# *Maximize Presupposition!* and Local Contexts*

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July 27, 2010

Heim (1991)'s *Maximize Presupposition!* is a principle of language use that forces speakers to sometimes use a sentence $\psi$ rather than a competing sentence $\phi$ to update the context $c$ when $\phi$ and $\psi$ contribute the same new information to $c$. More specifically, if $\phi$ and $\psi$ are competitors (in some well-defined class of competing elements), and $\psi$ has stronger presuppositions than $\phi$ which are satisfied in $c$, and $\phi$ and $\psi$ add the same new information to $c$, then the speaker must use $\psi$ in $c$. For example, since it is common knowledge that there is exactly one sun, it is odd to say # *A sun is shining*; this sentence is 'blocked' by its competitor, *The sun is shininig*, which is a better candidate under *Maximize Presupposition!* (henceforth MP).

All formal statements of MP that I am aware of characterize it is a global constraint, operative at the root (e.g., Sauerland (2003a, 2008), Percus (2006), Schlenker (2006), Chemla (2008), Magri (2009)). The goal of this paper is to show that this architectural assumption needs to be revised. Building on data first discovered by Percus (2006), I will argue (Section 3) that MP must checked in the local context of each embedded sentence (Local MP). The move to Local MP will also be argued (Section 4.1) to be necessary if a solution to the problem of antipresupposition projection is to be had. In Section 4.2, I will argue that Local MP has the added benefit of allowing us to eliminate Heim (1982, 1983a)'s Novelty/Familiarity Condition as a primitive constraint on operations of context change. If these arguments are sound, they might have relevance for broader debates concerning the role of dynamically changing local contexts in theories of interpretation.

*Thanks to Noam Chomsky, Kai von Fintel, Danny Fox, Ted Gibson, Irene Heim, Roni Katzir, Giorgio Magri, Orin Percus, Benjamin Spector, Bob Stalnaker, and to Angelika Kratzer and two anonymous reviewers for *Natural Language Semantics*.

# 1 MP as Global Competition

Consider the contrasts below:

(1) a. #A sun is shining
b. The sun is shining

(2) a. #All of John's eyes are open
b. Both of John's eyes are open

(3) a. #John thinks that Paris is in France
b. John knows that Paris is in France

(4) a. #The suns are shining
b. The sun is shining

(5) Context: The 26th is the last Tuesday of the month. The utterance time is, say, the 27th:
a. #Every Tuesday this month, I fast
b. Every Tuesday this month, I fasted

(6) John came to the store.
a. #Bill did.
b. Bill did, too.

These contrasts among (among several others) have been argued to be due to the operation of MP.[1] Very roughly, in each context of use, the (a) and (b) sentences contribute the same *new* information, but since the (b) sentences carry stronger presuppositions, which are met in the context of use, MP requires that the (b) sentences be used. Since we will argue for the need to revise the statement of MP, we should be a bit more precise in our characterization of the principle and its application. We will focus our attention on the case of competing determiners as in (1) and (2), but nothing follows from this decision.

Consider (1). First, assume the following lexical entries for the articles:

**Lexical Entry 1 (The Definite Article)**

$[[theX]Y]$ *expresses that proposition which is: (a) true at index* $i$ *if there is exactly one* $X$ *at* $i$*, and it is* $Y$ *at* $i$*, (b) false at* $i$ *if there is exactly one* $X$ *at* $i$*, and it is not* $Y$ *at* $i$*, (c) truth-valueless at* $i$ *if there isn't exactly one* $X$ *at* $i$

[1] For discussion, see: Heim (1991) for (1), Percus (2006), Chemla (2008) and Magri (2009) for (2), Percus (2006) and Chemla (2008) for variants of (3), Sauerland (2003b) and Spector (2007) for variants of (4), Sauerland (2002) for (5), Amsili and Beyssade (2006) and Singh (2008) for (6).

**Lexical Entry 2 (The Indefinite Article)**

$[[a(n)X]Y]$ *expresses that proposition which is: (a) true at index* $i$ *if there is at least one individual at* $i$ *that is both* $X$ *at* $i$ *and* $Y$ *and* $i$*, (b) false otherwise.*

We also assume the following definition of 'contextual equivalence,' borrowed from Sauerland (2003a) and Schlenker (2006):

**Definition 1 (Contextual Equivalence)**

*LFs* $\phi$ *and* $\psi$ *are* contextually equivalent with respect to context $c$ *iff* $\{w \in c : [[\phi]](w) = 1\} = \{w \in c : [[\psi(w)]] = 1\}$

Returning to the contrast in (1), note that our common knowledge entails that there is exactly one sun. As such, given our definition of contextual equivalence, it turns out that (1a) and (1b) end up being contextually equivalent. If there is exactly one sun in every world of evaluation, both (1a) and (1b) are true in the same worlds in the context, namely those worlds where this one sun is shining. But if both LFs serve the same communicative function (i.e., map the same input context to the same output context), why should (1a) be odd, while (1b) is perfectly felicitous?

The contrast was first noted in Hawkins (1978). He used it to argue that definites are subject to an 'inclusiveness' condition and indefinites to an 'exclusiveness' condition, by which was meant simply that *the N* presupposes that there is exactly one N in the context, and *a(n) N* presupposes that there are several N in the context. Heim (1991) presents crucial evidence against the exclusiveness condition for indefinites. For instance, the following sentence does not presuppose that there are at least two 20 ft. catfish:[2]

(7) Robert caught a 20 ft. catfish

Heim proposes instead that only the definite is presuppositional (cf. our lexical entries above). In addition, she suggests that there must be a principle in force urging us to use [[$the$ $X$] $Y$] instead of [[$a(n)$ $X$] Y] in contexts where the presuppositions of the former are met. She speculates that perhaps a maxim guiding us to make our conversational contributions presuppose as much as possible might generally be operative in communication. Sauerland (2003a, 2008), Percus (2006), and Schlenker (2006) generalize and formalize Heim's speculative

[2]One diagnostic for this is that you cannot felicitously apply the *Hey Wait a Minute!* Test (von Fintel (2004)) here: # *Hey wait a minute! I didn't know there are multiple 20 ft. catfish!* See also Sauerland (2008) for relevant discussion.

remarks. Sweeping certain irrelevant differences in their formulations under the rug, here, roughly, is a statement of MP that is (I believe) faithful to the intentions of all these works, which I'll call 'Standard MP:'

**Standard MP: MP as Global Competition** If $\phi$, $\psi$ are contextually equivalent alternatives, and the presuppositions of $\psi$ are stronger than those of $\phi$, and are met in the context of utterance $c$, then one must use $\psi$.

This statement presents Standard MP as a solution to an optimization problem: Given a set of competing LFs that all update the current context $c$ to a new output context $c'$, Standard MP determines that the best LF for carrying out this update is the one with the strongest presupposition satisfied in $c$. The reader will no doubt have noticed that the statement of Standard MP makes reference to an unanalyzed notion of 'alternatives.' To make the principle precise, therefore, it is necessary to spell out what this space of competing alternatives is. Much like work on scalar implicature, it has been thought that certain lexical items trigger MP competitions, and that the items themselves rest on certain scales. These scales have generally had to be stipulated. However, they are the only point at which stipulation is allowed. Once given, they can be used to mechanically derive the space of competing LFs. In our examples, for instance, the following lexical scales would need to be available: $< a, the >$, $< all, both >$, $< believe, know >$, $< pl, sg >$, $< PRES, PAST >$, $< \emptyset, too >$,[3] etc.[4]

**Alternatives for Standard MP** If $< \alpha, \beta >$ is a scale, and $\phi$ is an LF containing lexical item $\alpha$, and $\psi$ is an LF that is everywhere like $\phi$ except that at some terminal node it contains $\beta$ where $\phi$ contains $\alpha$, then $\phi$ and $\psi$ are alternatives.

With this machinery in place, the contrast in (1) is now derived. As discussed above, given that it is common knowledge that there is exactly one sun, both sentences are true in the same worlds in the context. They are also alternatives under the definition above. Furthermore, since the presupposition of (1b) (that

[3]Chemla (2008) suggests this scale. In Singh (2008), I suggest that $<\sim, too >$, where $\sim$ is Rooth (1992)'s focus interpretation operator, is a better scale. See Amsili and Beyssade (2006) for yet a different perspective.

[4]Much like with scalar implicatures, it would be better if one had an intensional characterization of the alternatives. I believe that such a characterization can be provided using Katzir (2007)'s structure sensitive procedure for generating alternatives. For ease of exposition here, I will simply assume the more familiar scalar approach.

there is exactly one sun) is met in the context of use, Standard MP requires that the speaker use (1b), rather than (1a). By uttering (1a), the speaker will have blatantly violated this principle of language use, generating the peculiar kind of oddness we detect upon hearing it.[5] Once we define appropriate lexical entries for *both* and *all*,[6] as well as the other scalar items in (3)-(6), the same reasoning we saw here would apply, *mutatis mutandis*, to account for the fact that the (b) sentences block the (a) sentences.[7]

# 2 Percus' Discovery

Percus (2006) discovered a serious flaw in the formulation of Standard MP. Consider the following contrast:

(8) a. Everyone with exactly two students assigned the same exercise to both his students

[5]It is tempting to try to articulate in greater detail the nature of this oddness. One can, of course, just state this as a brute force blocking effect. Alternatively, Heim (1991) suggested a possible derivation from implicatures. An utterance like *a sun is shining* would naturally be thought to give rise to an implicature that the speaker was not in a position to assert *the sun is shining*, from which it would follow that the speaker does not believe that there is exactly one sun. This would contradict the common knowledge that there is exactly one sun, and it is this contradiction between implicatures and common knowledge that would be responsible for the oddness. Heim argues that the derivation does not succeed, however, because, given the contextual equivalence of the competing sentences, the maxim of quantity is made inert, which results in no implicature being computed. As a result, there would seem to be no choice but to state MP as a primitive. Percus (2006) argues similarly. Schlenker (2006) attempts to derive MP from principles of multiagent epistemic logic put forth in Stalnaker (2002), and Magri (2009) and Singh (2009, 2010) argue that MP oddness follows from contradictions between the context and the output of an implicature system that computes without access to contextual information (e.g., Fox (2007)). None of these approaches, as currently stated, would extend to the puzzling cases to be discussed in Section 2. An alternative account might rely on processing considerations, such as that new discourse referents (e.g., introduced by indefinites) are generally more costly to process than those that exploit the existence of certain information as given (e.g., Gibson (2000), though see Note 21). We are clearly far from a proposal. For our purposes here, we will simply state MP as a brute force blocking principle, and refer the reader to the above literature for relevant discussion.

[6](1) $[[bothX]Y]$ expresses that proposition which is: (a) true at index $i$ if there are exactly two individuals that are $X$ at $i$, and both these individuals are $Y$ at $i$, (b) false at $i$ if there are exactly two individuals that are $X$ at $i$, and at least one of them is not $Y$ at $i$, (c) truth-valueless at $i$ if there are not exactly two $X$ at $i$. (2) $[[allX]Y]$ expresses that proposition which is: (a) true at $i$ if all individuals that are $X$ at $i$ are also $Y$ at $i$, (b) false otherwise.

[7]Though see Chemla (2007) for some puzzing data from French.

b. #Everyone with exactly two students assigned the same exercise to all his students

Under most theories of presupposition projection (e.g., Karttunen and Peters (1979), Heim (1983b), Schlenker (2007, 2008)), universally quantified sentences *Every A B* presuppose that every element of $A$ satisfies the presuppositions of $B$. Thus, (8a) is predicted to presuppose that everyone with exactly two students has exactly two students, i.e., it presupposes a tautology, which is to say it presupposes nothing at all. And since (8b) contains no presupposition trigger, it also presupposes nothing at all. It follows that no context should be capable of discriminating between the two, and MP as stated should therefore never be relevant. Yet, the same contrast we observed in (2) seems to be at play here as well. In fact, we can generalize from Percus' example and quite easily generate sentences which presuppose nothing at all yet seem to be subject to some sort of MP-like competition:

(9) a. If John has exactly two students and he assigned the same exercise to {both/ # all} of his students, then I'm sure he'll be happy
b. (Either John has exactly two students and he assigned the same exercise to {both/ # all} of his students) or he doesn't have any students at all
c. Mary believes that John has exactly two students and that he assigned the same exercise to {both/ # all} of his students

From the vantage point of Standard MP, these sentences are quite puzzling. First, globally, the competing sentences $\phi$, $\psi$ have no presuppositions. Second, embedded within them are sentences $S$, $S'$ which, when uttered in isolation, enter into MP competitions (e.g., *John assigned the same exercise to both/all his students*). The puzzling fact is that the competition between $\phi$, $\psi$ seems to be decided on the basis of which of $S$, $S'$ is presuppositionally stronger, even though this presuppositional difference is undetectable at the root. This pattern seems irreconcilable with the view that MP applies globally. Moreover, if MP is interpreted as a pragmatic constraint governing speech acts,[8] it is not *prima facie* clear

[8] As pointed out to me by Danny Fox (p.c.) and Kai von Fintel (p.c.), it is not clear that Standard MP need be interpreted this way. As far as I can tell, only two authors who have written on the subject have explicitly taken a view on the matter: For Schlenker (2006), MP should be derived as a theorem of Gricean reasoning. For Magri (2009), MP applies within the grammar, hence not pragmatic by definition. All authors have expressed the view that MP applies globally. A natural interpretation of this level of application is that it operates at the level of speech act. My point here

what to make of the apparent fact that the MP triggering sentences in (9) sit in non-asserted positions (in the antecedent of a conditional, a disjunct in a disjunction, and under *believe*, none of which are positions where a speech act of assertion can normally be thought to be taking place). These observations suggest to me that we should either give up on the idea that MP operates at the root, or we should give up the idea that MP is at all relevant to accounting for these contrasts.[9]

Despite this apparent tension, Percus (2006) maintains both that MP is indeed behind the contrasts observed immediately above and that MP is a principle that operates globally, at the root. To account for the apparent application of MP in presuppositionless sentences, he modifies Standard MP along several dimensions. First, he introduces the notion of one lexical item (rather than a sentence or LF) being 'presuppositionally stronger' than another. The exact definition is not important for our discussion.[10] It should suffice to note that the formal definition captures precisely our intuition. For example, it works so that *the* is presuppositionally stronger than *a*, that *both* is presuppositionally stronger than *all*, etc. He then introduces a notion of the *lexical alternatives* of a lexical item:

**Lexical Alternatives** The *lexical alternatives* of a lexical item $\alpha$ are all presuppositionally stronger lexical items $\beta$ of the same category.

This is an asymmetric notion of alternative. According to this definition, *both* is a lexical alternative to *all*, but *all* is not an alternative to *both*.[11] He uses this notion of lexical alternatives to generate the candidate set of alternative LFs that ultimately enter into MP competitions:

**Alternative-Family** The *Alternative Family* of LF $\phi$ is the set of LFs that can be generated by replacing a lexical item in $\phi$ with one of its lexical alternatives.

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is not to attribute this view to any particular author, but to raise a potential complication for the idea that MP is a pragmatic maxim governing speech acts.

[9] Hence, possibly also for the contrasts in (1)-(6).

[10] "The intuitive idea is that *both* is 'presuppositionally stronger' than *all* for the following reason: if we take two simple sentences that differ only in that one contains *both* where the other contains *all*, the domain of the *both* sentence is always a subset of the domain of the *all* sentence, and sometimes a proper subset" (Percus (2006), p.15). The formal definition is given in his (32), p.15: "$A$ is 'presuppositionally stronger' than $B$ iff the domain of $[[B]]^*$ properly includes the domain of $[[A]]^*$, where $[[A]]^*$ and $[[B]]^*$ are $[[A]]$ and $[[B]]$ adjusted to apply to sequences."

[11] The asymmetry is not important for the system's predictions, but is there to allow the Revised MP principle to receive a simplified statement.

This definition ensures that any LF $\phi$ containing (e.g.,) the lexical item *all* can be converted into an alternative LF $\psi$ by replacing an occurrence of *all* with *both*. Given these notions, Percus offers the following reformulation of MP:

**Revised MP** Let $\psi$ be a member of the Alternative-Family of $\phi$, and suppose $\phi$ and $\psi$ to be contextually equivalent.[12] Then one must not use $\phi$ if the use of $\psi$ would be felicitous in $c$.

Here is an illustration of how Percus' maxim works. Consider again sentence (8b), # *everyone with exactly two students assigned the same exercise to all his students.* This sentence has (8a) as a member of its Alternative-Family, *everyone with exactly two students assigned the same exercise to both his students.* These sentences are, of course, equivalent in all contexts. Furthermore, the use of (8a) is felicitous in all contexts. Since (8a) is a member of (8b)'s Alternative-Family, i.e., it can be generated from (8b) by replacing *all* with the presuppositionally stronger item *both*, the use of (8b) is blocked by (8a). The reader can verify that Percus' reformulation of MP captures the contrasts in (9) without losing the ability to predict the standard MP contrasts we introduced at the beginning ((1)-(6)).

# 3 The Domain Size of MP

My aim in this section is to motivate an alternative response to the data in (8) and (9). I shall begin (Section 3.1) by pointing to a consequence of Revised MP that I believe leads to a complicated view of the division of labour between formal semantic principles and maxims of language use. This tension will lead us to an alternative formulation of MP, one which will be argued (Section 3.2) to make empirically correct predictions that are not made by Revised MP.

## 3.1 Local MP

As originally stated, (Standard) MP was a competition-based principle that decided between competing elements based on the information contained in the context $c$, on the one hand, and the conditions the competing elements imposed on $c$,

[12] Percus presents a slightly different version of 'contextual equivalence' than the one used here. He uses it to mean not that $\phi$, $\psi$ are true in the same worlds in $c$, but that they have the same value in all worlds in $c$. The distinction will not be crucial to anything we say here (though see Note 23), so I will stick to our formulation as above.

on the other. Percus' discovery teaches us that this view is not tenable. His own response was to reanalyze MP as a principle that is sensitive to the lexical items that occur in structures, and not to the conditions imposed by LFs on the context of evaluation.[13] As a constraint regulating the semantics/pragmatics interface, this strikes me as somewhat unnatural. I know of no other principles of semantics/pragmatics that display preferences among LFs $\phi$, $\psi$ that are sensitive not to their semantic or contextual meanings but rather solely to the lexical items contained within them. A reformulation of MP in terms of the meanings of sentence-level structures and contexts of use would allow us to ask questions that arise naturally at this level of analysis, e.g., Do the relevant rules/principles apply at the root, or in embedded positions/local contexts?[14] Are the relevant rules/principles context-sensitive, or are they blind to contextual information?[15] An analyis at this level would, I believe, make it clear what the relevant choice points are in understanding MP and its relation to other principles of semantics/pragmatics.[16]

I would like to suggest a reformulation of MP of this kind which attempts to retain the original character of MP as a principle that discriminates between LFs based on the definedness conditions they impose on the context of evaluation. The observations in (8) and (9) teach us that the constraint cannot be applied at the root, but must instead be active in embedded positions. A natural way to allow for this is to allow the context of evaluation to change throughout the interpretation of a complex sentence. In effect, the context that is relevant for the application of MP will be the local context $c'$ of some embedded constituent, and $c'$ may be different from the global context $c$. I believe this move is a natural one to make, given that the appeal to dynamically changing contexts was to a great extent motivated by

[13]This move makes Revised MP rather close in spirit to a Distributed Morphology approach to blocking (e.g., Embick and Marantz (2008)), where the competition involves various Vocabulary items competing for insertion at terminal nodes.

[14]See, for example, the question of whether constraints requiring that sentences be contextually consistent/informative are checked at the root, or incrementally/in local contexts (e.g., Grice (1967), Horn (1972), Stalnaker (1978), van der Sandt (1992), Schlenker (2008, 2009), Fox (2008)); the question of whether scalar implicatures are generated at the root, or also in embedded positions (e.g., Grice (1967), Cohen (1971), Chierchia (2004), Sauerland (2004), van Rooij and Schulz (2004), Fox (2007), Russell (2006), Chierchia et al. (2008), Chemla and Spector (2009), Geurts and Pouscoulous (2009), and much other work); and the question of whether the constraint requiring that contexts entail presuppositions of sentences is checked at the root in the global context, or in the local contexts of embedded constituents (e.g., Karttunen (1974), Stalnaker (1974), Heim (1983b), Schlenker (2008, 2009), Fox (2008), Chemla (2009), and much other work).

[15]As with current work on scalar implicature (see Notes 5 and 14 for some references).

[16]See, for example, the attempts to relate implicature computation with MP discussed in Note 5.

presuppositional facts in the first place (e.g., Karttunen (1974), Stalnaker (1974), Heim (1983b)).[17] Given this prior motivation for the intimate connection between local contexts and presuppositional constraints, I propose to modify Standard MP (the original statement) just enough to allow it to take advantage of a theory that employs local contexts. Here is what I propose:

**Local MP: MP is Checked Locally** Check that MP is satisfied for each $S$ embedded in $\phi$ in $S$'s local context $c'$.

This formulation evidently requires a theory of interpretation that employs local contexts. There are several on the market (e.g., Heim (1983b), van der Sandt (1992), Schlenker (2009)). For our purposes in later parts of this paper, we will need to discuss the treatment of variables, and, as it stands, the CCP/DRT approaches have been most explicit on this front. For concreteness, I will follow the dynamic treatment in Heim (1983b), but I hope that this choice is immaterial to the broader conclusions I hope to draw.

Assuming this framework, Local MP readily predicts the contrasts in (8) and (9).[18] Consider (9a), for example. The local context for the second conjunct in the antecedent, *he assigned the same exercise to* {*both / all*} *his students*, is $c$+*John has exactly two students*. In this context, the presupposition of *John assigned the same exercise to both his students* is met, and it indeed presupposes more than its alternative *John assigned the same exercise to all his students*. They are equivalent in this context,[19] so, by MP, *John assigned the same exercise to all his students* is (locally) blocked by the presuppositionally stronger *John assigned the same exercise to both his students.* And this is what will be held accountable for the oddness of the *all* variant of the sentence. More generally, for $\phi$ a (possibly

[17] One of the main innovations of this move was to pair each constituent of a complex sentence with a 'local context,' and to require that the local context of each constituent entail the constituent's presupposition (Local Satisfaction). See also Note 14.

[18] I assume basic familiarity with the CCP framework. All the entries relevant for our present discussion are stated in the appendix, and are either taken or adapted from Heim (1983b).

[19] When we move to a dynamic framework, in order to use our definition of contextual equivalence (truth in the same worlds, cf. Definition 1), we need to state a dynamic definition of truth in a world. See e.g., Heim (1982), van Benthem (1996) for various formulations. We will say that $\phi$ is: (a) *true* in $w$ if $\{w\} \in dom(+\phi)$ and $\{w\} + \phi = \{w\}$, (b) *false* in $w$ if $\{w\} \in dom(+\phi)$ and $\{w\} + \phi = \emptyset$, and truthvalueless at $w$ otherwise. Definition 1 then applies: $\phi$ and $\psi$ are contextually equivalent with respect to context $c$ iff $\{w \in c : \phi$ is true in $w\}$ = $\{w \in c : \psi$ is true in $w\}$. Note that since ($c$ + *John has exactly two students*) + *John assigned the same exercise to both his students* = ($c$ + *John has exactly two students*) + *John assigned the same exercise to all his students*, the required contextual equivalence follows.

complex) sentence uttered in context $c$, we simply check that MP is satisfied each time we wish to execute $c' + S$ for each such instruction defined by the CCP of $\phi$. I hope the reader will trust that this reasoning can be extended in a general way to all the other examples discussed above.[20]

## 3.2 An Empirical Argument in Favour of Local MP

I believe Local MP effectively allows one to maintain the basic spirit of Standard MP. It modifies the principle only to the extent that such modifications were independently argued to be needed to account for presuppositional phenomena, viz. the checking of presupposition-related constraints in local contexts. Given this prior motivation, it would be rather unsurprising if MP should also be checked in local contexts. More important than this for evaluating the merits of Local MP as compared with Revised MP, however, is that the two principles make different predictions in certain cases. In these cases, the data side with Local MP.

First, consider a sentence $\phi$ whose CCP is defined on context $c$, so that $+S$ is defined in the local context $c'$ of each $S$ embedded in $\phi$. In such a case, it turns out that Local MP and Revised MP are equivalent. To see that this is so, suppose there is a $S_j$ embedded in $\phi$ which is a partial function (e.g., suppose it's a sentence containing the word *both*). Suppose further that the local context of $S_j$, $c'$, satisfies its presuppositions (cf. Note 17). Thus, by Local MP, $S_j$ should be used instead of its contextually equivalent alternative $S'_j$ (e.g., a sentence that is exactly like $S_j$ except it contains *all* at a terminal node where $S_j$ contains *both*). Since presuppositions are everywhere satisfied (by assumption), assuming (for current purposes) that this suffices for a sentence to count as 'felicitous,' the sentence $\phi$ containing $S_j$ will be felicitous in $c$. It will thus block its alternative $\phi'$, where $\phi'$ is like $\phi$ except it contains $S'_j$ where $\phi$ contains $S_j$. In other words, when presuppositions are everywhere satisfied, Local MP and Revised MP make identical predictions.

The two come apart, however, when presuppositions are not everywhere satisfied. Note that Revised MP makes the following prediction: one should never be able to find contextually equivalent members of the same Alternative-Family $\phi$, $\psi$ that are both felicitous, for the felicity of the presuppositionally stronger one ($\psi$, say) should block the use of $\phi$. Local MP, on the other hand, is not tied to any such prediction. To see this, observe that MP does not apply if, in local context $c'$,

[20] I will return to quantified sentences like (8) in Section 4, where we discuss the treatment of variables more broadly.

the presuppositions of $\psi$ are not met. Of course, such a state of affairs gives rise to the threat of infelicity due to presupposition failure. However, given the option of accommodation, this potential communicative catastrophe can be diverted, and $\psi$ might still be felicitous.[21] Our task, then, is to see if we can find competitors whose presuppositions are not satisfied in the context of use, but which still end up contextually equivalent, and which end up felicitous due to accommodation. Here are some examples of such cases:

(10) a. Context: It is not common ground how many bouncers there are at Club X, and any number of bouncers is possible, including none at all.
Speaker: I went to Club X last night. {A / the} mean looking bouncer at the door, the only one working that night, frisked me on my way in.

b. Context: It is not common ground how many delegates from France are at the convention. Any number could possibly be there, including none at all.
Speaker: {A / the} delegate from France isn't here because there is no delegate from France![22]

To see why this is problematic for Revised MP, and not for Local MP, we must establish that the indefinite and definite conditions are contextually equivalent. Since they are obviously felicitous (no sense of presupposition failure, no sense of MP violation, or any other detectable oddness), their contextual equivalence would constitute a direct argument against Revised MP. Local MP, on the other hand, simply does not apply, since the presuppositions of the definite sentences are not met in the context of use. It thus has no say on whether the definite or indefinite should be used, and, therefore, does not predict any blocking effects

[21] An anonymous reviewer points out that if accommodation is marked even if we are unaware of this, Revised MP would no longer apply, and the predictions of Revised MP and Local MP would remain equivalent. This is correct. It might be relevant that a recent experimental study I was involved with (Singh et al. (2010)) found no detectable processing cost to accommodation that sounds 'felicitous' in the sense assumed here. For example, there was no difference in processing complexity (across various measures, such as reaction times and amount and timing of 'stops making sense' judgments) between indefinite and definite conditions like the following: *John went to a restaurant last night. {A/The} waiter greeted him at the entrance.* One might think of the argument in this section as motivating the need to formulate a notion of 'felicity' that makes clear predictions in any given context.

[22] A modification of an example from Danny Fox, p.c.

between the competitors. Felicity, in these cases, seems to be regulated entirely by the possibility of accommodation.

The reader is asked to turn their attention now to example (10a). Given our lexical entries for the indefinite and definite article, the indefinite and definite versions of (10a) are true in the same worlds in the context set, viz. those worlds where there was a mean looking bouncer at the door, that this mean looking bouncer was the only bouncer working that night, and that this bouncer frisked the speaker on her way in. Accommodation of a bouncer happens fairly automatically here, and so the sentence is also felicitous. Sentence (10a) is thus a counterexample to Revised MP.[23]

In example (10b), the indefinite case results in an output context determined by the complement of the *because* clause, namely, that there is no delegate from France (since this sentence asymmetrically entails that a delegate from France isn't here). In the definite case, where the existence presupposition of *the delegate from France* is locally accommodated (so that, in effect, negation takes wide scope over the definite), the resulting output context is the same as in the indefinite case. The competitors are thus contextually equivalent,[24] and since both are felicitous, we have another counterexample to Revised MP. We have thus constructed the required pairs of contextually equivalent, felicitous competitors. Local MP, again, simply does not apply, and so predicts no blocking effects in these cases.

It might be somewhat suspect that our account relied on a process of context repair, namely, presupposition accommodation, in order to create the required felicity. Local MP is an attempt to restate MP as a contraint on update, much like the constraint of Local Satisfaction of presuppositions (Karttunen (1974), Stalnaker (1974), Heim (1983b)). If context repair can rescue the system from satifaction violations, might such processes also rescue the system from MP violations?

[23] As pointed out to me by Danny Fox (p.c.), this is only true under the Sauerland-Schlenker definition of contextual equivalence we've adopted here (truth in the same worlds). Under Percus' more stringent notion of contexual equivalence (same truth-value in all the worlds in the context set), depending on one's theory of presupposition projection, (10a) might or might not count as contextually equivalent. Without getting into projection out of appositives, and 'later' sentences more generally, sentence (10b) is still a counterexample, since the presupposition of the definite is cancelled.

[24] Under both the Sauerland-Schlenker definition as well as Percus'.

## 3.3 Monotonicity and Context Repair

We have argued that Local MP is very much like Local Satisfaction, a constraint that is checked in the local context of each constituent. As we saw in the last section, Local Satisfaction sometimes tolerates violations; when $c$ does not entail the sentence's presupposition $p$, the context can be repaired to a richer context, $c' \subset c$, in order to allow context update to occur. We might wonder, then, whether something like this process of context repair is available for Local MP.

Restricting our attention to atomic sentences, suppose that $\psi$ presupposing $p$, $\psi_p$, and $\phi$ (presuppositionless) are competitors, and suppose $c$ entails $p$. Under these conditions, $\psi_p$ is predicted to block $\phi$. If $\phi$ should nevertheless happen to be used, one can imagine the following possible repair strategy: Alter the context $c$ to a weaker context $c' = c \cup q$ for some proposition $q$ so that $c'$ does not entail $p$. This context weakening would allow the system to avoid violating MP, much like context strengthening sometimes allows the system to avoid violating the Satisfaction condition. As far as I know, such kinds of context repair are unattested. For example, there seems to be no escape from the oddness of sentences like (1)-(6), and (8) and (9). Indeed, recent experimental evidence produced by Chemla and Schlenker (2009) provides further confirmation that violations of Local MP give rise to stronger judgments of deviance than violations of Local Satisfaction. Why should this be?

We could make sense of this asymmetry in possibilities for context repair by adapting Stalnaker (1978)'s idealization of conversation as a monotonic process of context change to all operations of context update, be they assertions or otherwise. The restriction to monotonic operations readily generalizes to local operations of context change. Suppose we follow van der Sandt (1992), Geurts (1999), Schlenker (2009), and others, and translate Stalnaker (1978)'s constraints requiring that context update be informative and consistent into constraints on all local update operations. Given Local Satisfaction, Local Consistency, Local Informativity, and Local MP, it is fairly straightforward to show that the only constraint that can be repaired by a monotonic process of context change is Local Satisfaction.[25] For our purposes, the important point is that monotonicity predicts that there can be no escape from the oddness of MP violations. More evidence in favour of this prediction will be presented in the next section.

[25] See Singh (2008) for more discussion.

# 4 Admittance Conditions and Local MP

Having adopted Local MP, we will try in this section to make it do some work for us. Section 4.1 will propose a generalization of the notion of 'context admittance' familiar from the theory of presupposition projection that makes room for Local MP. The revised notion of admittance will allow us to associate both presuppositions and antipresuppositions with sentences of arbitrary complexity (Section 4.1). It will also lead to a simplification of the theory of context change by allowing for the elimination of Heim (1982)'s 'Novelty/Familiarity Condition' (Section 4.2).

## 4.1 Antipresupposition Projection

The elements $< \phi, \psi_p >$ that enter into MP competitions have use conditions relating the context $c$ with proposition $p$, but the conditions are rather different in kind. $\psi_p$ requires that $c$ entail $p$, while $\phi$ requires that $c$ not entail $p$. We might follow Percus (2006) and Chemla (2008) and say that $\phi$ *antipresupposes* $p$. Consider the following pair, for example:

(11) a. John submitted both his papers
Use Condition: $c$ must entail that John has exactly two papers
b. John submitted all his papers:
Use Condition: c must not entail that John has exactly two papers

Suppose we state these as contextual admittance conditions: A context *admits* (11a) just in case it entails $p$ = that John has exactly two papers, and it admits (11b) just in case it does not entail $p$. We would like to generalize these admittance conditions to complex sentences of all sorts. We already have in place theories of presupposition projection that tell us the admittance conditions of sentences $\psi$ embedding (11a), $\psi(11(a))$. What we would like are comparable theories of antipresupposition projection that tell us the admittance conditions of sentences $\phi$ embedding (11b), $\phi(11(b))$. Sauerland (2008) suggests that we should do this by free riding off our theories of presupposition projection. To compute the antipresupposition of $\phi(11(b))$, simply compute the presupposition of $\psi = \phi(11(b))[11(a)/11(b)]$ (i.e., the sentence derived by subsituting 11(a) for 11(b)). Suppose the presupposition of $\psi$ is $q$, which means the admittance condition on $\psi$ is that $c$ must entail $q$. The admittance condition on $\phi(11(b))$ would then be that $c$ must not entail $q$. As noted by Sauerland (2008), this free riding strategy seems to work for projection across negation and universial quantifiers:

(12) a. I didn't twist both of John's arms
Admittance Condition: $c$ must entail that John has exactly two arms[26]
b. #I didn't twist all of John's arms
Admittance Condition: $c$ must not entail that John has exactly two arms (computed on the basis of (12a))

Given that $c$ entails that John has two arms, the oddness of (12b) follows.

(13) a. Every candidate submitted both his papers
Admittance Condition: $c$ must entail that every candidate has exactly two papers (e.g., Heim (1983b), Schlenker (2008), Schlenker (2009))
b. Every candidate submitted all his papers
Admittance Condition: $c$ must not entail that every candidate has exactly two papers (e.g., Percus (2006), Sauerland (2008))

Evidence for the predicted admittance condition on (13b) comes from the observation that when the context does entail that every candidate has exactly two papers, the result is odd:[27]

(14) a. Every candidate has exactly two papers. What's more, every candidate submitted both of his papers.
b. #Every candidate has exactly two papers. What's more, every candidate submitted all of his papers

Unfortunately, Percus' discovery, recall, teaches us that the free riding strategy will not work, since one can find the relevant blocking effects even when the competing sentences carry no presuppositions at all:

(15) a. Every candidate with exactly two papers submitted both of his papers
b. #Every candidate with exactly two papers submitted all of his papers

Since (15a) carries no presupposition (at the root), we cannot simply ride off of presupposition projection to compute antipresuppositional admittance conditions for (15b).

[26]This follows from the fact that negation is a 'hole' for presupposition (e.g., Karttunen (1973), Heim (1983b)).

[27]Recall from Section 3.3 that monotonicity predicts there should be no escape from the oddness of (14b).

Here I would like to suggest that Local MP allows us to state precise antipresuppositional admittance conditions in exactly the way that Local Satisfaction has been argued to do for presuppositions. Instead of stating a projection method for complex sentences, we will instead ask Karttunen (1974)'s question: What does it take for context $c$ to admit $\phi$? Recall that for atomic $< \phi, \psi_p >$, $c$ admits $\psi_p$ just in case $c$ entails $p$, and $c$ admits $\phi$ just in case $c$ doesn't entail $p$. For complex sentences, we simply employ the following condition from Heim (1983b):

**Context Admittance** A context $c$ admits a sentence $S$ just in case each of the constituent sentences of $S$ is admitted by the corresponding local context.

This just means that a context admits a sentence $S$ just in case Local MP and Local Satisfaction are met for each constituent in $S$. Given an assignment of local contexts to the constituents in $S$ (here we follow the assignment found in Heim (1983b)), the above facts now all follow. The LF of (12), for example, is the following:

(16) Not (I twisted all of John's arms)

The execution of the context change potential of this LF on $c$ is: $c - (c+$ *I twisted all of John's arms*). Given this, $c$ will admit this sentence (given Local MP) only if $c$ does not entail that John has exactly two arms (since $c$ is the context on which $+$*I twisted all of John's arms* is executed). Since our context does entail this, the sentence is not admitted, and the sentence is therefore ruled out, as desired.

Turning to the quantified sentences in (13) and (14), Heim's system assigns them the LFs in (17) and (18), respectively:[28]

(17) a. $Every\ x_i, x_i$ a candidate, $x_i$ submitted all of his papers
b. $Every\ x_i, x_i$ a candidate, $x_i$ submitted both of his papers

(18) a. $Every\ x_i, x_i$ a candidate, $x_i$ has exactly two papers, $x_i$ submitted all of his papers
b. $Every\ x_i, x_i$ a candidate, $x_i$ has exactly two papers, $x_i$ submitted both of his papers

Recall that we want to predict that $c$ admits (17a) only if $c$ does not entail that every candidate has exactly two papers. For the interpretation of variables, contexts need

[28] See also Heim (1997) for evidence from ellipsis that quantifiers project LFs of this kind.

to be enriched from sets of worlds to sets of world-assignment pairs.[29] The local context for $+x_i$ *submitted all/both his papers* will be $c' = c + x_i$ *a candidate*. By Local Satisfaction, the function $+x_i$ *submitted both of his papers* will be defined only if $c'$ entails that $x_i$ has exactly two papers. This in turn will be met only when every individual in the domain is such that he/she has exactly two papers, since $x_i$ will be a 'new' variable (Heim (1982, 1983b,a)). Thus, $+x_i$ *submitted all his papers* will be blocked by Local MP only when this condition is met.[30] As long as the context does not entail that every candidate has exactly two papers, then, it will admit *Every candidate submitted all his papers*. Hence, under our notion of local checking of MP, the desired admittance condition follows.

In (18), on the other hand, the local context of $+x_i$ *submitted all/both of his papers* is $c' = c + x_i$ *a candidate* $+x_i$ *has exactly two papers*. This $c'$ does satisfy the presupposition $+x_i$ *submitted both of his papers*, and so the variant with *both* must be used. The context therefore will not admit (18b). Since $c$ was arbitrary, no context at all will admit (18b), which means that its necessary oddness is predicted.

## 4.2 The Novelty/Familiarity Condition

Consider the following contrasts:

(19) a. #A man$_i$ came in, and a man$_i$ started yawning.
b. A man$_i$ came in, and he$_i$ started yawning.

(20) a. #He$_i$ came in, and a man$_i$ started yawning.
b. He$_i$ came in, and he$_i$ started yawning.

(21) a. #Every man who read it$_i$ liked [a book by Chomsky]$_i$
b. Every man who read [a book by Chomsky]$_i$ liked it$_i$

Contrasts like the ones above have been used as evidence for Heim's (Heim (1982, 1983b,a)) Novelty/Familiarity Condition (NFC). To illustrate the functioning of

[29] See the Appendix for a small CCP fragment outlining all the lexical entries assumed in the paper.

[30] The introduction of variables requires yet another modification to our definition of contextual equivalence, since the standard Tarskian truth definition in terms of satisfaction with respect to a static assignment function no longer applies. We will say that the pair $< w, g >$ *satisfies* $\phi$ if $\{< w, g >\} \in dom(+\phi)$ and there is a $g'$, such that $g \subseteq g'$ and $\{< w, g >\} + \phi = \{< w, g' >\}$ (we allow for expansions of $g$ to make room for elements in $\phi$ that introduce new variables). $\phi$ and $\psi$ are contextually equivalent with respect to $c$ iff $\{< w, g > \in c :< w, g >$ satisfies $\phi\}$ = $\{< w, g > \in c :< w, g >$ satisfies $\psi\}$.

the NFC consider the contrast in (19). Recall that we are now construing contexts as sets of world-assignment function pairs $< w, g >$ to deal with variables, rather than simply identifying contexts with propositions. The use of variables is governed by Heim's NFC, which states something like the following:

**Novelty/Familiarity Condition** Let $p$ be an atomic formula containing noun phrase $NP_i$. Then, for all $< g, w > \in c$ : if $NP_i$ is definite, $i$ must be in $dom(g)$, and if $NP_i$ is indefinite, $i$ must not be in $dom(g)$.

Applying this to (19), note that the first conjunct of (19a) includes an indefinite *[a man]*$_i$, which requires that $i$ be a new variable. Thus, $c$+ *[A man]*$_i$ *walked into the room* = $\{< w, g^{i/a} >:< w, g > \in c$, $a$ is a man in $w$, and $a$ walked into the room in $w\}$.[31] Now the second conjunct of (19a) is clearly ruled out by the NFC. The second conjunct of (19b), on the other hand, which applies to this same context, is licensed, since $i \in dom(g)$ for each $g$.[32]

With our admittance conditions in place, I believe we are able to eliminate the NFC by eliminating the constraint on indefinites, and reducing the constraint on definites to a special case of Local Satisfaction. More precisely, we can assume that a sentence like *a man*$_i$ *started yawning* has no definedness condition at all, while a sentence like *he*$_i$ *started yawning* will be defined on context $c$ only if for every $< w, g > \in c$: (i) $i \in Dom(g)$, (ii) $g(i)$ is male in $w$. Since both sentences update the context in the same way (by adding the information that $g(i)$ started yawning), by Local MP, you are forced to use the pronominal variant (19b) instead of (19a). Similar remarks apply, *mutatis mutandis*, to (20) and (21).[33,34]

[31] We call $g^{i/a}$ a *modified variable assignment*, which is the unique assignment such that: (i) $dom(g^{i/a}) = dom(g) \cup i$, (ii) $g^{i/a}(i) = a$, (iii) for all $j \in dom(g^{i/a}), j \neq i : g^{i/a}(j) = g(j)$ (Heim and Kratzer (1998)).

[32] The gender presuppositions of the pronoun will also have to be met. See immediately below for a more precise statement of the definedness condition on + *he started yawning*.

[33] (20) is further evidence (cf. Section 3.3) that Local MP cannot be violated, while Local Satisfaction can. Note, for example, that while the first conjuncts of (20a)/(20b) are predicted to suffer from presupposition failure, only (20a) is odd. This contrast teaches us that the oddness of (20a) must derive from the second conjunct. Under our assumptions, this oddness must be due to a violation of Local MP. And again, no repair seems possible. For instance, while (20b) could easily be the first line of a novel (where it seems there is practically no limit to the flexibility that can be demanded of a hearer), there is no way for (20a) to enjoy such a status.

[34] In addition to providing further evidence for the inviolability of Local MP, (21) can also be taken to be evidence for the idea that universal quantifiers are 'internally dynamic' (Groenendijk and Stokhof (1991)).

Of course, as we saw, the NFC captured these facts just as well. However, our admittance conditions (Local MP, Local Satisfaction) extend to cases beyond those covered by the NFC, such as those we've already seen in (9), as well as to extensions of the atomic cases we saw in (1)-(6) to local contexts of all kinds, such as conjunctions, conditionals, and quantifiers:

(22) a. #It's raining and Mary believes it (e.g., Chemla (2008))
b. It's raining and Mary knows it

(23) a. #Every man who has exactly one son loves his sons (e.g., Sauerland (2008))
b. Every man who has exactly one son loves his son

(24) a. #If John went to the party, Mary did (e.g., Singh (2008))
b. If John went to the party, Mary did too

Given this generality, postulating the NFC in addition to Local MP/Local Satisfaction would result in a more complex theory without generating any new predictions. It would seem safe to conclude, then, that a theory incorporating our admittance conditions without also incorporating the NFC is to be preferred.

# 5 Concluding Remarks

In trying to determine the role, if any, of local contexts in a theory of anaphora and presupposition, there are many positions that can be and have been taken. Some have argued for a unification of presuppositions and anaphora (e.g., van der Sandt (1992), Geurts (1999)), and have argued that a form of localism is necessary to account for these facts. Others (e.g., Heim (1983b)) have kept anaphoric resolution and presupposition projection/accommodation conceptually and formally distinct, but have argued that contexts include a propositional component as well as an assignment function component, both of which get updated dynamically throughout a discourse. Other approaches (e.g., Barwise (1987), Groenendijk and Stokhof (1991)) paid attention only to the dynamics of assignment functions, while others (e.g., Stalnaker (1998)) have argued that with a general enough framework for understanding propositions and propositional update, we might be able to do away with the technical apparatus of assignment function dynamics entirely. This paper tried to argue that the facts about *Maximize Presupposition!* teach us that local contexts are necessary in a theory of interpretation, involving both dynamically updated information and dynamically updated variable assignments. The

main source of evidence for this conclusion, recall, comes from Percus' observation that sentences display MP effects even though the relevant differences between them are obliterated at the root. The relevant differences, therefore, must be playing themselves out in embedded positions. A theory with local contexts, and constrained operations on such contexts, provides a natural account of this pattern.

If the evidence for local contexts should accumulate, a remaining task would involve making sense of any proposed assignment of local contexts to embedded constituents, given the familiar argument that truth-conditions underdetermine the assignment (e.g., Soames (1989), Heim (1990)). For theoretical considerations addressing this concern, see LaCasse (2008), Rothschild (2008), Schlenker (2009). Empirical observations might also help constrain the problem, with potentially relevant considerations coming from anaphora (e.g., Heim (1982)), modals (e.g., Beaver (2001)), and, if we are right, antipresuppositions, as well.

# A CCP Fragment

**Lexical Entries**:

- $c + (\phi \wedge \psi)$ = $((c + \phi) + \psi)$
- $c + \neg\phi = c - (c + \phi)$
- $c + (\phi \rightarrow \psi) = c - ((c + \phi) - (c + \phi + \psi))$
- $c+$ *[[A(n) X ]$_i$Y]* = $\{< w, g^{i/a} >:< w, g >\in c$, $a$ is X in $w$, and $a$ is Y in $w\}$
- $c+$*He$_i$ Y* is defined iff $\forall < w, g >\in c : i \in Dom(g)$ and $g(i)$ is male in $w$; where defined, $c+$*He$_i$ Y* = $\{< w, g >\in c : g(i)$ is Y $w\}$
- $c+$ *Every*$x_i, A, B$ is defined iff $\forall < w, g >\in c : i \notin Dom(g)$; where defined, $c+$ *Every*$x_i, A, B = \{< g, w >\in c$ : for all $a$, if $< g^{i/a}, w >\in c + A$, then $< g^{i/a}, w >\in c + A + B\}$

**Admittance Condition** Context $c$ admits sentence $S$ iff Local Satisfaction and Local MP are satisfied by the local context of each constituent of $S$

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