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Presuppositions and Antipresuppositions in Conditionals*

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Abstract Utterances of counterfactual conditionals are typically attended by the information that their antecedents are false. But there is as yet no account of the source of this information that is both detailed and complete. This paper describes the problem of counterfactual antecedent falsity and argues that the problem can be addressed by appeal to an adequate account of the presuppositions of various competing conditional constructions. It argues that indicative conditionals presuppose that their antecedents are epistemically possible, while subjunctive conditionals bear no presupposition. Given this arrangement, utterance of the counterfactual results in an *antipresupposition*, that is, a scalar implicature generated from the presuppositions of competing alternatives rather than from the at-issue content of competing alternatives. The content of the antipresupposition is the negation of the presupposition of the competing indicative, i.e., that the antecedent of the conditional is known to be false by the speaker.

Keywords: Conditionals, Counterfactuals, Indicative Conditionals, Counterfactual Antecedent Falsity, Presuppositions, Antipresuppositions

1 Introduction: Conditionals and Counterfactual Antecedent Falsity

Utterances of counterfactual conditionals typically come along with the message that their antecedents are false. For example, B's utterance in (1) will typically carry the information that John did not attend the party. This paper will examine the source of that information.

- (1) A: I heard the party was no good.
B: If John had come, it would have been fun.

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B's utterance in (1) is an example of a counterfactual conditional. Counterfactual conditionals are uniquely in competition with past indicative conditionals, where a past indicative is an indicative conditional whose antecedent and consequent both refer to past events. An example is given in (2).

(2) If John came, it was fun.

This is a stipulative definition of 'counterfactual', but I think it closely approximates the class of sentences that many theorists aim to capture when they use the term 'counterfactual'. Note that the characterization makes no reference to the truth value of any conditional's antecedent or consequent. As characterized here, there is no contradiction in saying that a counterfactual has a true antecedent or true consequent.

There appear to be just these two methods of making conditional claims about the past in English. When a speaker chooses the counterfactual option, her choice is often attended by the information that the antecedent is false. But what is the source of that information? The question has proven interesting since it has been shown that counterfactuals neither entail nor presuppose that their antecedents are false. There are two arguments to this effect. First, counterfactuals can be used as premises in modus tollens arguments for the falsity of their antecedents, as in (3):

(3) This was done with a stiletto. But if the butcher had done it, he would have used a cleaver. So it wasn't the butcher.

This seems like good, convincing argument. But if counterfactuals entailed or presupposed that their antecedents were false, it would beg the question, since the first premise would entail or presuppose that the conclusion was true. Since the argument doesn't beg the question, we conclude that the counterfactual neither entails nor presupposes that its antecedent is false (cf. [Stalnaker 1975](#)).

Second, it has been widely noted that counterfactuals can have true antecedents. For example, a doctor might use (4) to argue that a patient had taken arsenic:

(4) If he had taken arsenic, he would have shown exactly the symptoms that he was in fact showing (modified from [Anderson 1951](#)).

So counterfactuals neither entail nor presuppose that their antecedents are false. The best remaining alternative is that the information of antecedent falsity that attends utterances like (1) arises as an implicature. I will not discuss here existing accounts of that implicature, which can be found in [Iatridou 2000](#) and [Ippolito 2003](#), but will shortly offer my own.

Next, though, we note that conditionals of various morphological structures are infelicitous in some contexts:

(5) A: John didn't go.
 B: If John had gone, it would've been fun. / # If John went, it was fun.

- (6) A: John isn't going to go.
B: If John went, it would be fun. / # If John goes, it will be fun.
- (7) A: John went to the party.
B: If John went, it was fun. / # If John had gone to the party, it would have been fun.

These infelicities are attributed to presupposition failure in [Stalnaker 1975](#), [Karttunen & Peters 1979](#), and [von Stechow 1997](#). However, these authors disagree about the exact nature of the presuppositions that fail.

This paper will add a novel account of the presuppositions triggered by some kinds of conditionals, and explain the data above. It will also apply the mechanism of *antipresuppositions* running on these presuppositions to explain the implicature of counterfactual antecedent falsity.

2 Antipresuppositions: Discussion

In this section I introduce the notion of an antipresupposition. In [Heim 1991](#), Irene Heim noted that (8) is infelicitous.

- (8) # I interviewed a father of the victim.
(9) Competitor: I interviewed the father of the victim.

Her explanation was that there is a competitor, (9), that is equivalent in every context that entails that every victim has exactly one father. However, (9) is presuppositionally stronger, and so Heim posits a Gricean maxim: *Maximize Presupposition!*. The infelicity of (8) is then explained as a violation of this maxim.

But if this is a Gricean maxim, we should expect to observe its use in the generation of implicatures. And such implicatures are indeed observed. In this section I will follow the formulation of [Chemla 2008](#), though alternatives also appear in [Percus 2006](#), [Schlenker 2006](#), and [Sauerland 2008](#). Consider (10), which, uttered in the correct circumstances, will generate the implicature that the speaker does not have a sister:

- (10) John believes I have a sister.

The implicature results from the competition between (10) and (11):

- (11) John knows I have a sister.

Hearers of (10) may wonder why the utterer did not choose the presuppositionally stronger (11); when the circumstances are right, they will conclude that the speaker believes that the presupposition of (11) is false. The job of the theory of antipresuppositions is then to describe the circumstances under which that inference is appropriate.

First we start with scales ordered in terms of presuppositional strength. Some plausible examples of such scales are <a, the>, <each, the>, <believe, know>.

Then, Chemla notes that a sentence *S* with presupposition π can be felicitously uttered by a speaker *s* only if:

- i. *s* believes that π is true ($B_s[\pi]$);
- ii. *s* is an authority about π ($Auth_s[\pi]$);
- iii. π is not crucial for the current purpose of the conversation.

(i) is a familiar condition on assertability extended to the presuppositional domain: just as we ought not say that which we do not believe, we ought not to presuppose that which we do not believe.

(ii) points out that a speaker who would not be treated as an authority with respect to π – that is, a speaker who would not be accommodated were she to utter any *S* that presupposes π in a context that does not already entail π – cannot felicitously presuppose π . Since her presupposition will not be accommodated, her assertion will suffer presupposition failure.

(iii) explains the infelicity of *B*'s second option in (12): it presupposes something crucial to the current purpose of the conversation:

- (12) A: Is the coffee maker working?
 B: No, John broke it. / # It was John who broke it.

This condition is orthogonal to our purposes here; it is always satisfied in the relevant cases. I include it for completeness, but will henceforth ignore it.

Note that Chemla introduces the above as necessary conditions. He does not argue that they are jointly sufficient. However, if Chemla's derivation of antipresuppositions is successful, they must be jointly sufficient, as we will see in the next paragraph. If additional constraints are required for joint sufficiency, I will assume that they are satisfied in the cases I discuss. A complete account should be clear about what those conditions are.

Given these conditions, when someone makes a presuppositionally weak utterance relative to a salient alternative with the same semantic content built from our scales, hearers may infer that the speaker does not believe the stronger presupposition to be felicitous. In other words, hearers may infer that the speaker *s* either does not believe the stronger presupposition is true, or does not believe that she would be treated as an authority with respect to π (neglecting (iii) and assuming that the conditions are jointly sufficient). In that case, the implicature will follow on three assumptions:

Authority: The speaker s believes in her authority about π : $(B_s[Auth_s[\pi]])$.

Competence: The speaker s is opinionated about π ; i.e., she believes π or she believes $\sim\pi$: $(B_s[\pi] \vee B_s[\sim\pi])$.

Reliability: If the speaker s believes π , then π : $(B_s[\pi] \rightarrow \pi)$.

More formally, from an utterance that is presuppositionally weak compared to an alternative with presupposition π , the audience infers:

- i. $(\sim B_s[\pi]) \vee (\sim B_s[Auth[\pi]])$ (Lest *Maximize Presupposition* be violated)
- ii. $\sim B_s[\pi]$ (From (i) and *Authority*)
- iii. $B_s[\sim\pi]$ (From (ii) and *Competence*)
- iv. $\sim\pi$ (From (iii) and *Reliability*)

Let me illustrate this process with the two examples of competition amongst presuppositions that we have already seen. Consider first the competition between (10) and (11). From the speaker's choice of a presuppositionally weak alternative (10), the audience infers:

- i. $(\sim B_s[speaker\ has\ a\ sister]) \vee (\sim B_s[Auth[speaker\ has\ a\ sister]])$
- ii. $\sim B_s[speaker\ has\ a\ sister]$ (From (i) and *Authority*)
- iii. $B_s[\sim(speaker\ has\ a\ sister)]$ (From (ii) and *Competence*)
- iv. $\sim(speaker\ has\ a\ sister)$ (From (iii) and *Reliability*)

Next consider the competition between (8) and (9). From the speaker's choice of a presuppositionally weak alternative (8), the audience infers:

- i. $(\sim B_s[victim\ has\ unique\ father]) \vee (\sim B_s[Auth[victim\ has\ unique\ father]])$
- ii. $\sim B_s[victim\ has\ unique\ father]$ (From (i) and *Authority*)
- iii. $B_s[\sim(victim\ has\ unique\ father)]$ (From (ii) and *Competence*)
- iv. $\sim(victim\ has\ unique\ father)$ (From (iii) and *Reliability*)

But this implicature will not be accepted; everyone knows that everyone has a unique father. Hence the result that (8) is infelicitous.

Up to this point, we've seen that the message of counterfactual antecedent falsity would best be accounted for as an implicature. We've seen that conditionals trigger presuppositions, and that competing presuppositions are capable of generating antipresuppositions, which are a form of scalar implicature. So if counterfactual

antecedent falsity is to be generated as an antipresupposition, we must ensure that the presuppositions of conditionals are capable of competing with each other: we need an account of the presuppositions of conditionals such that they form a scale asymmetrically ordered by logical entailment. And since the implicature arises from the use of the counterfactual, we expect the presupposition of a counterfactual to be logically weaker than the presupposition of its alternative, the past indicative. In the next section we examine several existing accounts of the presupposition of conditionals and show that none is capable of generating the implicature of counterfactual antecedent falsity.

3 Existing Accounts of Conditional Presupposition

It will be important, through this section, to have the semantics for conditionals in mind. There are two main approaches to conditional semantics. First there are *strict* conditional analyses. A strict conditional is true if and only if every world in the domain of quantification is one where the material conditional is true. We use the function D to determine the domain of quantification: it is a function which takes a world as argument and returns the set of worlds that are accessible from w . $\} \rightarrow^s$ is the strict conditional operator.

$$(13) \quad D : W \rightarrow \mathcal{P}(W) \\ \llbracket A \} \rightarrow^s C \rrbracket^w = 1 \text{ iff } D(w) \subseteq (\sim A) \vee C$$

Alternatively we have *variably strict* analyses. A variably strict conditional is true if and only if there is a world where the antecedent and consequent are true that is closer to the base world than every world where the antecedent is true and the consequent is false or, as Lewis (1973) put it, just in case there is an antecedent-permitting sphere throughout which the material conditional is true. $\} \rightarrow^{vs}$ is the variably strict conditional operator.

$$(14) \quad \llbracket A \} \rightarrow^{vs} C \rrbracket^w = 1 \text{ iff } \exists w' [w' \in (A \& C) \& (\sim \exists w'' (w'' \in (A \& \sim C) \& w'' \leq_w w'))]$$

Now we may examine existing accounts of the presupposition of conditionals. We begin with von Fintel's (1997) formalization of the proposal in Stalnaker 1975. Von Fintel points out that, since Stalnaker's proposal is nonformal, it is compatible with several alternative formalizations, some of which may differ in substantive ways. Note that von Fintel has formalized Stalnaker's proposal within a strict conditional framework. Stalnaker was working with a variably strict framework.

According to von Fintel's formalization of Stalnaker, indicative conditionals have no presupposition. Their felicity is, however, limited by a natural pragmatic constraint, that all antecedent worlds in the domain of quantification are in the common ground. The nature of this natural pragmatic constraint is not discussed in

detail, but it cannot be equated with presupposition. If it were, then indicatives and subjunctives should only be utterable in a complimentary distribution: they would never be assertable in the same context, which is contrary to von Fintel's data; see §5.

Subjunctive conditionals, on the other hand, presuppose that the natural pragmatic constraint might be suspended: the domain of quantification, in finding the relevant antecedent-worlds, "may reach outside of the context set" (Stalnaker 1975, p. 276). In the following I use 'context set' and 'common ground' interchangeably, and sometimes abbreviate both as 'CG'.

- (15) (S-I) Indicatives: Presupposition: \emptyset
 Natural Pragmatic Constraint: $A \cap D(w) \subseteq CG$
- (16) (S-S) Subjunctives: Presupposition: $\diamond(A \cap D(w)) \not\subseteq CG$

Here the requirements are in place for the generation of antipresuppositions: we have alternatives asymmetrically ordered by logical strength. However, since the presupposition of the indicative is strictly logically weaker than the presupposition of subjunctive conditionals, it will not generate the implicature of antecedent falsity.

Next I present von Fintel's (1997) formalization of Karttunen and Peters' (1979) nonformal proposal. On this account, indicative conditionals presuppose that there is an antecedent world in the common ground, while subjunctive conditionals presuppose that there is a non-antecedent world in the common ground. We saw in §1 that counterfactual conditionals do not presuppose that their antecedents are false. If counterfactuals are a subset of subjunctive conditionals (as I think Karttunen and Peters take them to be), it follows that subjunctive conditionals cannot (all) presuppose that their antecedents are false. On von Fintel's formalization Karttunen and Peters have essentially weakened this to the claim that subjunctive conditionals presuppose that their antecedents might be false, where by 'might' we mean contextual possibility, or consistency with the common ground.

- (17) (KP-I) Indicatives Presuppose: $A \cap CG \neq \emptyset$
- (18) (KP-S) Subjunctives Presuppose: $\sim A \cap CG \neq \emptyset$

These alternatives are not ordered by logical strength, and so are not capable of generating the target antipresupposition of counterfactual antecedent falsity.

Next we have von Fintel's own proposal (1997). As in the formalization of Stalnaker's proposal, the indicative triggers no presupposition, but again faces a natural pragmatic constraint to the effect that every world in the domain of quantification is also in the common ground. Subjunctives presuppose that there is a world in the domain of quantification that is not in the common ground.

- (19) (vF-I) Indicatives: Presupposition: \emptyset
 Natural Pragmatic Constraint: $D(w) \subseteq CG$
- (20) (vF-S) Subjunctives: Presupposition: $D(w) \not\subseteq CG$

These alternatives are ordered by logical strength. But since the order goes in the wrong direction, we will not generate the implicature of counterfactual antecedent falsity. Von Fintel has noted (p.c.) that an antipresupposition of the negation of the presupposition of the subjunctive should arise from the assertion of the indicative; that is, just exactly the natural pragmatic constraint on indicatives. So perhaps the natural pragmatic constraint could be analyzed as an antipresupposition. Problems for this result are discussed in Leahy 2012; the main problem is that the constraint on indicatives does not seem to be cancellable, as one would expect if it were an antipresupposition, since antipresuppositions are implicatures.¹

4 Counterfactual Antecedent Falsity as Antipresupposition

In this section I offer my own proposal for the presuppositions of conditionals and demonstrate that the proposed account generates the target antipresupposition.

4.1 Proposal for the Presuppositions of Conditionals

On my proposal, indicative conditionals presuppose that their antecedents are epistemically possible for their utterers. Counterfactual conditionals have no presupposition. Where A is a variable over propositions, $\diamond_{epis_s} A$ should be read as "A is possible in the epistemic state of s ".

- (21) (L-I) Indicatives: $\diamond_{epis_s} A$
- (22) (L-C) Counterfactuals: \emptyset

First, note that my account does not determine a presupposition for every conditional. Those conditionals that are neither counterfactual nor indicative are neglected by my account. The alternatives are not limited this way, as long as indicative and subjunctives exhaust the kinds of conditionals. Excluded by my account are "Future Less Vivid" (23) subjunctive conditionals and "Present subjunctive" conditionals (24). These kinds of conditionals are briefly discussed in §6.

- (23) If John went to Bermuda, he would have fun.
- (24) If John was in Bermuda, he would be having fun.

¹ von Fintel 1997 considers a fourth proposal about the presuppositions of conditionals, from Portner. I cannot discuss that proposal adequately here, since it mostly exists in personal communications and some important questions are left open by the published material.

Second, I do not think this is a particularly novel proposal. Indeed, I think it is a candidate formalization of the proposal in [Stalnaker 1975](#) and of the proposal for indicative conditionals in [Karttunen & Peters 1979](#).

4.2 Antecedent Falsity as Antipresupposition

Most importantly, this proposal meets the requirements for the generation of counterfactual antecedent falsity as antipresupposition. The presuppositions are asymmetrically ordered by logical strength, and the presupposition of the counterfactual is logically weaker. Suppose someone says (25) instead of the presuppositionally stronger (26):

(25) If John had come, it would have been fun.

(26) If John came, it was fun.

Following Chemla's theory, utterance of the presuppositionally weaker (25) will cause the hearer to infer that the speaker doesn't believe that the presupposition of (26) would be felicitous. That means that either the speaker does not believe that the antecedent is epistemically possible, or that the speaker does not believe that she would be treated as an authority with respect to the epistemic possibility of the antecedent: $\sim B_s[\diamond_{epis}A] \vee \sim B_s[Auth[\diamond_{epis}A]]$. The target implicature follows as long as the audience makes the authority, competence, and reliability assumptions:

i. $\sim B_s[\diamond_{epis}A] \vee \sim B_s[Auth[\diamond_{epis}A]]$

ii. $\sim B_s[\diamond_{epis}A]$ (from (i) and *Authority*)

iii. $B_s[\sim \diamond_{epis}A]$ (from (ii) and *Competence*)

iv. $\sim \diamond_{epis}A$ (from (iii) and *Reliability*)

This is stronger than we wanted: we wanted $\sim A$, but we got $\sim \diamond_{epis}A$. However, it is easy to show that the extra strength is not problematic. To see this, note that $\sim \diamond_{epis}A$ is equivalent to $(\sim A \ \& \ \text{The speaker knows } \sim A)$. So by this process of antipresupposition, we've generated the extra information that the speaker knows $\sim A$. But this extra information is not unwanted: it follows anyway from the reliability assumption and the standard assumption that speakers believe what they say, presuppose, or implicate.

4.3 Some Logical Relationships between Existing Accounts

In this section, I explore the logical relationships between the various proposals for the presupposition of indicative conditionals. This lends motivation to the account of

the presupposition of indicatives offered here, as we will see that it is not unrelated to existing accounts.

$$(27) \quad (\text{vF-I}) \text{ entails } (\text{S-I}) \\ D(w) \subseteq \text{CG} \models A \cap D(w) \subseteq \text{CG}$$

Assume (vF-I) is true. Since $A \cap D(w) \subseteq D(w)$ and since \subseteq is a transitive relation, it follows that $A \cap D(w) \subseteq \text{CG}$. (S-I) does not entail (vF-I) unless we assume that $A \cap D(w) = D(w)$, i.e., $D(w) \subseteq A$. But that assumption is not typically available, so (vF-I) is strictly stronger than (S-I).

$$(28) \quad (\text{S-I}) \text{ entails } (\text{KP-I}) \\ A \cap D(w) \subseteq \text{CG} \models A \cap \text{CG} \neq \emptyset$$

Assume (S-I) is true. Assume also that $A \cap D(w) \neq \emptyset$. (In the context of conditional semantics, this amounts to the requirement that there are evaluation worlds in the domain of quantification, i.e., the familiar requirement that we not quantify vacuously.) If there is an evaluation world in the domain of quantification and every evaluation world in the domain of quantification is in the common ground, it follows that there is an evaluation world in the common ground, so (KP-I) is true.

$$(29) \quad (\text{KP-I}) \text{ entails } (\text{S-I}) \\ A \cap \text{CG} \neq \emptyset \models A \cap D(w) \subseteq \text{CG}$$

Under some assumptions, (KP-I) entails (S-I) as well. This is the first point where we notice the impact of von Stechow's assumption of a strict conditional framework. For within a strict conditional framework, (KP-I) can establish that there is one relevant antecedent world in the common ground, but can not guarantee that all relevant antecedent worlds are in the common ground. However, given a variably strict framework, (KP-I) can make that guarantee on these two assumptions:

- i. The base world is in the common ground;
- ii. If the base world is in the common ground, worlds in the common ground are closer than worlds outside of it.

The assumption that if the base world is in the common ground, worlds in the common ground are closer than worlds outside of it was defended in [Stalnaker 1975](#). He writes, "The motivation of the principle is this: normally a speaker is concerned only with possible worlds within the context set, since this set is defined as the set of possible worlds among which the speaker wishes to distinguish. So it is at least a normal expectation that the selection function should turn first to these worlds before considering *counterfactual* worlds—those presupposed to be nonactual" (p. 276).

It follows that, if the base world is in the common ground, and there is an antecedent world in the common ground (as ensured by (KP-I)), then at least one of the evaluation worlds will be in the common ground. But if one evaluation world is in the common ground, and we have a variably strict analysis, then all evaluation worlds are in the common ground. For worlds outside the common ground, we have established, are further away than worlds inside it; so to admit them into the evaluation worlds would be to admit evaluation worlds that differ from the base world more than a proper subset thereof. But this is exactly what a variably strict analysis disallows. So under these two assumptions the two are equivalent within a variably strict semantics.

- (30) (L-I) entails (KP-I)
 $\diamond_{epis} A \models A \cap CG \neq \emptyset$
- (31) (L-I) entails (S-I)
 $\diamond_{epis} A \models A \cap D(w) \subseteq CG$

Finally, we compare (L-I) to (KP-I) and (S-I). On the assumption that the common ground is *honest* for the speaker, (L-I) entails (KP-I). Call a common ground *honest* for a conversational participant *p* just in case the common ground does not entail anything that *p* does not believe. That is, *p* believes everything that has been accepted into the common ground. In that situation, (L-I) is sufficient for (KP-I). For assume that *A* is consistent with a speaker's beliefs. Then, suppose that (KP-I) is false. This means that *A* has been ruled out of the common ground, i.e., that the speaker has admitted $\sim A$ into the common ground. But, by hypothesis, the speaker does not believe $\sim A$, and so the common ground is not honest. So we must reject the assumption that (KP-I) is false. The converse, though, does not hold: (KP-I) does not entail (L-I) unless we assume that everything the speaker believes is common ground, and that assumption is unacceptable. Since (KP-I) entails (S-I) under the assumptions described above, (L-I) entails (S-I) under those same assumptions.

5 Defending the Account of Conditional Presupposition

In 'The Presupposition of Subjunctive Conditionals' (1997), von Stechow tested existing accounts of the presupposition of conditionals against four litmus tests. He found that his account did better on all of these tests than did the alternatives. In this section I will show that my account fares well on all of von Stechow's tests. Since my account has the added virtue of explaining the implicature of counterfactual antecedent falsity, my account is preferable.

The first test eliminates any accounts on which counterfactuals presuppose that their antecedents are false. We've encountered the evidence that counterfactuals do

not presuppose that their antecedents are false already; I repeat the examples here as (32) and (33):

- (32) This was done with a stiletto. But if the butcher had done it, he would have used a cleaver. So it wasn't the butcher.
- (33) If he had taken arsenic, he would have shown just exactly those symptoms that he was in fact showing (modified from [Anderson 1951](#)).

These could not be good arguments if their conditional premises presupposed that their antecedents were false; since they are good arguments, the conditionals must not presuppose that their antecedents are false. Since counterfactuals have no presupposition on my account, there is no problem here. However, we might wonder why (33) does not antipresuppose that its antecedent is false; I say this is because the competence assumption fails. If the doctor is arguing about whether A, we will not assume that he has a belief one way or the other about whether A is consistent with his knowledge.

But the case here is in fact overdetermined. For neither (32) nor (33) have a felicitous indicative competitor, and so the implicature cannot be generated. Stalnaker (1975) noted that indicative analogues of the (32) and (33) are infelicitous:

- (34) This was done with a stiletto. # But if the butcher did it, he used a cleaver. So it wasn't the butcher.
- (35) # If he took arsenic he showed just exactly the symptoms that he in fact showed.

On a strict semantic analysis, (S-I) and (vF-I) can explain why. If the CG entails which symptoms the patient had, it follows that all CG-worlds are worlds where the consequent of the conditional is true. Then if we assume that $D(w) \subseteq CG$ or $A \cap D(w) \subseteq CG$, it follows trivially that all A-worlds in $D(w)$ are worlds where the consequent is true. So the conditional makes no contribution. On a strict conditional analysis, neither (KP-I) nor (L-I) can secure this result, since they cannot ensure that all of the evaluation worlds are in the common ground.

However, on a variably strict semantic analysis, (KP-I) and (L-I) can explain the triviality of (34) and (35). On a variably strict analysis, if one relevant A-world is in the context set, all of them are, since worlds outside the context set are further away than worlds inside it. (KP-I) guarantees that there is one relevant A-world in the context set; (L-I) guarantees that there is on the assumption that the context set is honest. So on a variably strict semantic analysis, my account passes this test.

The next example was introduced because it raises a problem for Karttunen and Peters' account of the presupposition of subjunctive conditionals. For counterfactuals can have necessarily true antecedents in subjunctive passages, contra (KP-I), which

claims that subjunctives (a superset of the counterfactuals) presuppose that their antecedents are possibly false.

- (36) a. If Polly had come to dinner tonight, we would have had a good time; but
b. if Uli had made the same amount of food that he in fact made, she would have eaten most of it (von Fintel 1997: 10).

Again, since on my account there is no counterfactual presupposition, there is no problem here. But we might wonder why (36b) doesn't generate the antipresupposition that its antecedent is false. Again I propose that this is because (36b) has no felicitous indicative competitor. To see this we must bear in mind that (36b) is interpreted relative to (36a). That is, the worlds we are talking about must continue to be worlds where Polly came. Compare (36b) with (37b), modified from (Roberts 1996: 210):

- (37) a. Maxine should have become a carpenter.
b. Her friends would have discovered she could build things, and she'd have been very popular on the weekends.

The factive verb 'discovered' bears the presupposition that its complement is true. But (37b) is felicitous when Maxine could never build things in the actual world, as long as she could build things in the evaluation worlds. The evaluation worlds must be ones that verify 'Maxine became a carpenter', i.e., the proposition in the scope of 'should' in (37a). This is the effect Roberts calls 'modal subordination' in Roberts 1987.

But note that special morphology is required to have this impact. (38b) does not show modal subordination effects; its interpretation does not depend on (38a) in all the same ways (37b) depends on (37a). And (38b) is infelicitous unless Maxine could build things in the actual world:

- (38) a. Maxine should have become a carpenter.
b. Her friends discovered she could build things, and she was very popular on the weekends.

And, indeed, we see the same effect with the indicative version of (36b):

- (39) a. If Polly had come to dinner tonight, we would have had a good time; but
b. # if Uli made the same amount of food that he in fact made, she ate most of it (von Fintel 1997: 10).

As in (38b), the interpretation of (39b) is not modally subordinate to (39a). As a result, its antecedent is trivially true, and conditionals with trivial antecedents are typically infelicitous (since one could instead simply assert the consequent). Further,

since the actual world must be amongst the evaluation worlds, the truth of (39b) will require that Polly ate most of the food that Uli made. But that can clash with the antipresupposition of (39a), that Polly did not come to dinner.

Finally, an adequate account of the presupposition of conditionals must not predict that indicative and subjunctive conditionals are in disjoint distribution (nor, what is weaker, that indicative and counterfactual conditionals are in disjoint distribution). For indicative and counterfactual conditionals can be licensed in the same context. For example, in the context of the discussion between X and Y in (40) below, a third party Z may reply with either the counterfactual Z(a) or the indicative Z(b):

- (40) X: Kennedy was shot by a lone gunman. Y: Kennedy was shot by two gunmen.
 Z(a): Guys, if two gunmen had shot Kennedy, two guns would have been found, so...
 Z(b): Guys, if two gunmen shot Kennedy, two guns must have been found, so...

As a result, any theory that predicts that indicative and subjunctive conditionals cannot be uttered in the same context is in trouble. Since my theory makes no such prediction, it is not in trouble here. However, my story does predict that, should circumstances be appropriate, Z(a) should antipresuppose that X is right. And this is in fact observed. Imagine a situation where X and Y both take Z to be opinionated about the number of gunmen, where both accept Z as an authority on the matter, and where both are willing to accommodate Z on the matter. Should X and Y approach Z with the issue, Z may respond with Z(a) to indicate, via implicature, that X is correct.

That brings us to the end of von Stechow's four tests. Next I want to point out how my view accounts for the infelicities observed in conditionals at the start of this paper.

- (41) A: John didn't go.
 B: # If John went, it was fun.
 (42) A: John went to the party.
 B: # If John had gone to the party, it would have been fun.

B's utterance in (41) is infelicitous because it suffers presupposition failure. B's utterance in (42) is infelicitous because it is a violation of *Maximize Presupposition*, unless hearers can find a motive to treat the utterance as an intentional flouting of a maxim.

Finally, I want to justify my use of epistemic possibility over contextual or doxastic possibility as the interpretation of the diamond in the presupposition of

indicative conditionals. At this point I can only offer theory-internal motivation, though independent motivation is offered in [Karttunen & Peters 1979](#).

My account does not work if indicative conditionals presuppose only that their antecedents are contextually or doxastically possible. Suppose that indicative conditionals presupposed that their antecedents were contextually possible, that their antecedents were consistent with the common ground. This is suggested by some of the comments found in [Stalnaker 1975](#). Then the antipresupposition predicted to arise from utterance of the counterfactual would be that the antecedent has been ruled out of the context. But if indicative conditionals presuppose that their antecedents are contextually possible, then it is impossible for the competence assumption to fail. For in that case the competence assumption would require that either the utterer of a counterfactual believed that the antecedent was consistent with common ground, or that the utterer believed that the antecedent was inconsistent with the common ground. Since we assume that speakers always know exactly what the common ground is (and hence, exactly what is consistent or inconsistent with it), there is no room for the competence assumption to fail. Thus we will not have sufficient flexibility for cancelling implicatures.

The same problem arises with doxastic possibility. If indicative conditionals presupposed that their antecedents were doxastically possible, then the competence assumption could never fail with respect to this presupposition, at least if we assume that, for any proposition A , a subject can determine whether she believes A or whether it is not the case that she believes A . Under that assumption, a subject can always tell whether a given proposition is consistent with her beliefs: if she believes its negation, it is not consistent; if it is not the case that she believes its negation, it is consistent. But that means that $B_s[\diamond_{dox_s} A] \vee B_s[\sim \diamond_{dox_s} A]$ is true for every proposition A and speaker s .

The same does not hold for epistemic possibility. While (on standard accounts) we can not be mistaken about what we believe, we can be mistaken about which of our beliefs are knowledge. So of these three options, only the last leaves room for the competence assumption to fail.

6 Conclusions and Future Directions

Throughout the course of this paper we have seen an account of the presupposition of conditionals, a derivation of the implicature of counterfactual antecedent falsity, and a provisional argument for the variably strict conditional analysis inasmuch as a variably strict semantics is required to make the analysis work. We conclude with some comments on open questions and directions for further research.

Most obviously, the account of the presuppositions of various kinds of conditionals is incomplete here. We have an account of indicative and counterfactual

conditionals, but not of those subjunctive conditionals that are not counterfactual. This might be thought pressing, since (43), unlike its indicative competitor (44), seems to strongly bear the message of antecedent falsity:

(43) If Grannie was here, she would be disappointed.

(44) If Grannie is here, she is disappointed.

I am concerned, though, that perhaps we draw the message of antecedent falsity because we naturally imagine a context where participants in the conversation know who is present, and hence whether or not the antecedent is true or false. In such a context, *if* the antecedent is true, then the conditional is unnecessary (the speaker could just as well assert that Grannie is disappointed); if the antecedent is false, then (44) suffers presupposition failure. Thus the speaker who needs to use a conditional is forced to use (43), even if there is no competition between the presuppositions of (43) and (44).

Determining whether the information of antecedent falsity here is an antipresupposition or some other kind of pragmatic inference requires the development of tools that enable us to test the difference. For example the information that its antecedent is false does not so clearly attend (45):

(45) If Grannie was there, she would be disappointed.

(45) can quite naturally be conjoined with an affirmation of its antecedent for purposes of modus ponens. Whether such conjunctions are cancellations of an implicature or rather the result of blocking some weaker pragmatic effect is not something we can test right now. As a result, I remain silent on this issue.

Next, we need to establish why the information of antecedent falsity associated with future-oriented would-have conditionals like (46) are particularly difficult to cancel. First note that future oriented would-have conditionals only seem felicitous in contexts that entail that their antecedents are false:

(46) John is dead. If he had come to the party tomorrow, it would have been fun.

Should we say that these examples presuppose that their antecedents are false? Or should we maintain that these examples implicate that their antecedents are false, but that the implicature is particularly difficult to cancel or even uncancellable? This is a question for future research.

One might wonder why the subjunctive should be a presuppositionally empty construction. After all, subjunctive appears to be a marked construction in several languages. However, Phillippe Schelenker has argued (2005) that the subjunctive in French is just that: a semantically empty device that is in fact a default resorted to when the indicative would trigger presupposition failure. Whether such an account can be extended to counterfactual conditionals in English will have to await a well-developed analysis of the grammatical composition of English counterfactuals.

A particularly interesting question for future research regards how conditional presuppositions project. There is a substantial literature discussing the behaviour of presupposition triggers embedded in conditionals in various ways (which gives rise to the so-called *proviso problem*). However, while it has been widely accepted that conditionals themselves trigger presuppositions, to my knowledge there has been no systematic investigation of how those presuppositions behave when embedded.

Finally, we need to establish what happens to the antipresuppositions associated with counterfactuals when they are embedded under various operators. A preliminary discussion of these issues appears in Leahy 2012, but a full analysis is yet to be conducted.

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