely:

(3) Slobovia has a president or a king.

It's always slightly tough to test for presuppositions. But if (1) had no presupposition then we would expect, all else equal, the following sentences to be fairly natural:

[6]Karttunen (1974) specifically endorses the view that (2) is the presupposition of (1), but he doesn't really give any arguments for this.

[7]Essentially the idea is that a potential presuppositions fails to be actualized when it's the case that were it to be actualized it would either conflict with or destroy the point of the assertion the sentence is making.

[8]Gazdar (1979) used the cumulative hypothesis to get potential presuppositions, but Soames (1982) used something closer to the rules in Karttunen and Peters (1979).

(4) I'm not sure whether there is even a head of state in Slobovia, but if John met the president or the king, he probably got treated well.

However, it seems to me that (4) is rather awkward. It does not seem much better than (5), which is a clear instance of a violation of a presupposition:

(5) I'm not sure wether Slobovia has a president, but if John met the president, he probably got treated well.

That these two sentences should have a similar degree of felicity is what we would expect if (1) presupposes (3). If (1) has no presuppositions, we would expect (4) to be substantially better than (5), because there would be no need to accommodate or cancel a presupposition in the antecedent of the conditional in (4). For this reason, I think we should accept that (1) presupposes (3), which is the judgment one usually finds in the literature.

Soames (1982) acknowledges that (1) presupposes (3) but thinks he can capture this on a cancelation story. His idea is that, while some part of the presupposition of (1) gets cancelled for conversational reasons, the weaker presupposition, (3), doesn't get cancelled, since it does not violate a conversational condition. Magidor (forthcoming) points out this attempt in Soames (1982) to derive (3) does not seem to be successful. Her argument is very simply, and, I think, correct. For proposition P we can think of any infinite set of weakenings: just disjoin P with any other proposition and you have a weakening of P. But clearly not any weakening of P that doesn't violate a conversational condition will still be presupposed when the potential presupposition P is cancelled by a conversational condition. So it is a mere stipulation on Soames's part to suppose that the presupposition of (1) is (3) after his cancelation mechanism applies to the potential presuppositon.[9]

3 A New Rule for Disjunction?

Cancellation accounts, while they may explain why we do not generate too strong a presupposition have a hard time explaining why we get any presupposition at all. One natural conclusion is just that the previous projection rules for disjunction discussed in section 1 are wrong, and we need to formulate a rule that covers (1) as well as the more standard cases.

The following rules are plausible enough modifications of (ii) and (iii) that can handle the

[9]Nathan Klinedinst suggested to me that one might try to constraint the cancellation method to certain contextually relevant alternatives to deal with this problem (see, Singh, 2007, for a related proposal). I do not examine this possibility here.

problem of conflicting presuppositions:[10]

$$P(\alpha \vee \beta) = ((\neg\alpha \& \neg P(\alpha)) \supset P(\beta)) \wedge ((\neg\beta \& \neg P(\beta)) \supset P(\alpha)) \tag{iv}$$

$$P(\alpha \vee \beta) = ((P(\alpha) \& ((\neg\alpha \& \neg P(\alpha)) \supset P(\beta))) \vee (P(\beta) \& ((\neg\beta \& \neg P(\beta)) \supset P(\alpha)) \tag{v}$$

If we apply either of these rules to (1) we do get (3).

While these rule do the trick, it's not a very nice solution. Recent work, particularly that of Schlenker (2006, 2008a, 2009), however, has suggested that theories of presupposition projections should go beyond mere descriptive adequacy to also explain why different connectives interact with presupposition in the way that they do. It is not an easy task to fit (iv) or (v) into such an explanatory framework, so we should be weary of simply stipulating either of them.

We do not need to resort to such stipulation. It turns out there are several other projection phenomenon linked to that of conflicting presuppositions, and I will propose a uniform explanation of them that can be added on top of the standard projection rules.

4 A Related Problem: Presuppositions Weakening

A similar phenomenon to that of conflicting presuppositions arises even without conflicting presupposition. Take this example:

(6) Either there is a king and John met the king, or John met the president.

On almost any standard theory—as well with rules (iv) an (v) above—the presupposition for this is predicted to be:

(7) ¬(There is a king and John met him) ⊃ (There is a president)

This presupposition, however, is clearly too strong. It makes it the case if there is a king and John failed to meet him and there is no president, then there is a presupposition failure. While the sentence is false in that case, it does not seem like an instance of presupposition failure. Again, it is more natural to think the presupposition is just (3) which, perhaps, in this case is more naturally stated in the form of an equivalent material conditional:

(8) ¬(There is a king) ⊃ (There is a president)

[10] See Magidor (forthcoming) for discussion of some of the difficulties of giving a projection rule that covers (1). Magidor (forthcoming) suggests her own rule, which differs a bit from these.

The two-stage cancellation view of Gazdar (1979) and Soames (1982) is of no help here. A cancellation mechanism might be able to entirely cancel the presupposition of (6), but it will not explain why we get (3) (or, equivalently (8)) instead. Again, I think that standard tests suggest that (6) really does make a presupposition.

Both (1) and (6) are cases in which a weaker presupposition than one would expect arises. One would hope that there is a common explanation of these two cases, which are remarkably similar in form. If there is a standard explanation then we do not need rule (iv) or (v), which would be nice, since it's hard to see how to motivate those rules as part of an explanatory theory of presupposition projection.

As the phenomenon of presuppositions weakening has, to my knowledge, not been noted before in the literature, it's worth giving another example of it to show that it is not just an artifact of the particular form of (6). Consider this pair of sentences:

(9) a. Either it didn't rain, or they complained about the fact that the game was cancelled.
b. Either it didn't rain and everyone had a good time, or they complained about the fact that the game was cancelled.

Here are the predicted presuppositions of these sentences according to standard theories:

(10) a. it rained $\supset$ game was cancelled
b. $\neg$ (it didn't rained & everyone had a good time) $\supset$ game was cancelled.

It does not seem to me that (9-b) makes a stronger presupposition than (9-a). However while (10-a) is innocuous, (10-b) is not at all, as it entails that if everyone did not have a good time, the game was cancelled. In this instance, this is entailed by (9-b) but it does not seem to be presupposed by it. One way to see this is imagine someone challenging (9-b). It does not seem that in challenging it they would naturally be taking for granted that if everyone didn't have a good time the game was cancelled. Rather they might think that people had a good time, despite the game being cancelled.

I hope these examples make plausible that there is a general phenomenon of perceived presuppositions being weaker than standard theories predicts. I think this has largely gone unnoticed because the relevant examples are complex and the judgments somewhat subtle. Before giving a common explanation of what's going on with these cases and with the case of conflicting presupposition, I review a related kind of case which has been much discussed in the recent presupposition literature.

5 Proviso Problem

In the case of both (1) and (6) standard theories predicted presuppositions that were much stronger than the observed presupposition. This is, in some sense, the inverse problem of what is commonly called the *proviso problem.* This is the label for the fact that presupposition projection theories systematically predict presuppositions that are *weaker* than the ones that people seem to observe. Here is one example:

(11) If John is in town then he doesn't use his car very often.

The most standard rule for presuppositions projection in conditionals is the following:

$$P(\alpha \rightarrow \beta) = P(\alpha) \wedge (\alpha \supset P(\beta)) \tag{vi}$$

According to (vi) the presupposition of (11) is:

(12) (John is in town) $\supset$ (he has a car)

However, many have observed that what (11) seems to take for granted is rather the unconditional proposition that John has a car.

One reaction is to think that projection rules that give you conditional presuppositions, such as (vi) are wrong.[11] However, it is worth pointing out that, to all appearances, we sometimes do get exactly the conditional presuppositions a rule like (vi) would predict. The classic case is as follows:

(13) If John is a suba diver, then he took his wetsuit with him.

Here the most plausible presupposition seems to be the conditional one predicted by (vi):

(14) (John is scuba diver) $\supset$ (he has a wetsuit)

So it seems that both conditional and non-conditional presuppositions *can* arise.

It is not even true that you always either get the predicted conditional presuppositions or the presupposition of a part of the sentence without any condition: sometimes merely part of the conditional presuppositions disappears. Consider the following example:[12]

(15) If John is a scuba diver and he is allowed to check luggage, then he'll bring his wetsuit.

[11]This is the view of van der Sandt (1992) and Geurts (1996), as I understand them.
[12]Whose example is this? Barts?

Here normal theories predict the presupposition will be:

(16) (John is scuba diver and he is allowed to check luggage) $\supset$ (he has a wetsuit)

More intuitively, however, the presupposition of (15) is the same as that of (13), namely (14).

One traditional explanation of this range of facts is by reference to the idea that there are systematic pragmatic mechanisms whereby certain weak (i.e. conditional presuppositions) are strengthened. On this sort of story we take for granted that the projection rules that yield conditional presuppositions are correct and just suppose that often while a sentence only requires a conditional presupposition to be felicitous, when we actually use the sentence we, for some reason, accommodate an unconditional presupposition. There are fairly plausible things to be said about why this happens.[13]

A traditional objection to this view is that when you make a conditional presupposition *explicit* a similar transformation from conditional to non-conditional presupposition does not occur:

(17) Mary knows either John isn't in town or he has car.

Given the facivitity of "to know" any standard theory will tell you that (17) will presuppose (12).[14] However, unlike (11), (17) does seem to presuppose (12), not the stronger presupposition that John has a car. So any story that explains why the presupposition of (11) get strengthened had better not also apply to (17). There's quite a lot that can and has been said on behalf of strengthening theories to deal with this problem.

The data presented in the last section, in particular sentence (6), provides a more serious challenge to the entire strengthening approach. What we see with (6) is that in a similar way to certain presuppositions getting strengthened, others get weakened. Unfortunately, as far as I know, none of the standard strengthening stories can be adapted to handle weakening. The reason is that strengthening is naturally seen as a pragmatic process that happens *after* the presupposition has been calculated. Someone utters a sentence S that takes for granted $A \supset B$, the audience understands B to be taken for granted as a way of making S acceptable (i.e. as part of the process of presupposition *accommodation*). This could be because B is contextually equivalent to $A \supset B$ or because in the context B is simpler and more salient than $A \supset B$. Either way, once you've taken B for granted, then S is acceptable. Similar stories cannot be told about how one can *weaken* a presupposition: if S needs some background assumption to be acceptable then taking for granted a *weaker* proposition will not will not suddenly make S acceptable. So strengthening stories do not naturally extend to cases like (6).

[13] See for instance, Heim and van Rooij (2007).

[14] I use a disjunction inside "to know" rather than a conditional to be sure we have something equivalent to material conditional presupposition of (12).

Of course, there could just be two different stories: a strengthening story for the proviso problem and something else for (6). To the extent that what's happening with (6) resembles what's happening with (15) this is going to seem a bit hokey, though. My sense is these two cases do seem very similar. Below I will try to substantiate this impression by giving a single story that covers the proviso problem and cases like (6). Then I'll argue that this same mechanism can also handle the case of conflicting presuppositions, such as (1), that we started with.

6 Presupposition Altering

Here I formulate a mechanism that systematically allows us to strengthen and weaken presuppositions. As I mentioned earlier, there is considerable controversy on exactly what the right rules for describing the projection of presuppositions are. I do not wish here to assume any particular method for understanding the projection of presuppositions. So, I will just discuss, in a propositional language, what the presupposition of an entire sentence is when only one part of it has a presupposition on its own. Consider any sentence of the form $\alpha * \beta$ where $*$ is some binary connective. I'll use the formula $P_\beta(\alpha * \beta)$ to represent the presupposition that the entire sentence has when β, but not α, has a presupposition. Formulating the matter so narrowly, there is actual little disagreement (the proviso problem aside) on what the pattern of presupposition projection is. The following are the most standard assumptions in the literature, shared by nearly every empirically adequate theory:

$$P_\beta(\alpha \wedge \beta) = \alpha \supset P(\beta) \tag{vii}$$

$$P_\beta(\alpha \vee \beta) = \neg\alpha \supset P(\beta) \tag{viii}$$

$$P_\beta(\alpha \rightarrow \beta) = \alpha \supset P(\beta) \tag{ix}$$

I will also assume, as is absolutely standard, that presuppositions project unaltered through negation:

$$P(\neg\beta) = P(\beta) \tag{x}$$

Now, note that in (vii)–(ix) the presuppositions are always of the form $\phi \supset P(\beta)$. I will call ϕ (which is either (α or $\neg\alpha$)) the *weakening material*. What I will propose is a procedure for neutralizing irrelevant material in the weakening material which I'll call the *reduction algorithm*.[15] This algorithm (context-sensitive as it is) can be represented by a function $R_{P(\beta)}$ that acts on the weakening material to yield a new proposition. I subscript R with $P(\beta)$ because, as we will see, the function works by removing material irrelevant to $P(\beta)$, and this will differ for different $P(\beta)$s.

[15] I owe the basic idea of this way of handling the proviso problem by neutralizing some information in the calculation of presuppositions to discussions with Philippe Schlenker.

This function $R_{P(\beta)}$ is sensitive to not just the proposition expressed by the weakening material ϕ but also its syntactic form. So, it is a function that goes from sentences to propositions. Given the reduction algorithm R we can describe the observed presuppositions as follows:

$$P_\beta(\alpha \wedge \beta) = R_{P(\beta)}(\alpha) \supset P(\beta) \tag{xi}$$

$$P_\beta(\alpha \vee \beta) = R_{P(\beta)}(\neg\alpha) \supset P(\beta) \tag{xii}$$

$$P_\beta(\alpha \rightarrow \beta) = R_{P(\beta)}(\alpha) \supset P(\beta) \tag{xiii}$$

The idea behind the reduction algorithm $R_{P(\beta)}$ is that any material in the weakening material that is not relevant to the presupposition of the embedded clause β is made innocuous. So we need two notions: one is the notion of relevance to $P(\beta)$ and the other is that of making innocuous.

Relevance to $P(\beta)$ is not a notion I will define. Whatever it is, it depends on contextual assumptions and background knowledge. Intuitively, a sentence P is relevant to a sentence Q if and only if knowing whether or not P is true or false *greatly* affects one's degree of belief in Q. For example, that John is a scuba diver is clearly relevant to whether or not he owns a wetsuit. However, where he is flying to, or whether he is allowed to check luggage, is not. While it's tempting to define relevance as lack of probabilistic independence this is probably too broad a definition: . Maybe though, it could be defined though as a substantial lack of independence (so substantial correlations). However, the notion of relevance we need must be sensitive not just to the absolute relevance an atomic formulas to the presupposition it weakens but also to its position in the weakening material; in particular whether or not it shows up under negation. The problem can be seen with the following examples:

(18) If John is not a scuba diver, then he probably rarely uses his wetsuit.

Intuitively this does not have the standard presupposition predicted:

(19) (John is not a scuba diver) $\supset$ (John has a wetsuit)

Rather it seems to have the simple presupposition that John has a wetsuit. However, if we take John being a scuba diver to be *relevant* to John having a wet suit, then our reduction algorithm will have nothing to do, so we cannot derive the stronger presupposition. Examples such as this suggest the following rule: an instance of atomic formula, A in a weakening algorithm α is relevant to the presupposition P iff when α' is the formula found by replacing A with $\neg A$, $\alpha \supset P$ is substantially more likely than $\alpha' \supset P$.[16] This formulation too, might is probably subject to counterexamples.[17] Regardless my purpose here is not to spell out this notion but to examine how, given the right notion, we go about altering presuppositions.

The way material is made innocuous is that is turned into a tautology. However, in order to get interactions with negations right (and not produce troublesome contradictions) we need to state this rule in two parts. If A is an atomic formula appearing in α then to make A innocuous in α we a) replace every instance of A in α with a tautology T and b) replace any instance of a negation in front of a tautology in α that has resulted from a) with T. So, for instance if we have a sentence $A \wedge B$ and we want to make B innocuous we get A by following a) and then noting that b) doesn't apply. On the other hand, if we have $A \wedge \neg B$ and we want to make B innocuous we get A again by applying a) and then b). In the simple case, if we make A innocuous in either A or $\neg A$ we get T.

Now we can state the reduction algorithm: $R_\psi(\phi)$ is the result of making innocuous any atomic propositions in ϕ that are irrelevant to ψ. In the remainder of this section I'll go through the predictions of this algorithm.

Notation W = John will bring his wetsuit, S = John is scuba diver, B = John is going to Bermuda, C = John is going to Canada, L = John likes the Beetles, T = tautology

Presuppostions $P(W) = P(\neg W)$= John has a wetsuit, all other presuppositions are just T

Relevance I'll assume that S is relevant to $P(W)$ but B, L, and C are not.

[16] I am very grateful to Marta Abrusan for bringing this problem to my attention. She noted that without this more refined notion of relevance the treatment of conflicting presuppositions which I give in the next section would often yield presuppositions that were sometimes too weak. In particular without this caveat we predict to (i) to presuppose only that John is a scuba diver or owns a wet suit, not both, which seems wrong.

(i) Mary knows John is a scuba diver or his wet suit is well hidden.

[17] Nathan Klinedinst suggested the following sort of case to me. Most people who have Albania fathers also have Albanian mothers. So having an Albanian father substantially raises the probability of having an Albanian mother. Suppose nothing about Mary's parents is in the common ground. It does not seem like this sentence is appropriate then:

(i) If Mary's father is Albanian, then her Albanian mother lives in the US.

It seems like (i) still presupposes that Mary has an Albanian mother, not that *if* she has an Albanian father she has an Albanian mother too. It might be that the criteria for getting a "conditional" presupposition is something more like near contextual entailment. If this right this explains the fact that any observed conditional presuppositions are extremely weak.

6.1 Presupposition Strengthening

First let's show that we can cover the basic proviso problem cases where we fail to get conditional presuppositions. One such case is $B \to W$:

(20) If John is going to Bermuda then he'll bring his wetsuit.

The presupposition of this is $R_{P(W)}(B) \supset P(W)$. Given that B is not relevant to $P(W)$ this comes to $T \supset P(W)$ which comes to $P(W)$. So we get the unconditional presupposition that we should.

It's worth going through a disjunction also, since we will need to see how these work later. Take, $\neg B \vee W$:

(21) Either John is not going to Bermuda or he'll bring his wetsuit.

The presupposition is as follows $R_{(P(W)}(\neg\neg B) \supset P(W)$. This again yields $T \supset P(W) = P(W)$, a good result.

It's easy to see, given the relevance relations, that $S \to W$ will give the standard prediction of $S \supset P(W) =$ if John is scuba diver then he has a wetsuit, since $R_{P(W)}(S) = S$.

Now let's do a conjunction in the antecedent of a conditional as in example (15) above: $(S \wedge B) \to W$:

(22) If John is scuba diver and is going to Bermuda, then he'll bring his wetsuit.

Here this is going to be $R_{P(W)}(S \wedge B) \supset P(W)$. Given the relevant relations this simplifies to: $(S \wedge T) \supset P(W) = S \supset P(W) =$ if John is a scuba diver then he has a wet suit, which is the prediction we want. Note that that we get the same presupposition on these rules for $(S \wedge \neg B) \to W$, which also seems like a good prediction.

Things are a little more stranger when we have a disjunctive antecedent, as in $(S \vee \neg C) \to W$:

(23) If John is a scuba diver or isn't going to Canada, then he will bring his wetsuit.

The presupposition of this is $R_{P(W)}(S \vee \neg C) \supset P(W) = (S \vee T) \supset P(W) = P(W)$. I take it that it's pretty reasonable to think that (23) presupposes that John has a wetsuit, but the judgment is a little unclear .

Assuming, then, that we have an appropriate grasp on the relevance relations among sentences and presuppositions, this mechanism seems like a reasonable way of calculating the presuppositions of sentences. It also does not seem that *ad hoc*, since after all the idea behind the algorithm is just that in calculating presuppositions we ignore as much irrelevant material as we can.

I should note also, that since the algorithm only affects the weakening material of presuppositions we have no problem when a presupposition is itself conditional, as in this example:

(24) Mary knows that if he goes to Bermuda then John has a wetsuit.

Here there is no weakening material to work on so the presupposition of the whole is just whatever our account of the trigger "to know" yields, which is just the factive presupposition "if John goes to Bermuda then John has a wetsuit." Thus, the mechanism I have preposed for dealing with the proviso problem does not have any problem allowing that there are often conditional presuppositions.

6.2 Presupposition Weakening

I will now show that there are cases in which this mechanism does not strengthen presuppositions but rather *weakens* them. Where it weakens them is easiest to see in disjunctions with conjunctive first disjuncts such as this $(\neg S \wedge L) \vee W$.

(25) Either John isn't a scuba diver and doesn't like the Beatles or he'll bring his wetsuit.

In this case we make tautologous one conjunct in a negative environment in the weakening material, thus making the entire presupposition stronger: the presupposition of $(\neg S \wedge L) \vee W$ is $R_{P(W)}(\neg(\neg S \wedge \neg B)) \supset P(W)$. Applying our reduction algorithm we get $\neg(\neg S \wedge T) \supset P(W) = S \supset P(W)$. Note that $S \supset P(W)$ is actually weaker than the predicted presupposition without the algorithm $\neg(\neg S \wedge \neg B) \rightarrow P(W)$. I think this prediction is right.

We can see also why presuppositions weakening is such an elusive phenomenon: it requires a negated conjunction in the weakening material. We naturally find such examples in disjunctions since these are cases where the standard presupposition projection algorithm adds a negation to the weakening material: however constructing the relevant sentences with conditionals or conjunctions is extremely difficult.[18]

That our algorithm can strengthen as well weaken presuppositions will be key for dealing with conflicting presuppositions. But, before that, let us tackle the direct example of presupposition weakening presented in section 4. Sentence (6), repeated here:

(26) Either there is a king and John met the king, or John met the president.

[18] Another potential case is "unless", which, according to Schlenker (2008a) has a similar projection rule to disjunction. So we should predict (i) to have also have a weaker than predicted presuppositions just as (25) does:

(i) Unless John isn't a scuba diver and doesn't like the Beatles, he'll bring his wet suit.

This prediction seems plausible to me.

If we assume that "there is a king" is relevant to the presupposition of the consequent ("there is a president") but that "John met the king" is not relevant, then we get the prediction that the whole sentence presupposes that if there is a king then there is a president. So as advertised, this way of treating the proviso problem can also handle the problem in Section 4.

7 Expanding to Conflicting Presuppositions

We now have *some* of the resources we need to see what's going on with the case of conflicting presuppositions that we started with. However, there are two crucial gaps: first, we haven't described how we should understand the syntax and semantics of presuppositional expressions themselves with respect to the reduction algorithm, second, we don't have any projection rules that deal with cases where presuppositional expressions appear in both disjuncts rather than just in the second disjunct.

We need to have a treatment of the syntax and semantics of presuppositional expression for the purposes of the reduction algorithm, because we are going to need apply the algorithm to sentences that include presuppositional expressions, and the reduction algorithm is sensitive to both syntax and semantics. What I am going to assume is that, for the purposes of the reduction algorithm, the *presuppositional content is treated as syntactically separate from the non-presuppositional content.* I'll treat a sentence like "John met the king" as being the conjunction of two atomic sentences "There is a king" and "John met him".[19] I won't be too particular about the content of the non-presuppositional part is, but it will be critical to my story that relevance relations can differ between these two sentences. In this particular example, for instance, while "There is a king" might be relevant to "There is a president", "John met him" might not be.[20]

The treatment of presuppositions in both disjuncts is a more complicated business. For the moment, I will give a rather simple treatment of the matter that matches that of Schlenker (2006, 2008a, 2009), and Chemla (2008). However, in the next section I will show that while this approach handles the problem of conflicting presuppositions it can only do so at the cost of creating another problem.

From the perspective of Schlenker and Chemla each embedded presuppositional expression creates its own separate demand on the context and the total presupposition of any sentence is just the conjunction of all the demands from all the embedded expressions. This is a nice suggestion since it allows us to keep what work we've already done for presuppositions in the

[19] This way of thinking about presuppositional expressions is also in Schlenker (2008a).

[20] Following Schlenker, I'll write A' to mark the assertive component of A. The complication is that "John met him" seems to entail there is a president. In this case relevance relations are not closed under strengthening: A can be relevant to B while some C that entails A might not be. Note that my treatment of example (6) above also required this.

second disjunct and then just calculate presuppositions for the first disjunct and then conjoin the two presuppositions to get the presupposition of the whole sentence.

We already have stated what presupposition an occurrence of β in $\alpha \vee \beta$ yields, namely $R_{P(\beta)}(\neg\alpha) \supset P(\beta)$, so what remains is to deal with α. All our examples so far suggest that the order of the disjuncts is irrelevant to presupposition projection. On this assumption, we can simply switch β with α to get the presupposition that α yields in $\alpha \vee \beta$:

$$P_{\alpha}(\alpha \vee \beta) = R_{P(\alpha)}(\neg\beta) \supset P(\alpha) \tag{xiv}$$

If we conjoin both the left and right together, we get a a new projection algorithm, which is basically of the same form as (ii) above with the added reduction algorithms:

$$P(\alpha \vee \beta) = (R_{P(\beta)}(\neg\alpha) \supset P(\beta)) \wedge (R_{P(\alpha)}(\neg\beta) \supset P(\alpha)) \tag{xv}$$

Now we're ready to tackle the case of conflicting presuppositions:

Notation $P(MP) \wedge MP'$ (or just MP for short)= John met the president, $P(MK) \wedge MK'$ (or just MK for short)= John met the king.

Presuppositions $P(MP)$ = there is a king, $P(MK)$ = there is a president.

Relevance I assume $P(MK)$ is relevant to $P(MP)$ and vice versa but that MK' and MP' are not relevant to $P(MP)$ or $P(MK)$

Let us calculate the presupposition of $MP \vee MK$, our original sentence (1). Let's first figure out what presupposition the right disjunct leads to. $P_{MK}(MP \vee MK) = R_{P(MK)}(\neg(P(MP) \wedge MP') \supset P(MK)) = \neg(P(MP) \wedge T) \supset P(MK) = \neg P(MP) \supset P(MK) = P(MP) \vee P(MK)$. Now, since the rules of presupposition projection for disjunction are symmetric the presuppositions induced by the left disjunct, MP, will be exactly the same. So conjoining them together the total presupposition is predicted to be $P(MP) \vee P(MK)$ = there is a king or there is a president. This is exactly the desired result.

8 The Double Cancellation Problem

Everything looks very nice so far: we had three related problems, the problem of conflicting presuppositions, the problem of raised by sentence (6) where presuppositions had to be weakened, and the proviso problem. One intuitive mechanism dealt with all three. Unfortunately, our handling of presuppositions across both disjuncts now gives us a new problem. Consider this sentence.

(27) Either John didn't meet the president or John didn't talk to the president.

Look at the presupposition of the right disjunct for instance without even applying the reduction algorithm. It can be stated as follows:

(28) (There is a president and John met him) $\supset$ (there is a president).

This is obviously trivial. So we expect there is no presupposition from the right disjunct, and similar reasoning will now apply to the left disjunct too. But this is an awful result! Clearly (27) presupposes that that there is a president as much as any of its disjuncts alone would.

Since we haven't even used the reduction algorithm the problem is not with the reduction algorithm itself but rather with the assumptions about how to treat the presuppositions of disjuncts that we made above, along with the idea that presuppositional expression entail their presuppositions.

One way to fix this problem is through the reduction algorithm itself. If the proposition "there is a president" is not relevant to itself then we can allow (27) to have a non-trivial presupposition once we apply the reduction algorithm. This response would seem to do the work, but it is rather *ad hoc*, as on a normal notion of relevance a proposition is relevant to itself.

Schlenker (2008b) in response only to the problem presented by (27) suggested that we should ignore presuppositional content when calculating the weakening material. This will deal with (27), but if we go this route then no longer have any solution to the problem of conflicting presuppositions, since that relied on using presuppositional content in the weakening material.

A more principled way of treating this problem is to abandon the basic idea that presuppositions are calculated individually for each embedded presuppositional expression and then all conjoined together. Rejecting this idea will requite abandoning fundamental aspects of the frameworks of Schlenker (2006, 2008a), and Schlenker (2009), and Chemla (2008).

What kind of architecture do we need instead? Theories that predict rules for disjunction along the lines of (iii) do not suffer from the problem presented by (27). On these theories (27) is correctly predicted to presuppose that there is a president. Moreover, these theories can also handle the problem of conflicting presuppositions if we modify (iii) using the reduction algorithm. In this case we get the following rule for presupposition projection through disjunction:

$$P(\alpha \vee \beta) = ((P(\alpha)\&(R_{P(\beta)}(\neg\alpha) \supset P(\beta))) \vee (P(\beta)\&(R_{P(\alpha)}(\neg\beta) \supset P(\alpha))) \tag{xvi}$$

Since we can motivate this kind of rule without the reduction algorithm and the reduction algorithm is itself well motivated, this seems like the best solution. I am not sure which the explanatory story we should prefer that explains yields (iii), but it does fall out of a number of theories, so the problem is not a lack of explanation but wealth of them.

9 Conclusion

The problem of conflicting presuppositions has largely been forgotten in the literature. However, it turns out that a successful solution is non-trivial and might place serious constraints on both the treatment of the proviso problem and even potentially the basic architecture of the theory of presupposition projection.

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