

## 0. Introduction

The aim of this paper is to describe in full detail a relatively recently discovered mechanism by which sentences bear information. I label this mechanism *presuppositional implicature*, since the mechanism as I analyze it is a species of scalar implicature. However, the implicatures are generated by comparing the relative informativeness of the presuppositions of competing alternatives, not by comparing the relative informativeness of the assertive contents of competing alternatives. Hence these scalar implicatures are presuppositional in nature; hence the name ‘presuppositional implicature’.

The possibility that information is conveyed by this mechanism has been noted since at least (Percus 2006); sustained attempts to analyze the generation of this information appear in (Chemla 2008) and (Schlenker 2012). However, existing accounts have technical shortcomings as a result of not adequately distinguishing presuppositional implicatures from antipresuppositions. This paper will both draw the distinction clearly and remedy the technical shortcomings. The structure is as follows. In section 1, we carefully distinguish presuppositional implicatures from antipresuppositions. Section 2 presents and criticizes Schlenker’s (2012) account of presuppositional implicatures. Section 3 amends Schlenker’s theory to avoid the problems. Section 4 concludes.

In this paper we employ the Stalnakerian model of context and contextual update described in (Stalnaker 1974, 1978) and much subsequent work;<sup>1</sup> I adapt my presentation here from (Kadmon 2001). On that view a proposition is a set of possible worlds, and a common ground is a set of propositions CG that participants in a conversation find it convenient to treat as mutually believed. The context set C is the intersection of that set of propositions. To make an assertion is, roughly, to add a proposition to CG which, if the assertion is not already entailed by C, results in a new context set C' that is a proper subset of C. Following Schlenker I will use ‘context’ to abbreviate ‘context set’.

## 1. Antipresuppositions and Presuppositional Implicatures

---

<sup>1</sup> My reservations about this model are apparent in, for example, (citation removed). However, the alternative to the Stalnakerian framework I prefer is not yet sufficiently developed to motivate the position I take in this paper; consequently I adopt Stalnaker’s framework to make my position clear.

In this section we isolate presuppositional implicatures by carefully distinguishing them from antipresuppositions. We begin by describing antipresuppositions. Note the infelicity of (1), in contrast to (2).

(1) #A sun is shining.

(2) The sun is shining.

The infelicity of (1) is surprising, since (1) and (2) are logically equivalent given that there is exactly one sun. To explain this infelicity, (Heim 1991) posits a novel Gricean maxim, *Maximize Presupposition!* (MP). MP has been formulated in slightly different ways by different authors; Schlenker formulates it thus:

**DEFINITION I: MAXIMIZE PRESUPPOSITION<sup>2</sup>**

If a sentence S is a presuppositional alternative of a sentence S'... and the context C is such that

- (i) the presuppositions of S and S' are satisfied within C;
- (ii) S and S' have the same assertive component relative to C;
- (iii) S carries a stronger presupposition than S',

then S should be preferred to S'.

(Schlenker 2012:393)

The presuppositional alternatives of a sentence are determined by a presuppositional scale. Presuppositional scales are ordered sets of lexical items such that if A is a sentential frame and  $\langle e_1, e_2, e_3 \rangle$  is a scale, A(e<sub>1</sub>), A(e<sub>2</sub>), and A(e<sub>3</sub>) are well formed sentences and the presupposition of A(e<sub>3</sub>) entails the presuppositions of A(e<sub>2</sub>) and A(e<sub>1</sub>) but not vice versa, and the presupposition of A(e<sub>2</sub>) entails the presupposition of A(e<sub>1</sub>) but not vice versa. Some examples of presuppositional scales are  $\langle a, the \rangle$ ,  $\langle all, both \rangle$ ,  $\langle believe, know \rangle$ . The members of these scales differ in the strength of the presuppositions they trigger: for example, 'know' triggers a factive presupposition; 'believe' does not. Members that trigger stronger presuppositions appear later in the scale. Presuppositional scales are closely related to Horn scales, which are discussed in section 3.

The presuppositional alternatives of a sentence that contains a member of a presuppositional scale are all the sentences that result from replacing that member of the scale with some other member of the scale. So 'John believes that I have a sister' and 'John knows that I have a sister' are presuppositional alternatives of one another. Since scale members are ordered in terms of the strength of the presuppositions they trigger, sets of presuppositional alternatives

---

<sup>2</sup> Here I've used Schlenker's "preliminary statement" of (MP); the complications he introduces later on resolve issues that do not concern us here.

can also be ordered in terms of the logical strength of their presuppositions. Here is Schlenker's definition of (relative) presuppositional strength.

**DEFINITION II: PRESUPPOSITIONAL STRENGTH**

A clause  $F$  carries a stronger presupposition than  $F'$  just in case  $\{w \in W: F' \text{ is neither true}^{\{w\}} \text{ nor false}^{\{w\}} \text{ in } w\} \subset \{w \in W: F \text{ is neither true}^{\{w\}} \text{ nor false}^{\{w\}} \text{ in } w\}$ , where  $W$  is the set of all possible worlds. (Schlenker 2012:393)

A sentence  $S$  is presuppositionally stronger than sentence  $S'$  iff the set of worlds where  $S'$  is neither true nor false is a proper subset of the set of worlds where  $S$  is neither true nor false. Schlenker defines presuppositional strength (and identity of assertive content, below) for clauses, not for sentences, because he will eventually offer a version of *local* maximize presupposition aimed to explain features of the behavior of presupposition triggers in embedded positions. That generality is not useful for us here, since we will only consider presupposition triggers in nonembedded positions. Thus we can replace 'clause' in (II) and (III) with 'sentence', since the set of sentences is a subset of the set of clauses. Also, the superscripts  $\{w\}$  (and  $c$  in the definition of identity of assertive content below) are introduced to address complications that do not concern us here and can be safely ignored.

We must also define 'identity of assertive content', which Schlenker uses synonymously with 'contextual equivalence'.

**DEFINITION III: IDENTITY OF ASSERTIVE CONTENT (SCHLENKER CONTEXTUAL EQUIVALENCE)**

Let  $F$  and  $F'$  be two clauses which do not yield presupposition failures relative to the context  $C$ .  $F$  and  $F'$  have the same assertive content relative to  $C$  just in case  $\{w \in C: F \text{ is true}^c \text{ in } w\} = \{w \in C: F' \text{ is true}^c \text{ in } w\}$ . (Schlenker 2012:392)

Identity of assertive content is defined relative to a context  $C$ . Two sentences that do not yield presupposition failure relative to  $C$  have the same assertive content in  $C$  iff they are true at all the same worlds in  $C$ . Note that identity of assertive content in a context  $C$  is only defined for (pairs of) sentences that are both defined in  $C$ , i.e., for pairs of sentences that do not suffer presupposition failure. Two sentences can have the same assertive content in  $C$  only if  $C$  satisfies the presuppositions of *both* sentences. We will say that two sentences with the same assertive content in  $C$  are contextually equivalent in  $C$ . The contextual equivalence requirement is important when explaining the antipresupposition data in (1) and (2) because the problem associated with that data arises exactly because the two sentences are contextually equivalent, yet one is marked and the other is not.

More formally, suppose  $E = \langle e_1, e_2, e_3 \rangle$  is a scale and  $A$  is a sentential frame that admits substitutions from members of  $E$ , so that  $A(e_1)$ ,  $A(e_2)$ , and  $A(e_3)$  are well formed sentences. Suppose that  $A(e_3)$  presupposes  $\pi_3$ ;  $A(e_2)$  presupposes  $\pi_2$ ; and  $A(e_1)$  presupposes  $\pi_1$ . Suppose  $\pi_3$  entails  $\pi_2$  and  $\pi_1$  but not vice versa, and  $\pi_2$  entails  $\pi_1$  and not vice versa. Suppose, moreover, that in some context  $C$ ,  $A(e_1)$ ,  $A(e_2)$ , and  $A(e_3)$  all yield the same context update: they all remove the same worlds from the context. Then (MP) requires that we choose  $A(e_3)$  over  $A(e_2)$  and  $A(e_1)$ .

Thus clarified, we see how (MP) explains the infelicity of (1) and the felicity of (2). (1) is a presuppositionally weak alternative. Typical human contexts entail that there is exactly one sun, thus satisfying the presupposition of (2). In such contexts, (MP) requires speakers to choose (2) over (1). Note that in a science fiction context where there are two suns, (1) is not marked.

This phenomenon has come to be known as *antipresupposition*. Percus, in introducing the term,<sup>3</sup> writes that sentences with standard presuppositions require “that a certain proposition be part of what is taken for granted in the conversation. Other sentences, by contrast, impose the condition that the interlocutors *not* take the truth of a certain proposition for granted...In these cases, we might say that the sentence antipresupposes the proposition in question” (p. 6, all emphasis original). Thus (1) antipresupposes that there is a unique sun.

Note that (MP), as stated so far, has a rather distinct character among the Gricean maxims. Levinson writes that Grice’s maxims “arise from basic rational considerations and may be formulated as guidelines for the efficient and effective use of language in conversation to further co-operative ends” (Levinson 1983:101). If you want to use language to communicate, then by and large you will be more successful if you follow Grice’s maxims. However, (MP) does not have the same status. It does not arise from purely rational considerations given a desire to co-operate in sharing information via language. Consider the maxim of quantity, which requires speakers to choose sufficiently informative answers to questions over insufficiently informative answers to questions. Suppose Bill asks Sue what the date is and how the weather is. If Sue aims to co-operate with Bill, it is clear that she should choose the answer “It is July 15 and it is sunny out” over “It is July 15”, given that she has reason to believe the former and so on. The former is a more effective way of sharing information via language than the latter.

Turn now to (MP). When two presuppositional alternatives are equivalent in a context, that is, when all their presuppositions are already satisfied, it is not clear what co-operative ends

---

<sup>3</sup> He notes that he first heard the term from von Stechow.

are better satisfied by choosing the presuppositionally stronger alternative, or why speakers ought to have those ends simply in virtue of having a desire to communicate efficiently and effectively. If Bill asks Sue what the date is and how the weather is, and everyone knows (that everyone knows, etc.) that there is exactly one sun, no joint goal that Bill and Sue have merely in virtue of desiring to share information via language is better satisfied if Sue chooses 'It is July 15 and the sun is shining' over 'It is July 15 and a sun is shining'. The former option is neither more effective nor more efficient. The demands of *Maximize Presupposition!* do not seem to follow from purely rational considerations. So it seems that if *Maximize Presupposition!* is a Gricean maxim, it has a rather unique status amongst the maxims, in that it is not motivated purely by considerations of rational communication via language. I take this to be part of the motive for Schlenker's effort to derive (MP) from the maxim of quantity, which we will see in the next section.

Having described antipresuppositions in some detail, I wish now to describe the closely related phenomenon, presuppositional implicatures, that it is the task of this paper to analyze. The most widely discussed example is (3); (4) is in some ways a less controversial example.

- (3) a. Utterance: John believes I have a sister.  
       Presupposition:  $\emptyset$   
       Assertion: John believes I have a sister.  
 b. Alternative: John knows I have a sister.  
       Presupposition: Speaker has a sister.  
       Assertion: John believes that the speaker has a sister.  
 c. Inference: Speaker does not have a sister.<sup>4</sup> (Chemla 2008:141), (Schlenker 2012:393)
- (4) a. Utterance: A friend of mine brought all his children.  
       Presupposition:  $\emptyset$ <sup>5</sup>  
       Assertion: A friend of mine brought all his children.  
 b. Alternative: A friend of mine brought both his children.  
       Presupposition: The friend has exactly two children.  
       Assertion: A friend of mine brought all his children.  
 c. Inference: The friend does not have exactly two children. (Percus 2006:16)

An utterance of (3a) can generate the information in (3c), although (3a) does not entail or presuppose that Bill does not have a sister. Where, then, does this information come from?

---

<sup>4</sup> I suspect that some philosophers will object to this example, since the assertive contents of (3a) and (3b) may not be equivalent; (3b) may also assert that John meets some kind of justification condition. I am sympathetic to this objection, and discuss it at length in the appendix.

<sup>5</sup> I am ignoring here the non-vacuity presupposition of quantified sentences, described in (von Stechow 1998:30), since it is shared by both (4a) and (4b). Similarly, following (Musan 1997), (3a) and (3b) both presuppose that John is alive; this presupposition can be safely ignored when our goal is to compare the relative logical strength of the presuppositions of alternatives.

(Chemla 2008) and (Schlenker 2012) propose that it arises as a result of Gricean competition between the weak presupposed content of (3a) in contrast with the logically stronger presupposed content of (3b). Note that the inference is cancellable. For example, in a context where it is accepted Bill does not know whether he has a sister, an utterance of (3a) need not yield the inference in (3c).

Theories of presuppositional implicature have different explanatory goals than theories of antipresupposition. Theories of antipresupposition aim to explain why utterances of presuppositionally weak alternatives are infelicitous in contexts that satisfy the presupposition of a presuppositionally stronger alternative. Theories of presuppositional implicature aim to explain why *felicitous* utterances of presuppositionally weak alternatives generate cancellable information that is not part of the asserted or presupposed content. One might offer a unified theory that accomplishes both explanatory goals. (Schlenker 2012) and (Chemla 2008) aim to do just that; see also (Ippolito 2003). Others have only been concerned with antipresuppositions (Heim 1991), (Percus 2006), (Sauerland 2008), and (Singh 2011). (Percus 2006, note 24) prefers a nonunified explanation, and suggests that presuppositional implicatures should be accounted for as standard scalar implicatures. We examine this possibility in section 3. To my knowledge, no one has aimed to give an account of presuppositional implicatures that is not also a theory of antipresuppositions. This paper will do so. In section 2 I criticize the unified theory of (Schlenker 2012), demonstrating why it cannot in fact account for the presuppositional implicature data. In section 3 I present the required modifications of Schlenker's view of presuppositional implicatures. I remain agnostic regarding Schlenker's account of antipresuppositions.

## **2. Schlenker's Theory of Presuppositional Implicature**

Schlenker does not distinguish presuppositional implicatures from antipresuppositions; he treats them as a single phenomenon to be given a single analysis. But in presenting his unified analysis he first presents a special case, and that special case is what I am calling presuppositional implicatures. So we will call that portion of his theory his theory of presuppositional implicature.

Presupposition accommodation plays a central role in Schlenker's theory. He develops his own account of accommodation in detail, but our purposes here are equally well served by a brief sketch, since in the cases we will be concerned with no accommodation actually happens. A presuppositional implicature arises when a speaker could have used a presuppositionally strong alternative that would have required accommodation, but instead used a presuppositionally weaker alternative that did not require accommodation or required less accommodation.

Presuppositions are propositions that a context must entail in order for sentence bearing that presupposition to be felicitously uttered in that context. If a sentence  $S$  bears presupposition  $\pi$ , then  $S$  can only be added to common grounds that entail  $\pi$ . Note that this does not mean that  $S$  can only be added to common grounds that entail  $\pi$  before  $S$  is uttered. Suppose we are conversing, and that our common ground does not entail  $\pi$ . If I utter  $S$ , you may recognize that  $S$  can only be added to common grounds that entail  $\pi$ . Then, if you take me to be a conversant in good standing (at least with regard to whether  $\pi$ ), then you may “quietly and without fuss” (von Stechow 2008:146) adjust the common ground so that it does entail  $\pi$ . Making these quiet adjustments is known as *accommodating* the presupposition of  $S$ .  $S$  may then be added to the adjusted common ground.

With the notion of presupposition accommodation in hand, we see that sentences can be informative due to their presupposed content, not only due to their assertive content. But if sentences can have informative presuppositions, then sometimes the maxim of quantity may require a speaker to choose a sentence  $S$  over some other sentence  $S'$ , not because the assertive content of  $S$  is more informative than that of  $S'$ , but because the presupposed content of  $S$  is more informative than that of  $S'$  while their assertive contents are (contextually) equivalent. The maxim of quantity, as formulated by Grice, is stated in definition (IV).

**DEFINITION IV: MAXIM OF QUANTITY**

- (1) Make your contribution as informative as is required (for the current purposes of the exchange).
- (2) Do not make your contribution more informative than is required. (Grice 1975:45)

As we saw in (III) above, Schlenker (2012) defines contextual equivalence of assertive content as follows: where  $S$  and  $S'$  are sentences and  $C$  is a context such that neither  $S$  nor  $S'$  suffers presupposition failure in  $C$ ,  $S$  and  $S'$  are contextual equivalents in  $C$  if and only if the set of worlds in  $C$  where  $S$  is true is identical with the set of worlds in  $C$  where  $S'$  is true. Neglecting some complications that needn't worry us here, Schlenker defines presuppositional strength (see definition II) relative to the universe context—that is, the set of all possible worlds—as follows: a sentence  $S$  with presupposition  $\pi$  is strictly presuppositionally stronger than a sentence  $S'$  with presupposition  $\mu$  if and only if the set of worlds in the universe where the truth value of  $S'$  is undefined is a proper subset of the set of worlds in the universe where the truth value of  $S$  is undefined. Since presuppositional strength is defined relative to the universe context set, presuppositional strength does not depend on a contextual parameter.

With these definitions in place, Schlenker aims to derive *Maximize Presupposition!* from the maxim of quantity. Where the assertive contents of S and S' are equivalent in a context C, and S is a strictly presuppositionally stronger presuppositional alternative to S', then one must choose S over S' in C. For S, due to its stronger presupposition, is more informative than S', and so it is required by Grice's maxim of quantity.

This is intended to explain the data in (3) and (4). Consider (3). The maxim of quantity prefers the alternative in (3b) (modulo the other maxims, as always). If a speaker chooses the less informative (3a), the audience may wonder why; sometimes the best hypothesis will be that the speaker was faced with a conflict of maxims, in particular, a conflict with quality. That is, the speaker did not want to use the more informative alternative because in doing so he would have violated the maxim of quality, i.e., he would have imparted (via presupposition accommodation) something that he did not believe was true. Therefore the speaker chose the less informative (3a); the hearer who reasons this way draws the implicature that the extra information in the presupposition of (3b) is false; that is, the hearer infers that the speaker does not have a sister.

This approach, however, cannot be quite right. The problem is that (MP) only compares contextually equivalent alternatives, and contextual equivalence is only defined for alternatives in contexts where neither alternative suffers presupposition failure. That is, two alternatives are contextually equivalent only if the context already entails the presupposition of the stronger alternative. Thus (3a) and (3b) are contextually equivalent only in contexts that entail that Bill has a sister. But we know that the inference in (3c) can arise in a context that is silent about whether Bill has a sister. In such a context, (3a) and (3b) are not contextual equivalents on Schlenker's definition. So Schlenker's theory will not explain how the inference in (3c) arises in contexts that are open regarding how many sisters Bill has.

This is not an anomaly of Schlenker's proposal; all existing versions of (MP) have some version of the contextual equivalence requirement that renders them unfit to account for presuppositional implicatures. I believe that this problem has arisen due to inadequately distinguishing antipresuppositions from presuppositional implicatures. (MP) was developed to account for antipresuppositions, the data in (1) and (2). There the contextual equivalence requirement is necessary, since the problem to be explained is why one alternative can be marked and the other not even though they are contextually equivalent. When we pay closer attention to the presuppositional implicature data, we see that when a presuppositional implicature is generated there is a sequence of contexts where the relevant alternatives are never

contextually equivalent, since no context ever actually arises that satisfies the presupposition of the presuppositionally stronger alternative. If a context is open about whether Bill has a sister, and Bill utters (3a), and the audience infers that Bill has no sister, we never arrive at a context that entails that Bill has a sister. We never arrive at a context where (3a) and (3b) are contextually equivalent. The contextual equivalence requirement looks like a vestige, accidentally held over from the theory of antipresupposition, but which undermines the theory's ability to account for presuppositional implicatures.

The problem can be resolved by revising (MP) and replacing the contextual equivalence requirement. (Chemla 2008:146) has already suggested that the contextual equivalence requirement may need to be weakened, though he has not offered a proposal for how exactly it should be weakened. The next section will offer a hypothesis that resolves the problem raised in this section.

### **3. An Alternative Theory of Presuppositional Implicature**

In Section 1 we saw that *Maximize Presupposition!* has an unwanted stipulative character. One way to resolve this problem is by deriving *Maximize Presupposition!* from the maxim of quantity. This seems reasonable: the maxim of quantity, as stated in (4), tells us to be (usefully) informative. It does not tell us through what vector that information should be carried. Since the time of Grice's writing, we have learned that utterances can carry novel information via at least two vectors: through their assertive content and through informative presuppositions via accommodation. The maxim of quantity is rightfully silent about which vector one ought to employ in making our assertions usefully informative. When quantity of information matters, and we are faced with two options that agree in their assertive contents but where one has a more informative presupposition, the maxim of quantity ought to ensure that we choose the option with the more informative presupposition. However, this requires that we formulate *Maximize Presupposition!* to ensure that it is active when it is not the case that the presuppositions of all available alternatives are satisfied. It must be active when presuppositions are informative; that is, when accommodation is or could be at work.

To this end I will offer and defend my own version of Maximize Presupposition. I will demonstrate why my version, unlike Schlenker's, is fully capable of accounting for the presuppositional implicature data exemplified in (3). Then I will show that my version of Maximize Presupposition can be seen as a special case of the maxim of quantity. The new version

of (MP) will replace the contextual equivalence requirement with a *potential* contextual equivalence requirement.

Presuppositional implicatures arise when a speaker felicitously uses a presuppositionally weak alternative in a context where the presupposition of a presuppositionally stronger alternative is not satisfied but would have been accommodated. The fact that the speaker did not require this accommodation yields the inference that the speaker does not believe that the extra information that would have been accommodated is true. In order to account for this, we need to replace the contextual equivalence requirement with what I will call the *potential contextual equivalence* requirement.

**DEFINITION V: POTENTIAL CONTEXTUAL EQUIVALENCE**

If S and S' are sentences, and the context C is such that

- (i) any presuppositions of S and S' that are not satisfied in C could be accommodated, and
- (ii) the context C' that would arise from accommodating the presupposition of S would satisfy the presupposition of S'; and
- (iii) S and S' would have identical assertive contents in the (perhaps only hypothetical) context C';

then S and S' are potential contextual equivalents.

If a speaker chooses a presuppositionally weak alternative in a context C that does not satisfy the presupposition of a presuppositionally stronger alternative, the speaker fails to use an informative presupposition, that is, fails to require the audience to accommodate. But *if* the speaker had done so, the context *would have* become one where the alternatives are contextual equivalents. This context did not arise, but it could have; thus I add the qualifier 'perhaps only hypothetical'.

The definitions of 'presuppositional alternatives' and 'identity of assertive content' (i.e., Schlenker Contextual Equivalence) may be preserved from Schlenker. We can then adjust the statement of MP accordingly:

**DEFINITION VI: MAXIMIZE PRESUPPOSITION! FOR PRESUPPOSITIONAL IMPLICATURES**

If a sentence S is a presuppositional alternative of a sentence S', and in the context C

- (i) S and S' are potential contextual equivalents in C;
- (ii) S carries a stronger presupposition than S',

then S should be preferred to S'.

The maxim of quantity tells us that, modulo the other maxims, we should choose more informative options over less informative options. Following Maximize Presupposition! as I have reformulated it (we will refer to it as (MP-PI)) is a special case of following the maxim of quantity. It is the case that arises when the options we are choosing between will induce different degrees of presupposition accommodation, but do not otherwise differ in informativeness in the context.

This formulation resolves the problem for Schlenker's account of presuppositional implicature. To illustrate, return to example (4).

(4) Context: open regarding how many children anyone has.

a. Utterance: A friend of mine brought all his children.

Presupposition:  $\emptyset$

Assertion: A friend of mine brought all his children.

b. Alternative: A friend of mine brought both his children.

Presupposition: The friend has exactly two children.

Assertion: A friend of mine brought all his children.

c. Inference: The friend does not have exactly two children.

In this context (4a) and (4b) are not contextual equivalents, as Schlenker defines them, since (4b) is undefined and (4a) is not. They are, though, potential contextual equivalents. For in the hypothetical context C' that would have arisen by accommodation if the speaker had chosen (3b) instead of (3a), the two alternatives are true at exactly the same worlds.

We can now use (MP-PI) to derive the desired presuppositional implicature. Since (4a) and (4b) are potential contextual equivalents and (4b) carries the stronger presupposition, (MP-PI) recommends that speakers use (4b) over (4a). Should an apparently co-operative speaker choose (4a) over (4b), hearers will look for a reason why; sometimes the best explanation will be that the speaker believes that the extra information that (4b) would have imparted—via accommodation—is not true; so hearers infer that the presupposition of (3b) is not true. That is, they infer that the friend does not have exactly two children.

Note that at no point in this process does any accommodation actually take place. The speaker has uttered (3a), which did not require accommodation. The hearer compares what actually happened with what would have happened if the speaker had uttered (3b); that is, if the speaker had required the hearer to accommodate. But the speaker did not in fact require the hearer to accommodate. This fact forestalls a possible objection. For it might be suggested that I have overlooked some subtlety in Schlenker's account of accommodation that undermines the difference I have described between contextual equivalence and potential contextual

equivalence. But since we can have presuppositional implicatures without any actual accommodation, no such objection can stand.

Note that I have not altered (MP) in a manner that prevents its extension to antipresuppositions. While I do not make any claims about antipresuppositions, the required features remain intact, since all actual contextual equivalents in a context *C*, like (1) and (2) in a context that entails that there is exactly one sun, are potential contextual equivalents in *C*.

Up to this point, we have altered Schlenker's contextual equivalence requirement, reformulated (MP), and shown that the reformulated (MP-PI) is a special case of the maxim of quantity. Next we compare presuppositional implicatures with standard scalar implicatures.

Like presuppositional implicatures, scalar implicatures arise when a speaker chooses a weak alternative when a stronger alternative is available. Alternatives are again defined relative to scales. Where necessary we will call them 'Horn scales' (in honor of Larry Horn) to distinguish them from presuppositional scales. Some Horn scales are lexically determined. For example, <possibly, necessary> is a scale because for any sentence *p*, necessarily *p* entails possibly *p*, but not vice versa; <some, all> is a scale because (supplemented with the assumption that quantification is not vacuous) all *x*'s are *F* entails that some *x*'s are *F*, but not vice versa. Other scales are pragmatically determined: if Gianni is travelling from Sicily to Milan, then 'Gianni has reached Rome' will implicate that Gianni has not reached Bologna; if he is travelling from Milan to Sicily it will implicate that he has not reached Naples. Thus relative to one common ground, <Naples, Rome, Bologna> form a (part of a) scale, while relative to another common ground <Bologna, Rome, Naples> form a (part of a) scale (Horn 2006:12).

Two sentences *S* and *S'* are scalar alternatives just in case *S* includes some member of a Horn scale, and *S'* results from replacing that member of the scale with a nonidentical member of the scale. Scalar alternatives are ordered by logical strength (given information from the context). If  $E = \langle e_1, e_2, e_3 \rangle$  is a scale and *A* is a sentential frame that admits substitutions from members of *E*, then *A*(*e*<sub>1</sub>), *A*(*e*<sub>2</sub>), and *A*(*e*<sub>3</sub>) are well formed sentences such that, given information from the context, *A*(*e*<sub>3</sub>) entails *A*(*e*<sub>2</sub>) and *A*(*e*<sub>1</sub>) but not vice versa, and *A*(*e*<sub>2</sub>) entails *A*(*e*<sub>1</sub>) and not vice versa (cf. Levinson 1983:133). Given that Gianni is travelling from Sicily to Milan, having reached Rome entails that he has reached Naples, but not vice versa. When a speaker chooses a logically weaker alternative, hearers may wonder why the speaker didn't choose a logically stronger alternative. Sometimes the best explanation will be that the speaker believes the

stronger alternative contains misinformation, and so the hearer will infer that the extra content in the stronger alternative is not true.

This account of scalar implicature derives new information from competition between strictly semantic components of the meaning of competing alternatives: it compares their entailments. We would like to see something a bit more general: presuppositional content sits somewhere on the border between semantic content and pragmatic content, and so we would like to see an account of scalar implicature that explains how new information can be derived from competition between alternatives with differing semantic/pragmatic contents. This is possible if we formulate our theory of scalar implicature in a dynamic framework that has the ability to describe both the semantic relationships that hold between sentences and the semantic/pragmatic relationships that hold between them in virtue of their presuppositions.

My proposal is as follows. Let  $E = \langle e_1, e_2, \dots, e_n \rangle$  be either a Horn scale or a presuppositional scale. Let  $A$  be a sentential frame that admits substitutions from members of  $E$  such that  $A(e_1), A(e_2), \dots, A(e_n)$  are well formed sentences.  $A(e_2)$  is more informative than  $A(e_1)$  in context  $C$  just in case the result of updating  $C$  with  $A(e_2)$  yields a context  $C'$  that is a proper subset of the context  $C''$  that results from updating  $C$  with  $A(e_1)$ . More formally:

**DEFINITION VII: INFORMATIVENESS**

$A(e_2)$  is more informative than  $A(e_1)$  in context  $C$  iff  $C \cap A(e_2) \subset C \cap A(e_1)$ .

A context  $C'$  that is a proper subset of a context  $C''$  is more informative in the following sense. The worlds in the context are the world that participants in a conversation are treating as candidates for actuality; they are the worlds such that; for all the conversants know, are the actual world. They are the worlds that have not been ruled out by the shared knowledge and background of conversational participants. If  $C'$  is a proper subset of  $C''$ , then participants in context  $C'$  have ruled out more worlds as candidates for actuality than have participants in context  $C''$ . There is some world  $w$  such that participants in  $C'$  know that  $w$  is not the actual world, while participants in  $C''$  do not know that  $w$  is not the actual world.

This formulation in terms of contexts is, as required, insensitive to whether the extra information contained in  $A(e_2)$  is carried by the semantic content or generated through accommodation of presupposed content.

When this condition is met, then should a speaker choose  $A(e_1)$  over  $A(e_2)$ , hearers may wonder why the less informative option was chosen. Sometimes the best explanation will be that

the speaker believes the stronger alternative contains misinformation, and so the hearer will infer that the extra content in the stronger alternative is not true.

#### 4. Conclusion

In this paper we carefully distinguished presuppositional implicatures from antipresuppositions,<sup>6</sup> criticized an existing theory of presuppositional implicatures, and offered an amendment of that theory that resolves the problem. We compared the resulting theory of presuppositional implicatures with the theory of scalar implicatures and found that if we analyze scalar implicatures in a sufficiently broad manner, we see that presuppositional implicatures are a special case of scalar implicatures.

#### Appendix

In this appendix I want to consider an alternative proposal suggested by a referee. The referee suggested a context-independent definition of contextual equivalence, and an accordingly altered version of (MP), as follows:

#### (ICE) *INVARIANT CONTEXTUAL EQUIVALENCE*

If  $F$  and  $F'$  are sentences, and for every context  $C$  that satisfies the presuppositions of both,  
 $\{w \in C: F \text{ is true}^C \text{ in } w\} = \{w \in C: F' \text{ is true}^C \text{ in } w\}$ ,  
then  $F$  and  $F'$  are then invariant contextual equivalents.

---

<sup>6</sup> A referee asked me to comment on Schlenker's theory of antipresuppositions. Very briefly and very roughly, Schlenker extends his proposal for presuppositional implicatures to antipresuppositions by arguing that even if a proposition is entailed by the common ground, there is always a nonzero chance that an addressee has forgotten (or isn't adequately attending to) this fact. This is called the principle of *Fallibility*. Consequently, there is some expected value in reintroducing this fact into the conversation. So it is rational for speakers to reintroduce this fact into the conversation.

Schlenker provides the example in (iv). In a context where it is obviously raining, (iv a) is pragmatically infelicitous, although in this context it has exactly the same informational content as (iv b). There is a nonzero probability that the addressee has forgotten the rain, and so there is nonzero probability that marking that information by choosing (vi b) over (iv a) increases informativeness.

- (iv) a. #John believes that it is raining.  
b. John knows that it is raining.

Schlenker notes that while the motivation for *Fallibility* is largely theory-internal, there is some independent motivation. He argues that the expected payoff of choosing the presuppositionally stronger alternative is always slightly higher than choosing the presuppositionally weaker alternative. For there is no extra cost associated with the stronger alternative and there is some additional expected payoff, since there is nonzero probability that the audience has forgotten (or isn't adequately attending to) the additional presupposition. While I do not have a worked-out critique, I do have the following concern. Schlenker asserts but does not argue that there is no extra cost associated with the stronger alternative. But this needn't be the case, for example, if the stronger alternative takes longer to produce. Of course, this extra cost may be very small, but then, so is the extra payoff produced by choosing this alternative when the probability of forgetting is very small.

So the motivation for *Fallibility* is, indeed, largely theory-internal. As far as I can tell, my proposal for presuppositional implicatures could be extended to antipresuppositions using the same tools. However, I choose to be conservative for the moment, and remain agnostic regarding how we should account for antipresuppositions.

**(MP-A): MAXIMIZE PRESUPPOSITION!-ALTERNATIVE**

If a sentence *S* is a presuppositional alternative of a sentence *S'* and *S* and *S'* are invariant contextual equivalents and the context *C* is such that

- (i) *S* and *S'* have the same assertive component relative to *C*, and
  - (ii) *S* carries a stronger presupposition than *S'*,
- then *S* should be preferred to *S'*.

This proposal will account for the information associated with, for example, the information generated by an utterance of 'John brought all of his children' in a context that was previously open regarding how many children John had. For (MP-A) recommended that the speaker prefer 'John brought both of his children' to the chosen alternative; since the recommendation of (MP-A) was not followed, it will be inferred that there is something wrong with the presuppositionally stronger alternative—perhaps that the extra information borne in its presupposition is false.

I will refer to the referee's proposal as ICE (for Invariant Contextual Equivalence); mine as PCE (P for potential); and Schlenker's as SCE (S for Schlenker). If two sentences are potential contextual equivalents, I will say that they are PCE (and similar for SCE and ICE). I trust that no confusion will arise from this ambiguity. In this appendix, I will demonstrate the logical relationships between the three proposals, so that we can get a sense of the similarities and differences between them. We will see that ICE is neither weaker nor stronger than SCE, but that both SCE and ICE are stronger than PCE in that if two sentences are SCE in a context *C*, they are also PCE in *C*; and if two sentences are ICE, they are PCE in any context. Then I will argue that my proposal is to be preferred to the referee's.

To see that ICE is neither weaker nor stronger than SCE, we first show an example of two sentences (5a) and (5b) that are ICE but not SCE.

- (5) a. No one other than Bill ate vegetables.  
Presupposition:  $\emptyset$   
Assertion: No one other than Bill ate vegetables.
- b. Only Bill ate vegetables.  
Presupposition: Bill ate vegetables.  
Assertion: No one other than Bill ate vegetables.

(5a) and (5b) are ICE since they have the same assertive content in every context that satisfies the presuppositions of both. Now consider a context *C* that is consistent with but does not entail 'Bill ate vegetables'. (5a) and (5b) are not SCE in this context, since (5b) is undefined in this context and SCE compares sentences in a context only if both are defined in that context.

Next we show that there are sentences *S* and *S'* that are SCE in some context *C* but that are not ICE.

- (6) a. Bill loves Mary.  
Presupposition:  $\emptyset$   
Assertion: Bill loves Mary.
- b. Bill loves Mary and Sue.  
Presupposition:  $\emptyset$   
Assertion: Bill loves Mary and Sue.

Consider a context *C* that entails that Bill loves Sue. (6a) and (6b) are SCE in *C*, since they are true at all the same worlds in *C*. But they are not ICE, since there are contexts where both are defined but they are not true at all the same worlds (for example, the universe context).

To see that ICE is stronger than PCE, we show that being ICE is sufficient for being PCE in any context. Assume two sentences *S* and *S'* are ICE. This means that they have the same assertive component in any context where both are defined. Now consider a context *C*. Either both *S* and *S'* are defined in *C*, or at least one of *S*, *S'* is undefined in *C*. If both *S* and *S'* are defined in *C*, they are true at all the same worlds in *C* (since they are ICE), and hence they are PCE in *C*. Note that the context *C'* that would arise from accommodating any unsatisfied presuppositions is just *C*, since there are no unsatisfied presuppositions.

If one of *S*, *S'* is undefined in *C*, consider the context *C'* that arises from accommodating all presuppositions of *S* and *S'* that are unsatisfied in *C*. Since *S* and *S'* are ICE, it follows that *S* and *S'* have the same assertive content in *C'*; hence they are PCE in *C*. So *S* and *S'* are PCE in *C* in either case. Since *C* was arbitrarily chosen, the same holds for any context *C*.

Finally we show that if *S*, *S'* are SCE in *C*, it follows that they are PCE in *C*; but the converse does not hold. Suppose *S* and *S'* are SCE in *C*; it follows that the presuppositions of *S* and *S'* are satisfied in *C* and that they are true at all the same worlds in *C*. It follows immediately that *S* and *S'* are PCE in *C*. To show that the converse does not hold, consider again (5a) and (5b) in a context *C* that does not entail that Bill ate vegetables. If this context is accommodated to context *C'* that satisfies the presupposition of (5b), then (5a) and (5b) have the same asserted component in *C'*; hence they are PCE in *C*. But they are not SCE in *C*, since (5b) is undefined in *C* but (5a) is not.

Now we have seen that PCE is strictly logically weaker than both ICE and SCE, but that ICE and SCE are not ordered by logical strength. This paper has argued that PCE is preferable to SCE in the theory of presuppositional implicatures. Now I will argue that PCE is preferable to ICE.

The fact that ICE is a stronger relation than PCE renders it incapable of accounting for some presuppositional implicatures that are not uncontroversially attested in English, but that are controversially attested in English and may be attested in other languages. I think we should expect presuppositional implicatures in these cases; my account predicts these presuppositional implicatures but an account that replaced PCE with ICE (and made according alterations to MP) would not.

We begin by illustrating the presuppositional implicatures predicted by my theory that are not predicted by a theory built around ICE. My theory is constructed to leave open the possibility that pragmatic factors act to render two alternatives that have different “assertive contents” potential contextual equivalents in that context. Consider the following fanciful example, in which English contains a lexical item “schtitt” that triggers a presupposition that is strictly logically stronger than the presupposition triggered by “quit” but that also contributes to the assertive content of the sentences it appears in.

(7) a. John quit smoking.

Presupposition: John used to smoke.

Assertion: John doesn't smoke now.

b. John schtitt smoking.

Presupposition: John used to smoke and John tried to quit once before.

Assertion: John doesn't smoke now and John loves Mary.

The key feature of this example is that ‘quit’ and ‘schtitt’ are both presupposition triggers, and the presuppositions they trigger in alternative sentences are ordered by logical strength; but these alternative sentences also have assertive contents that are strictly ordered by logical strength. (7a) and (7b) are not ICE. But in a context that entails that John loves Mary, they are PCE. A theory of presuppositional implicature that uses PCE rather than ICE predicts

presuppositional implicatures from utterances of (7a) in contexts that are open about whether John tried to quit smoking once before. A theory that relies on ICE rather than PCE (where MP requires speakers to choose the presuppositionally stronger of ICE alternatives) does not make this prediction, since the two sentences are not ICE.

Next we turn to a disputable example from English. On some views, 'X knows p' presupposes that p and asserts that X believes p and X has a good/justifying reason for believing that p:

- (8) a. John believes that Bill is sad.  
Presupposition:  $\emptyset$   
Assertion: John believes that Bill is sad.
- b. John knows that Bill is sad.  
Presupposition: Bill is sad.  
Assertion: John believes that Bill is sad and John's belief is justified.

The assertion of (8b) is strictly logically stronger than that of (8a) (on the view at hand), as is the presupposition. If we adopt this view of knowledge claims, then a theory of presuppositional implicatures that appeals to PCE predicts antipresuppositions that a theory that appeals to ICE does not predict. For (8a) and (8b) are not ICE, and so will not be compared by the resulting version of MP. (8a) and (8b) are PCE in contexts that entail, for example, that all of John's beliefs are justified, or that if John believes that Bill is sad, then John's belief is justified. An assertion of (8a), in such a context and on my theory of presuppositional implicature, predicts the implicature that Bill is not sad. I take this to be a desirable consequence.

## Bibliography

- Chemla, Emmanuel. 2008. An epistemic step for anti-presuppositions. *Journal of Semantics* 25. 141–173.
- von Stechow, Kai. 1998. The Presupposition of Subjunctive Conditionals. In Uli Sauerland and Orin Percus (eds.), *The Interpretive Tract*, 29-45. MIT Working Papers in Linguistics 25.
- von Stechow, Kai. 2008. What is presupposition accommodation, again? *Philosophical Perspectives* 22. 137-170.
- Grice, Paul. 1975. Logic and Conversation. In P. Cole and J. Morgan (eds.), *Syntax and Semantics* vol.3: Speech Acts, 41-58. New York: Academic Press.
- Heim, Irene. 1991. Artikel und definitheit. In Arnim von Stechow & Dieter Wunderlich (eds.), *Semantik: Ein internationales handbuch der zeitgenössischen forschung*, 487–535. Berlin: De Gruyter.
- Horn, Larry. 2006. Implicature. In Larry Horn and Gregory Ward (eds.), *The Handbook of Pragmatics*, 3-28. Malden: Blackwell.
- Ippolito, Michela. 2003. Presuppositions and implicatures in counterfactuals. *Natural Language Semantics* 11. 145–186.
- Kadmon, Nirit. 2001. *Formal Pragmatics*. Oxford: Basil Blackwell.
- Levinson, Stephen. 1983. *Pragmatics*. Cambridge: Cambridge University Press.
- Musan, R. 1997. *On the Temporal Interpretation of Noun Phrases* (Outstanding Dissertations in Linguistics). New York: Garland.
- Percus, Orin. 2006. Antipresuppositions. In A. Ueyama (ed.), *Theoretical and empirical studies of reference and anaphora*, Japan Society for the Promotion of Science: Report of the Grant-in-Aid for Scientific Research (B).

- Sauerland, Uli. 2008. Implicated presuppositions. In Anita Steube (ed.), *The discourse potential of underspecified structures*, Berlin: Mouton de Gruyter.
- Schlenker, Philippe. 2012. Maximize presupposition and Gricean reasoning. *Natural Language Semantics* 20. 391–429.
- Singh, Raj. 2011. Maximize presupposition and local contexts. *Natural Language Semantics* 19(2). 149–168.
- Stalnaker, Robert. 1974. Pragmatic presuppositions. In M. K. Munitz and D. K. Unger (eds.), *Semantics and Philosophy*, 197-213. New York University Press.
- Stalnaker, Robert. 1978. Assertion. *Syntax and Semantics* 9. 315–332.