

Symmetric presupposition satisfaction is mid-sentence presupposition correction

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Think of the most boring, uncontroversial case of presupposition satisfaction you can imagine. I thought of this one: I have a pet hamster. I know that I have a hamster. You know that I have a hamster. I know that you know, and so forth. I say to you:

(1) Tomorrow I'm taking my hamster to the vet.

Why was it acceptable for me to utter this sentence, which contains the presuppositional expression *my hamster*? Presumably it's because the sentence presupposes that I have a hamster; and a sentence with this presupposition is acceptable in any context like the one we're in, where you and I come into the conversation sharing the belief that I have a hamster. It could also be that you didn't know that I had a hamster, but I told you: "I have a hamster. Tomorrow I'm taking my hamster to the vet." So then it's not necessary that we begin the *conversation* both believing that I have a hamster: it's enough that, before the *sentence* containing the phrase *my hamster* is uttered, we both believe that I have a hamster.

But beliefs are fickle creatures. What happens if I start a sentence, and then something happens in the room while I'm talking? If you and I witness the event, our beliefs will change, and the context changes accordingly. For instance, imagine I say:

(2) *I'm tired, my head hurts, ...*

and then a bird flies in the window, and I continue:

and I'm going to kill that damn pigeon.

The fact that no pigeon was in the room the sentence was begun with is apparently not a barrier to the use of the presuppositional expression *that damn pigeon*. It appears, then, that presupposition satisfaction is able to track more fine-grained context changes than we originally thought. We were wrong to conclude that the crucial question is what the participants believed before the *sentence* was uttered; it is enough, perhaps, that presuppositions be satisfied at the moment when the presupposition *trigger* is uttered.

The thrust of this paper is that an important class of examples which have been used to motivate recent "symmetric" theories of projection are really of the same sort as (2): they are cases in which the context changes mid-utterance in a way which affects presupposition satisfaction at a very local level. The kind of examples I have in mind, attributed by Schlenker (2008) to Barbara Partee, are:

- (4) a. The bathroom is downstairs, if there is a bathroom in this building.
b. The bathroom is downstairs, or there is no bathroom in this building.

These sentences are problematic because the presupposition of the first clause appears to be satisfied by material in a following clause (the postposed antecedent the second disjunct's negation, respectively). This runs against the received view that projection is deeply asymmetric.

Recent theories (Schlenker 2008; Chemla 2008; Rothschild 2008) have taken (4) as crucial data on which to build a new “symmetric” theory of presupposition projection. However, I will argue, these examples are not really indicative of a phenomenon of symmetric presupposition satisfaction, but are rather cases of mid-utterance context change, as in (2). The key difference is that the context change in (4) is not addition but subtraction of information: that is, it is a case in which the speaker initially makes an assumption and then withdraws it later in the utterance. This is a type of non-monotonic belief change (Reiter 1980; Thomason 1997) which, I show, is independently attested for intra-sentential assertive content.

Evidence for the analysis comes from two main sources: first, from contexts in which sentences like (4) are infelicitous precisely where the non-monotonic analysis would predict; and secondly, from the fact that sentences like (4) require an intonational pattern which is associated with corrections and contradictions. I give an implementation of the analysis within Roberts’ (1996) theory of information structure in discourse, showing that it predicts the prosodic properties and limited acceptability of (4). The upshot is that examples like those in (4) can be explained without abandoning the traditional assumption that linear order plays a crucial role in presupposition projection. The scope of the present theory is discussed in the conclusion, where I suggest tentatively that the present theory may be able to replace symmetric theories entirely using only an incremental approach plus the independently motivated mechanisms of non-monotonic reasoning and Roberts’ theory of information structure.

1. Asymmetric presupposition projection

Presuppositions of compound sentences appear in many cases to be sensitive to the order in which clauses containing presupposition triggers occur. This may be true even when this order does not affect truth-conditional meaning. Consider (5):

- (5) a. Bill is incompetent, and he knows that he is incompetent.
b. Bill knows that he is incompetent, and he is incompetent.

(5a) presupposes nothing: the factive presupposition of *know* is satisfied by the first clause, it appears. In contrast, the first clause of (1b) seems to presuppose that Bill is incompetent, and the second clause feels redundant. Stalnaker (1999 [1974], p.60) explains this asymmetry as an effect of the fact that sentences are uttered in real time:

[W]hen a speaker says something of the form *A and B*, he may take it for granted that *A* ... after he has said it. The proposition that *A* will be added to the background of common assumptions before the speaker asserts that *B*. Now suppose that *B* expresses a proposition that would, for some reason, be inappropriate to assert except in a context where *A*, or something entailed by *A*, is presupposed. Even if *A* is *not* presupposed initially, one may still assert *A and B* since by the time one gets to saying *B*, the context has shifted, and it is by then presupposed that *A*.

Implicit in Stalnaker’s discussion is the prediction that, in the situation he describes, *B and A* would not be appropriate. This is correct, as (1b) shows. Stalnaker’s discussion cannot be the whole story, since the projection facts with connectives other than *and* are considerably more complicated. However, it would be desirable, all else being equal, to explain presupposition projection as a pragmatic phenomenon along these lines.

Dynamic semantic accounts of presupposition such as Heim (1983) capture the behavior of *and* and other connectives by building asymmetric projection behavior into their lexical

entries. However, as Soames (1989), Heim (1990), and others have noted, this approach fails to *explain* the persistent asymmetry in presupposition projection. It is just as easy in Heim's semantics to write an entry for *and* that derives (5) as it is to write an entry that reverses the predictions for these sentences, producing the incorrect result that (5a) should be infelicitous and (5b) should be acceptable.

Schlenker (2008) responds to this explanatory challenge by articulating a pragmatic theory of presupposition projection which vindicates Stalnaker's intuition about the importance of linear order, but makes better predictions about sentences with other connectives.¹ (The details of the theory are not really crucial here, but I will give them for completeness.) Schlenker's theory relies on two maxims of manner. The first requires that a speaker use an overt conjunction rather than a presupposition unless the presupposition is already entailed by the context set:

- (6) *Be Articulate*: For any expression $\underline{d}d'$ with presupposition \underline{d} and asserted content d' , express the meaning of $\underline{d}d'$ as d and $\underline{d}d'$ unless independent pragmatic principles rule out the full conjunction.

The second maxim, *Be Brief*, rules out asserting an overt conjunction if the first conjunct is already entailed by the context set.

- (7) *Be Brief*: Given a context set C , a predicative or propositional occurrence of d is infelicitous in a sentence that begins with α (d and if for any expression γ of the same type as d and for any good final β , $C \models \alpha (d \text{ and } \gamma) \beta \leftrightarrow \alpha\gamma\beta$).

The idea is that a speaker should prefer an overt conjunction to a bare presupposition unless the material in the first conjunct is already entailed by the context. As an example, if the context set includes *I have a hamster*, (8) is ruled out by *Be Brief* and only (9) is allowed. However, if this proposition is not in the context set, (9) is ruled out by *Be Articulate*, and only (8) is allowed.

(8) I have a hamster, and I have to take my hamster to the vet.

(9) I have to take my hamster to the vet.

Taken together, (6) and (7) make a complex range of predictions: in fact, Schlenker (2007) proves that in almost all cases (6-7) make the same predictions as Heim's (1983) dynamic theory, supplemented by Beaver's (2001) asymmetric treatment of *or*. Some of these predictions are summarized in (10):

| | | | | |
|------|-------------|--|-------------|--------------------------------------|
| (10) | and: | $\underline{p}p' \text{ and } q$ | presupposes | \underline{p} |
| | | $p \text{ and } \underline{q}q'$ | presupposes | $p \rightarrow \underline{q}$ |
| | if: | $\text{if } \underline{p}p' \text{ then } q$ | presupposes | \underline{p} |
| | | $\text{if } p \text{ then } \underline{q}q'$ | presupposes | $p \rightarrow \underline{q}$ |
| | or: | $\underline{p}p' \text{ or } q$ | presupposes | \underline{p} |
| | | $p \text{ or } \underline{q}q'$ | presupposes | $(\neg p \rightarrow \underline{q})$ |

As (10) shows, the projection properties of a sentence are extremely sensitive to linear order. When a presupposition \underline{p} occurs in the initial clause of a sentence such as *if $\underline{p}p'$ then q* , this

¹ I will focus on Schlenker's theory for convenience, but my arguments against the need for a symmetric alternative extend equally to Chemla (2008) and Rothschild (2008).

presupposition cannot fail to project. In contrast, when a presupposition occurs in a later clause as in *if p then qq'*, the presupposition that *q* can fail to be inherited by the entire sentence if *p* entails *q*.

This asymmetry is the property of Schlenker's theory which is crucial for our purposes: *Be Brief* is an incremental rule which does not take into account any material that comes after the clause being evaluated. The algorithm quantifies over good finals, meaning any grammatical way of completing the sentence, whether or not it is relevant to the presupposition. As a result, material which linearly follows a presupposition cannot be taken into account in determining its presupposition. Schlenker's theory predicts that, if a presupposition trigger occurs in an initial clause, its presupposition is always inherited by the entire sentence.

This fact is the cause of the only major divergence between Schlenker's theory and Heim's, their treatment of sentences with postposed *if*-clauses. Heim predicts that they should behave just like their preposed counterparts, while Schlenker does not.

| | | | | |
|------|-----------------|-------------|-------------------|---------------------|
| (11) | | | <u>Heim</u> | <u>Schlenker</u> |
| | <i>pp' if q</i> | presupposes | $q \rightarrow p$ | p |
| | <i>p if qq'</i> | presupposes | q | $p \rightarrow q^2$ |

I will have nothing to say about the second prediction, but the first is directly relevant to the crucial sentences we will consider from the first section (i.e., (4)). Schlenker, unlike Heim, predicts that a sentence *pp' if q* presupposes *p*, regardless of the content of *q*.

2. Symmetric presupposition projection

The main problem for the incremental theory we have seen is the sentences in (4), repeated in (12).

- (12) a. The bathroom is downstairs, if there is a bathroom in this building.
 b. The bathroom is downstairs, or there is no bathroom in this building.

Schlenker's theory predicts that both of the sentences in (12) should presuppose that there is a bathroom, since this is a presupposition of the initial clause, and the projection algorithm has no access to the content of later clauses. However, Schlenker (2008) judges that these sentences are acceptable, although somewhat degraded. This suggests that the presupposition of an initial clause can sometimes be satisfied by later material, contra *Be Brief* (7). Schlenker concludes that a second version of *Be Brief* which ignores linear order is needed for calculating presupposition projection, and that the two versions of the maxim should be ranked for the relative acceptability of sentences which satisfy them. The alternate version of *Be Brief* is (13):

- (13) *Be Brief (symmetric)*: Given a context set *C*, a predicative or propositional occurrence of *d* is (somewhat) infelicitous in a sentence that begins with α (*d* and *d'*) β if for any expression γ of the same type as *d* and for any good final β , $C \models \alpha$ (*d* and γ) $\beta \leftrightarrow \alpha\gamma\beta$.

(13) differs from the asymmetric version of *Be Brief* in (7) in holding the sentence's end constant: we do not consider everything that *could* follow, but only what does follow.

² This is because Schlenker interprets *if* as the material conditional, and so if *p* is false then, trivially, $C \models ((p \text{ if } \gamma) \leftrightarrow (p \text{ if } (q \text{ and } \gamma)))$.

By building into the theory a second projection algorithm designed to account for (12), Schlenker gets the basic facts right. However, this approach is undesirable for several reasons. First, it is a strictly more complex theory. Second, it no longer vindicates Stalnaker's (and Schlenker's) intuition that asymmetries in presupposition projection exist because we hear sentences in real time. As a result the account loses some of its explanatory appeal. Third, Schlenker gives no rule to determine when or why the symmetric principle would be invoked rather than the incremental version. Without this, the explanatory advantages of the theory, which were relatively straightforward under the original incremental approach, are in jeopardy.

3. Context-sensitivity of “symmetric” presuppositions

Of course, if a more complex theory is the only way to account for the data, then a more complex theory is needed. But perhaps our interpretation of (12) as symmetric presupposition satisfaction was too hasty. When we articulate a context for these examples more fully, the symmetric examples seem to be felicitous only in certain special situations. Consider (14):

(14) [Context: Bill and Joe are in an unfamiliar classroom building.]

- a. Joe: Either there is no bathroom in this building, or the bathroom is downstairs.
- b. Joe: If there is a bathroom in this building, the bathroom is downstairs.
- c. Joe: The bathroom is downstairs, or there is no bathroom in this building.
- d. Joe: The bathroom is downstairs, if there is a bathroom in this building.

In this context, any of (14a-d) are acceptable, and they do not seem to presuppose that the building has a bathroom. This is in contrast to the minimally different situation in (15):

(15) [Context: Bill and Joe are on a city bus. They both know that city buses usually don't have bathrooms.]

- a. Joe: Either there is no bathroom on this bus, or the bathroom is in the back of the bus.
- b. Joe: If there is a bathroom on this bus, the bathroom is in the back of the bus.
- c. Joe: #The bathroom is in the back of the bus, or there is no bathroom on this bus.
- d. Joe: #The bathroom is in the back of the bus, if there is a bathroom on this bus.

My intuition is that only (15a-b) are acceptable, while (15c-d) are odd in the context described. That is, (15) does not allow symmetric readings as readily as the situation in (14). A symmetric theory of presupposition projection like (13) has no way to account for a contrast like this: to the extent that (14c-d) do not presuppose that there is a bathroom, neither do (15c-d). This is not of course a knock-down argument against Symmetric Transparency. However, since the symmetric theory is already dispreferred on conceptual grounds, as argued in the previous section, these unexplained data suggest that it is worth looking for an alternative which does predict this contrast. In the next section I provide such an alternative.

4. Common ground and acceptance

Many theories of presupposition follow Stalnaker (1974) in identifying being *presupposed* with being *in the common ground*. The common ground, it is supposed, is the intersection of the beliefs of the conversational participants (or some related object such as the intersection of the

interlocutors' beliefs about their mutual beliefs). However, Stalnaker (2002) has argued that we should treat the CG not as the participants' common beliefs but as their commonly *accepted* propositions. Acceptance, for Stalnaker, is a propositional attitude encompassing belief, pretense, make-believe, temporary assumptions, presumptions, and related attitudes (Stalnaker 2002, p.704).

Like belief, acceptance can change rapidly; perhaps even more so, since it is a weaker attitude. Adopting the idea from Stalnaker that common ground is common acceptance, we can look a bit more closely at the idea I introduced in the first section, that the CG can change mid-utterance in a way that affects whether presuppositions are satisfied. A bit more formally, the principle needed to account for cases like (2) is:

- (16) If an expression α is a presupposition trigger, and its presupposition in a given sentence S is p , then the presupposition of α in S is satisfied iff the context set entails p at the moment when α is uttered.

I'll suggest that, in combination with Stalnaker's theory of CG and an incremental theory of projection, (12) makes it possible to explain away the symmetric readings of *if* and *or*. To see how this works, let's look again at our examples of symmetric presupposition.

The account of the contrast between (14) and (15) (and by extension of symmetric presupposition projection) that I will pursue relies crucially on Stalnaker's permissive definition of CG. It begins with an intuition: the salient difference between the situations described in (14) and (15) is that it is *reasonable* for Bill and Joe to assume that the classroom building that they are in has a bathroom, while it would be *unreasonable* for them to assume that the city bus they are in has a bathroom. As I set up the scenario, in neither situation do Bill and Joe have a specific belief about whether or not the building/bus in question has a bathroom. So the difference is not one of belief strictly defined. Rather, the difference lies in a generalization which is often, though not always, true: classroom buildings normally have bathrooms, while city buses do not.

Generalizations like "classroom buildings have bathrooms" and "city buses do not have bathrooms" are *default assumptions* (Reiter 1980, Thomason 1997). Default assumptions encode regularities which are defeasible, and reasoning with default assumptions, in contrast to deductive reasoning, is not guaranteed to be monotonic. For example, from *Tweety is a bird* and the default assumption *Birds fly* we infer defeasibly that *Tweety flies*; but if we add the premise *Tweety is a penguin*, we happily withdraw the conclusion. Similarly, *classroom buildings normally have bathrooms* and that *this is a classroom building* defeasibly imply *this classroom building has a bathroom*; but this conclusion can be withdrawn if there is reason to do so.

Default assumptions are able to license presuppositions, as Kálmán (1990) has shown in detail. In his example, it is acceptable for a speaker to report: *Joe got married yesterday. The minister spoke very loudly*, even though weddings do not always have ministers. However, the minimally different sequence *Joe got married yesterday. The dog barked very loudly* is very strange. The usual diagnosis in such cases is that the presupposition in the first pair of sentences is easier to accommodate. However, this explanation leaves unexplained why a speaker would *say* the first pair in ordinary contexts, but no speaker of English would utter the second pair of sentences except in a very special context. Kálmán's suggestion is that both speakers' willingness to presuppose *there is a minister* and hearers' willingness to accommodate are explained by the fact that *weddings normally involve a minister* is a reasonable default assumption. The difference in acceptability of the second pair of sentences, then, is a result of the fact that *weddings normally involve a dog* is not a reasonable default.

The only feature that I wish to add to Kálmán’s account (essentially following Stalnaker 2002) is to treat defaults as part of the CG, rather than a special process of accommodation. That is, rather than the information *there was a minister* being added *after* the definite description is uttered, the presence of the default assumption *weddings normally involve a minister* in the CG *before* this phrase is uttered is what licenses the presupposition of *the minister*.

If the CG includes not just common beliefs but also commonly accepted default assumptions, we have the beginnings of a theory which explains (10) and (11) while remaining asymmetric. Recall that asymmetric theories predicted that presuppositions will always project from a sentence-initial clause. Thus the incremental satisfaction principle in (16) predicts that (14) and (15) are acceptable just in case, when the phrase *the bathroom* is uttered, the commonly accepted propositions include *there is a bathroom*. Bill and Joe lack conclusive evidence about the status of this proposition, but conclusive evidence is not needed: all we need is that, at the moment of utterance, *there is a bathroom* is commonly accepted. If in relevant situations the CG contains the default assumptions *classroom buildings normally have bathrooms* and *city buses normally do not have bathrooms*, the asymmetry between (10) and (11) follows immediately.

But this is only part of the story. In the “symmetric” cases, the speaker continues by explicitly questioning the truth of the default assumption which licensed the presupposition in the initial conjunct: ... *or there is no bathroom here / if there is a bathroom here*. How are these continuations possible in this context, if the presupposition is satisfied initially?

The first thing to note is that default assumptions, by definition, are removed from an agent’s set of accepted propositions – and *a fortiori* from the CG – if they clash with some more certain form of evidence or inference. But default assumptions are even weaker than this: simply questioning a default assumption will typically suffice to remove it from the set of commonly accepted propositions. For example:

- (17) [Background assumptions: Birds normally fly. Penguins never fly.]
Mary: Tweety is a bird.
 [Default inference: Tweety flies.]
Sue: Is Tweety a penguin?
 [Default suspended: Tweety may or may not fly.]

So, in some sense, questioning a default assumption is enough to remove it from the CG. This makes sense because questioning a default is a signal that the questioner does not accept it, and thus that it is not *commonly* accepted. I will make this intuition a bit more explicit in section 5.

The main observation of this essay is that the three core features of presupposition and common ground that we have noted – the non-monotonicity of CG update as seen in (17), the possibility of mid-utterance context change, and the rule for presupposition satisfaction given in (16) – conspire to make a surprising but important prediction. Not only is it possible for the context to change mid-utterance in a way that causes a presupposition to be satisfied which would not have been satisfied earlier in the sentence (the pigeon example in (2)), but its inverse is also possible. The context can change mid-utterance such that a presupposition can be *satisfied at one point* and, at a later point, can *fail to be satisfied* because some information which was previously accepted has been called into question.

In general, in a sentence $A * B$ ($*$ = any connective) it is possible for a presupposition to be entailed by the CG when A is uttered, but not to be entailed when B is uttered. I want to suggest, in essence, that this is how “symmetric” presupposition satisfaction works. When the first clause of (14c-d) is uttered, the CG defeasibly entails that there is a bathroom; when the second clause is uttered, this entailment no longer holds. Section 4 gives further arguments for treating (14) and (15) in this way by looking at the broader phenomenon of *correction*.

5. Symmetric presuppositions as corrections: The role of contrastive focus

The account of symmetric presuppositions sketched in the previous section relied heavily on the perceived difference in felicity between (14) and (15). There is independent motivation for non-monotonic CG update and for mid-utterance context change, and this combination predicts the difference between (14) and (15). Since Schlenker's symmetric theory does not predict this difference, this is at least a point in favor of the present theory, which remains incremental. This contrast is admittedly subtle, and so in this section we turn to a second empirical argument in favor of the present account.

Attending to the information structure of (14) and (15) gives us reason to believe that symmetric presupposition projection is a species of correction. Corrections have particular intonational properties which are shared by symmetric presuppositions. The problematic cases in (14-15) differ not only in their behavior with respect to presupposition projection, but also in their focus structure. (18) and (19) present several variants of these cases, annotated for focus.

(18) [Bill and Joe are in an unfamiliar classroom building.]

- a. Joe: The bathroom is downstairs, or there [IS]_F no bathroom in this building.
- b. Joe: #The bathroom is downstairs, or there is no [BATHROOM]_F in this building.
- c. Joe: #The bathroom is downstairs, or there is no bathroom in this building.
(read with default stress)

(19) a. Joe: The bathroom is downstairs, if there [IS]_F a bathroom in this building.
b. Joe: #The bathroom is downstairs, if there is a [BATHROOM]_F in this building.
c. Joe: #The bathroom is downstairs, if there is a bathroom in this building.
(read with default stress)

(18-19) illustrate two important points. Contrastive focus (or *verum focus*) is obligatory in symmetric satisfaction cases, with the result that the (c) examples (without focus) are usually judged unacceptable. Secondly, the (b) examples, with contrastive focus on *BATHROOM*, are infelicitous in the situation described above, but acceptable in a minimally different context:

(20) [Bill and Joe are visiting a friend who lives in an antique farmhouse. They know that old farmhouses sometimes have outhouses.]
a. Joe: The bathroom is upstairs, or there is no [BATHROOM]_F in this farmhouse.
b. Joe: The bathroom is upstairs, if there is a [BATHROOM]_F in this farmhouse.

Apparently, the salience of *outhouse* as an alternative to *bathroom* in the context in (20) serves to make these examples felicitous. In contrast, since there is no ready alternative to *bathroom* in the situation in (18-19), the (b) sentences are not acceptable. (Note that the (a) examples in (18-19) would also be acceptable in the farmhouse case, with different implications; cf. (21b) below.)

Theories of focus based on discourse antecedence such as Schwarzschild (1999) fail to predict the felicity of the sentences in (20). On Schwarzschild's theory, these should behave exactly like the (b) examples in (18-19) since the previous discourse in these examples is identical. As a result the difference in accent is unexplained.

I suggested earlier that symmetric presuppositions are a species of correction. Corrections display the same type of focus structure as the symmetric presuppositions in (14-16) (and are equally problematic for theories of focus based on discourse antecedence).³

- (21) a. [In the classroom building]
Bill: The bathroom must be downstairs.
Joe: Maybe there [IS]_F no bathroom in this building.
- b. [In the antique farmhouse]
Bill: The bathroom must be upstairs.
Joe: Maybe there [IS]_F no bathroom in this farmhouse.
OR
Joe: Maybe there is no [BATHROOM]_F in this farmhouse.

As van Leusen (2004) and others have noted, contrastive focus is obligatory on the corrected element in dialogues like (21a-b). If symmetric presuppositions are really corrections, we have an immediate explanation for the data noted in (18-20) and their similarity to (21): in both cases, contrastive focus signals a correction and evokes a set of relevant alternatives.

We might think that this account of (18-20) is odd because it supposes that a speaker makes an assumption and withdraws it almost immediately. However, intra-sentential self-correction is independently attested. The following example illustrates a speaker making an assertion, and immediately withdrawing it (with contrastive focus, as usual). The example suggests that speaker has realized mid-sentence that he is unsure of the content of his assertion, much as I suggested for presupposition correction cases.

- (22) John flew to San Diego yesterday, or maybe [SACRAMENTO]_F is where he went.

Likewise, a presupposition can be overtly corrected as in (23): the speaker appears to realize mid-sentence that the assumption licensing the presupposition in the first clause may be incorrect, and there are alternative explanations for John's bad smell.

- (23) John's dog must be smelly, or maybe he doesn't [HAVE]_F a dog (and that's his smell).

The natural understanding of (23) involves non-monotonic belief revision, consistent with the picture of CG as common acceptance that we adopted from Stalnaker (2002). And one again, the information structure of (23) patterns with the flagship cases of symmetric presuppositions.

6. The interaction of focus, presupposition, and non-monotonic context change

The previous section showed that apparently symmetric presuppositions require contrastive focus in precisely the same way that overt corrections do, and that the focus can shift depending on relevant alternatives just as it can in corrections. Theories of focus based on discourse

³ Schwarzschild (1999, p.163) claims that his theory explains assertion-contradiction pairs, but he looks only at one type of example, contradiction in sentence-final position. When we examine a broader range of sentences, the explanation does not generalize. I suspect that we need both a theory of new information focus along Schwarzschild's lines and a theory of contrastive focus, as Selkirk (2007) has claimed. This is supported by facts about second occurrence focus (Selkirk 2007) and phonetic differences between new information focus and contrastive focus in various Germanic languages (see Pierrehumbert and Hirschberg 1990 and Kraemer and Swerts 2000 for English; Alter et al. 2001 for German; Watson et al. 2008 for Dutch).

antecedence fail to predict either of these facts. We need an alternative explanation, ideally one that will also explain how contrastive focus is implicated in correction and other types of non-monotonic CG update. In this section I describe Roberts' (1996) theory of information structure and extend it to explain the interaction of contrastive focus and default assumptions in corrections. I argue that this theory makes the right predictions for the cases at hand. This account is of course not complete, but I hope that it will provide a starting point.

The crucial features of Roberts' theory for our purposes are the following:

- (24) Following Hamblin (1973), the denotation of a question $?(\alpha)$ is the set of possible answers to $?(\alpha)$. For instance, $[[\textit{Did John leave?}]] = \{[[\textit{John left}]], [[\textit{John didn't leave}]]\}$.
- (25) The denotation of a wh-question is the set of all answers which differ from the question only by replacing the wh-element with an appropriately typed object in the domain of discourse. $[[\textit{Who left?}]] = \{[[\textit{Mary left}]], [[\textit{Sue left}]], \dots\}$.
- (26) The **focus alternative set** (Rooth 1992) corresponding to a constituent β , $[[\beta]]^F$, is the set of all interpretations obtained by replacing all the F-marked (focused) and *wh*-constituents in β with variables, and then interpreting the result relative to each member of the set of all assignment functions which vary at most in the values they assign to those variables. (Roberts 1996, (24))

It should be clear that there is a very close connection between the meaning of a question as described in (24) and (25) and the focus alternative set as defined in (26): the denotation of a question is identical to the focus alternative set of a direct answer to that question.

- (27) A: Who left? B: MARY left.
 $[[\textit{Who left?}]]^F = [[\textit{MARY left}]]^F = \{\textit{John left, Mary left, Sue left, \dots}\}$

The pattern noted in (27) can be used to explain question-answer congruence:

- (28) a. Who left? MARY left./#Mary LEFT.
 b. What did Mary do? Mary LEFT./#MARY left.

Roberts proposes explains question-answer congruence using the following principle.

- (29) **Presupposition of prosodic focus in an assertion β :**
 β is a congruent answer to the question under discussion at the time of its utterance.

A congruent answer to q is simply an answer whose focus alternative set is equivalent to the denotation of q . (29), in combination with the meanings of questions and focus alternatives, predicts question-answer congruence. (Note that (29) does not invoke an *existential* presupposition, and so is immune to Rooth's (1999) and Büring's (2004) criticisms of presuppositional semantics for focus.)

Finally, to explain the prosody of symmetric presuppositions and other corrections we adopt from Roberts three general principles governing the information structure of a discourse.

- (30) The **information structure** for a discourse is a tuple which includes (inter alia) the common ground and a stack of **questions under discussion (QUD)**.

- (31) a. When an assertion is accepted, it is added to CG.
 b. When a question is accepted, it is added to the top of the QUD stack.
 c. When a question is resolved, it is popped from the QUD stack.
- (32) The **immediate QUD** is the question at the top of the QUD stack, i.e. the most recently added question that has not yet been resolved.

I add a subclause to (31) based on the conclusion in section 2 about questioning defaults (17):

- (31b') When a question is accepted, it is added to the top of the QUD stack, and any defeasible assumptions which entail an answer to the question are removed.

Some corrolaries of (31) and (31b') are the following rules relating the QUD stack and the CG:

- (33) a. The CG may not entail a complete answer to any question in the QUD stack.
 b. If the CG entails a non-defeasible complete answer to a question in the QUD stack, that question is removed.
 c. If the CG contains a complete answer to a question in the QUD stack and the answer is a defeasible assumption or relies on a defeasible assumption, the answer is removed from the CG.

I propose that corrections like those in (21-23) display the intonational structure that they do because of the interaction between focus, acceptance, and the QUD stack. Suppose that the QUD stack contains one question, *?p*. This question denotes a set of two answers, *p* and *not p*. Now suppose that a speaker asserts *p*. If all conversational participants accept this assertion, then *p* is added to the common ground, and *?p* is removed from the QUD stack by virtue of (33b).

Now suppose that a speaker asserts *p*. If some participant refuses to accept this assertion, (33b) is not invoked; thus *?p* is not removed, and remains the immediate QUD. But recall that the focus presupposition (29) required that an assertion be a congruent answer to the immediate QUD. As a result, Roberts' theory predicts that whether or not an assertion is accepted will affect the focus properties of subsequent utterances. (34) illustrates.

- (34) A: Who left?
 B: JOHN left.
 C: JOHN didn't leave. (MARY did.)

Assuming that A's question is accepted, the immediate QUD after A's utterance is *Who left?*. B's assertion is felicitous by (29) because it is a congruent answer. If B's assertion were accepted, the immediate QUD *Who left?* would be removed from the QUD stack by (31c); as a result C's assertion would be infelicitous, because the QUD stack would be empty. However, C rejects B's assertion in (34). Assuming that *not* takes wide scope, the focus semantic value of C's assertion is $[[[JOHN]_F \textit{left}]] = \{\textit{Mary left, John left, Sue left, ...}\}$. This is a congruent answer to the original question *Who left?*. As a result, by focusing *JOHN*, C indicates that he still considers *Who left?* to be the immediate QUD, and thus that he has not accepted B's assertion.

Defaults and defeasible assumptions can be incorporated in a similar fashion. (35) illustrates the pragmatic reasoning involved in removing a default assumption from the CG.

Crucially, questioning a default assumption will often involve *question accommodation*, where a listener must infer the intended QUD from the focus structure of the utterance.

- (35) **QUD** = *Why does John smell so bad?*
Assumption: Only a dog could smell that bad.
Assumption: People who live with dogs sometimes smell like their dogs.
∴ Assumption: John has a dog.

A: John's dog must be smelly.

Presupposition satisfied; **QUD** = \emptyset

A: Actually, I guess it's possible he doesn't [HAVE]_F a dog (and that's his smell.)

1. Focus alternative set = {*John has a dog, John doesn't have a dog*}

2. Alternative set in (1) is a congruent answer only to the question

Does John have a dog?

3. Question accommodation: Immediate QUD = *Does John have a dog?*

4. Abandon default: By constraint (31b'), accepting *Does John have a dog?* to the QUD stack requires removing the assumption *John has a dog*.

It is crucial to the reasoning in (35) that defaults are very weak: they can be abandoned whenever a conversational participant wishes to question them (by principle (31b')). Similar reasoning allows us to explain the asymmetry between the classroom and farmhouse examples.

- (36) **QUD** = *Where is the bathroom?*
Assumption: Classroom buildings have bathrooms.
∴ Assumption: There is a bathroom in this classroom building.
Bill: The bathroom must be downstairs.
Presupposition satisfied; **QUD** = \emptyset
Joe: Maybe there [IS]_F no bathroom in this building.
1. Focus alternative set = {*there is a bathroom, there is not a bathroom*}

2. Alternative set in (1) is a congruent answer only to the question

Is there a bathroom?

3. Question accommodation: Immediate QUD = *Is there a bathroom?*

4. Abandon assumption: By (33c), remove from the CG the defeasible conclusion
There is a bathroom.

(36) is acceptable (with appropriate modifications) as long as it is reasonable to assume that there is a bathroom – in a classroom building or a house, but not on a city bus. (37), on the other hand, is acceptable only when the context provides appropriate alternatives to *bathroom* (21b):

- (37) **QUD** = *Where is the bathroom?*
Assumption: There is a bathroom.
Bill: The bathroom must be upstairs.
Presupposition satisfied; **QUD** = \emptyset .
Joe: Maybe there is no [BATHROOM]_F in this farmhouse.
1. Focus alternative set = {*there is a bathroom, there is an outhouse*}

2. Alternative set in (1) is (in context) a congruent answer only to the alternative question *Is there a bathroom or an outhouse?*

3. Question accommodation: Immediate QUD = *Is there a bathroom or an*

outhouse?

4. Abandon assumption: By (31b'), remove the assumption *There is a bathroom*.

As (36) and (37) show, Roberts' theory provides a natural pragmatic explanation of the felt difference between *there IS no bathroom* and *there is no BATHROOM*. The contexts in which the latter are possible are only those in which some alternative to *bathroom* is readily available, and this is why Joe's reply in (34) is appropriate in a farmhouse, but not in a classroom building.

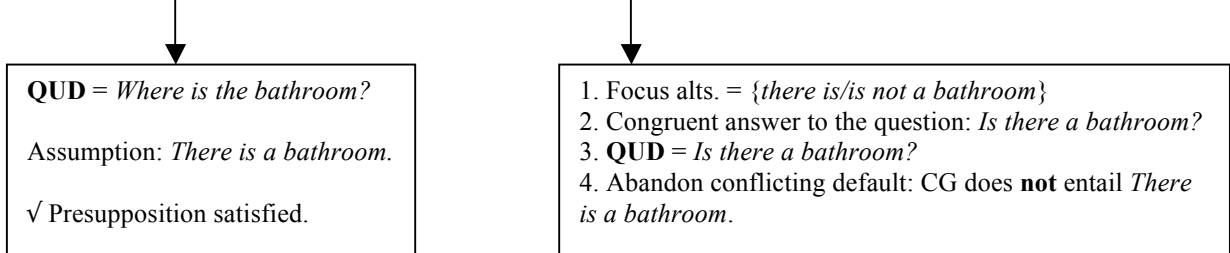
The same reasoning accounts for intra-sentential corrections like (23).

(38) John's dog must be smelly, or maybe he doesn't [HAVE]_F a dog.

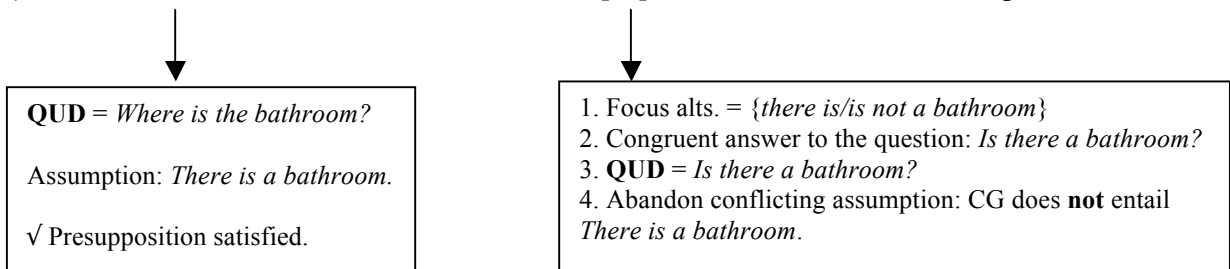
The intra-sentential correction is available here just as it is in the inter-sentential corrections in (35-37), with similar focus patterns. When the presupposition trigger is uttered, the CG defeasibly entails that John has a dog. However, since the CG need not remain constant throughout an utterance, it is possible for a speaker to question a previous assumption without self-contradiction. (Importantly, (38) suggests that the QUD can be revised at any clause boundary, and not just at the sentence level.) Just as in the second sentences of (35-37), the focus structure of the second clause in (35) indicates that the QUD *Does John have a dog?* has been introduced, and as a result the incompatible assumption *John has a dog* is removed from the CG.

We can now flesh out the claim I made in previous sections, that the symmetric presuppositions which motivated our investigation are simply corrections like (35-37).

(39) Joe: The bathroom is downstairs, or there [IS]_F no bathroom in this building.



(40) Joe: The bathroom is downstairs, if there [IS]_F a bathroom in this building.



The analysis of corrections we adopted for (35-37) immediately predicts the possibility of intra-sentential presupposition corrections, which appear to be cases of symmetric presupposition satisfaction – but, I claim, are not. The presupposition that there is a bathroom *does* project, as Schlenker's incremental theory claims, and is satisfied by the assumption when it is uttered. However, the CG changes before the second clause is uttered in a way that masks this fact.

This theory yields an account of why (39) and (40) are felicitous in some contexts and not in others: the presupposition trigger *the bathroom* is only appropriate when the conversational participants are likely to have made the assumption that there is a bathroom, and thus have made

this proposition part of the common ground. If there is not likely to be a bathroom, such as while riding a city bus, (39) and (40) are predicted to be infelicitous, because Bill and Joe are unlikely to have made such an assumption.

The empirical advantage of this theory, despite its seemingly greater complexity, is that it correctly predicts that “symmetric presuppositions” are possible in (14) but not (15), and that they require contrastive focus. Symmetric theories of presupposition projection have little to say on these matters. Further, the added features that I invoke are all motivated independently of the problem at hand. Finally, they allow us to remain with incremental theories which, except for the few symmetric cases we have seen, are better motivated empirically and conceptually.

7. Strong triggers

Finally, there is one type of symmetric case which Philippe Schlenker (p.c.) brings up which I have not mentioned, involving *too*. *Too* is arguably a stronger trigger than definite descriptions and possessives, and it has been suggested that symmetric cases with *too* are more acceptable than the examples we have discussed. Schlenker suggests the following example:

(41) If the teachers salaries aren't increased too, the nurses won't get a raise either.

Symmetric theories predict that (41) should be acceptable to the extent that (4a-b) are, while my theory predicts something quite different: (41) should be acceptable if it is initially reasonable to assume that the nurses will get a raise. Here are some contexts to help us adjudicate the question.

Imagine that there is a recession, and we think that the city government probably has no money to give anyone a raise. So, for any group of city employees, the chance that that group will get a raise is very small. But the nurses' and teachers' unions are always warring, and it is quite generally impossible to give one a raise and not another without making a political mess – so we know that it's both or none, and probably none. The question is whether (42) is a felicitous way to describe the situation.

(42) It's unlikely that any city employees will get a raise this year. And we know one thing for sure: if the teachers' salaries aren't increased too, the nurses won't get a raise.

My intuition is that (42) is not very felicitous: the second sentence seems to imply that there is already discussion underway about the nurses getting a raise, which we know from the first sentence is not the case. However, if we change the situation so that there's a lot of money around and the government is being generous, the key sentence seems to improve:

(43) The city has plenty of money and will give raises to employees in a number of key sectors this year. But the political situation with the teachers' and nurses unions is delicate. If the teachers' salaries aren't increased too, the nurses won't get a raise.

To the extent that there is a contrast between (42) and (43), this supports the present theory over the symmetric competitors. Symmetric theories cannot distinguish between these cases: in both (42) and (43) it is the material in the final clause which licenses the initial presupposition.

My approach, in contrast, maintains that the presupposition is licensed only if the participants initially assume that someone other than the teachers (here, most likely the nurses) will get a raise. That is, just as in the contrast between (14) and (15), the initial plausibility of the presupposition is the controlling factor in the felicity of the sentence, whether or not the sentence proceeds to call this presupposition into question. I leave it to the reader to judge which

set of predictions is correct.

8. Conclusion

We started off by reviewing empirical and conceptual motivations for asymmetric projection algorithms. Symmetric presuppositions seemed to provide counter-examples to these principles, motivating Schlenker (2008) to weaken his theory by adding a second projection algorithm. However, I showed that these theories overgenerate in one respect, leaving unexplained the unacceptability of symmetric presuppositions in certain contexts, and undergenerate in another, failing to predict the peculiar intonational patterns they require. I explored an alternative based on information structure and the composition of the common ground, incorporating elements from Stalnaker (2002) and Roberts (1996). I argued that this theory predicts correctly the environments in which apparently symmetric presuppositions are and are not available.

Thus the present theory has improved empirical coverage, and it also avoids adding a second symmetric algorithm for presupposition projection, which makes the theory more parsimonious than its alternatives. Finally, by treating presupposition projection and satisfaction as obeying asymmetric principles, the present theory interfaces well with theories of pragmatics such as Stalnaker's, as well as incremental theories of semantic processing (one of the original motivations for Schlenker's asymmetric theory). I conclude that the current theory is promising in its empirical coverage, theoretical parsimony, and integration with well-developed theories of information structure, non-monotonic reasoning, and presupposition projection.

References

- Alter, Kai, et al. 2001. Kontrastprosodie in Sprachproduktion und –perzeption. *Linguistische Arbeiten* 77: 59-79.
- Beaver, David. 2001. *Presupposition and Assertion in Dynamic Semantics*. Stanford: CSLI.
- Büring, Daniel. 2004. Focus Suppositions. *Theoretical Linguistics* 30(1): 65-76.
- Hamblin, C.L. 1973. Questions in Montague English. *Foundations of Language* 10:41-53.
- Heim, Irene. 1990. Presupposition projection. In R. van der Sandt (ed.) "Presupposition, Lexical Meaning and Discourse Processes: Workshop Reader." University of Nijmegen.
- Kálmán, László. 1990. Deferred information. In Kálmán and Pólos (eds.), *Papers from the 2nd Symposium on Logic and Language*. Budapest: Akadémia Kiadó. 125-57.
- Krahmer, Emiel, and Marc Swerts. 2001. On the alleged existence of contrastive accents. *Speech Communication* 34: 391-405.
- Leusen, Noor van. 2004. Incompatibility in context. *Journal of Semantics* 21(4).
- Pierrehumbert, Janet, and Julia Hirschberg. 1990. The meaning of intonational contours in the interpretation of discourse. In Cohen et al. eds., *Intentions in Communication*. MIT Press.
- Reiter, R. 1980. A logic for default reasoning. *Artificial Intelligence* 13: 81-132.
- Roberts, Craige. 1996. Information structure in discourse: Towards an integrated formal theory of pragmatics. In Yoon and Kathol (eds.), *OSU Working Papers in Linguistics* 49.
- Rooth, Mats. 1992. A theory of focus interpretation. *Natural Language Semantics* 1(1): 75-116.
- Rooth, Mats. 1999. Association with focus or association with presupposition? In Bosch and van der Sandt (eds.), *Focus: Linguistic, Cognitive, and Computational Perspectives*. CUP.
- Rothschild, Daniel. 2008. Making dynamic semantics explanatory. Ms., Columbia University.
- Schlenker, Philippe. 2007. Anti-dynamics: Presupposition projection without dynamic semantics. *Journal of Logic, Language and Information* 16: 325-56.
- Schlenker, Philippe. 2008. Be Articulate! A pragmatic theory of presupposition projection. *Theoretical Linguistics* 34(3): 157-212.

- Schwarzschild, Roger. 1999. Givenness, AVOIDF and other constraints on the placement of accent. *Natural Language Semantics* 7: 141-77.
- Selkirk, Elizabeth. 2007. Contrastive Focus, Givenness and the Unmarked Status of “Discourse-New”. *Interdisciplinary Studies on Information Structure* 6 (2007): 125–145.
- Soames, Scott. 1989. Presupposition. In D. Gabbay and F. Guenther (eds), *Handbook of Philosophical Logic IV*: 553-616.
- Stalnaker, Robert. 1999 [1974]. Pragmatic presuppositions. In *Context and Content*. OUP.
- Stalnaker, Robert. 2002. Common ground. *Linguistics and Philosophy* 25(5-6): 701-21.
- Thomason, Richmond. 1997. Nonmonotonicity in linguistics. In van Benthem and ter Meulen eds., *Handbook of Logic and Language*. Amsterdam: Elsevier. Pp. 777-836.
- Watson, Duane, et al. 2008. Tic Tac TOE: Effects of predictability and importance on acoustic prominence in language production. *Cognition* 106: 1548-1557.