Maximize Presupposition! and Informationally Encapsulated Implicatures

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Abstract

This paper attempts to overcome certain objections to the idea that *Maximize Presupposition!* (Heim 1991) is reducible to the theory of implicature.

1 Introduction

Heim's (1991) *Maximize Presupposition!* (henceforth MP) states, roughly, that given two contextually equivalent alternatives, speakers must use that alternative whose presuppositions are stronger and happen to be met in the context of use. Given our common knowledge that there is exactly one sun, for example, the principle accounts for why # *A sun is shining* is such an odd sentence; the speaker should have used *The sun is shining* instead. The principle is technically sound, and fully predictive. The puzzle facing us is a conceptual one: why should language use be constrained by such a principle?

The goal of this paper is to explore the extent to which MP might be reduced to more general principles. More specifically, my goal is to explore the extent to which MP might be reducible to the theory of scalar implicature. Heim (1991) suggested a way to derive MP effects from implicature reasoning, but concluded that the context-dependence of this reasoning prevented the reduction from succeeding. In response to this, Magri (To Appear) noted that if the system that computes implicatures can be prevented from accessing contextual information, Heim's derivation can go through unencumbered. However, even with modularity assumptions in place, Magri argued (from new data that he discovered) that the reduction is not possible, concluding that a separate principle will be needed. I will attempt to defend the reduction against these objections.

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2 MP as Global, Pragmatic 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[1]
   (b) Both of John's eyes are open

Take the contrast in (1), for instance. How would MP account for it? We should begin by setting up some background assumptions.

First, let us 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*

Lexical Entry 2 (The Indefinite Article)

$[[a(n)X]Y]$ *expresses that proposition which is true at index i iff there is at least one individual at i that is both X at i and Y and i.*

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

Definition 1 (Contextual Equivalence)

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

Let us return now to our contrast in (1). First 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* can only be used if there is exactly one N in the context, and *a(n) N* can be used only if there are many

[1] From Chemla (2007) and Magri (To Appear).

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]

3. 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 (2003, 2008), Percus (2006), and Schlenker (2006) generalize and formalize Heim's speculative 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, Pragmatic Competition If ϕ, ψ are contextually equivalent alternatives, and the presuppositions of ψ are stronger than those of ϕ, and are met in the context of utterance c, then one must use ψ in c, not ϕ.

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: $< a, the >$, $< all, both >$. These can multiply more generally: $< believe, know >$, etc.[3]

[2]One diagnostic for this is that you can't 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.

[3]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's (2007) procedure for generating scalar alternatives. For ease of exposition here, I will simply assume the more familiar scalar approach.

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

With this machinery in place, let us return now to our contrast in (1). 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 to one another under the above definition. Furthermore, since the presupposition of (1b) (that 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. Technically, all seems well. The question is: why should language use be constrained by a principle like MP?

3 On Deriving MP

Heim (1991) writes that 'it would be desirable to derive [MP] from general principles of some sort...[MP] reminds one at first glance of the phenomenon of scalar implicature.' She then asks us to imagine how scalar implicatures might be used to generate MP like effects. She focusses on the articles. Under the classical interpretation of indefinites and definites assumed here, the latter asymmetrically entail the former.[4] Thus, assertion of [[*a*(*n*) X] Y] generates the implicature that the speaker doesn't believe [[*the* X] Y].[5] Thus, if the speaker believes the content of her assertion, the conclusion is that the speaker doesn't believe (by implicature) that there is exactly one X. In the case of *A sun is shining*, the implicature would be that the speaker doesn't believe that there is exactly one sun. Since this contradicts common knowledge, the result is odd.[6]

Having derived the essential effect for us, Heim goes on to argue that the derivation will not succeed. The basis of her skepticism lies in the pragmatic nature of scalar implicatures. For example, since it is common knowledge that there

[4]For this to be true under a presuppositional analyses of definites one needs to assume that if a sentence S presupposes p, then it also entails p. Most theories abide by this assumption, though some do not (eg. Karttunen and Peters 1979). I will assume in this paper that presuppositions are indeed also entailed.

[5]See Footnote 11 for a sample computation. I ignore for now issues of primary versus secondary implicatures. See Sauerland (2004) and Fox (2007) for recent discussion. I return to the epistemic status of this implicature towards the end of the paper (Section 4, cf. also Chemla 2008, Sauerland 2008).

[6]The more general idea is, of course, that use of sentence ϕ will be odd if it gives rise to an implicature that contradicts common knowledge. We will return to this more general idea in just a few moments.

is exactly one sun, the indefinite and the definite contribute the same *new information* to the context. As such, scalar reasoning doesn't apply, since the maxim of quantity is made inert by the contextual equivalence of the scalar alternatives. Hence the required implicature cannot be generated.[7]

Schlenker (2006), reporting on a personal communication from Emmanuel Chemla, presents some compelling evidence suggesting that the effect of MP might nonetheless follow from scalar implicatures, for the same effect seems to come up with scalar alternatives that carry no relevant presuppositions (so that MP, if operative at all, would be irrelevant to such cases):

4. John assigned the same grade to all of his students. He gave an A to {all / #some} of them.

As in Heim's argument, we see that when the scalar implicature contradicts common knowledge, the result is distinctly odd. In (4), the second sentence is evaluated with respect to a context updated by the information conveyed by the first sentence. The implicature that John gave an A to some but not all of his students contradicts the contextually entailed information that John assigned the same grade to all of his students.

But what of Heim's argument concerning the inapplicability of scalar reasoning? Given the Chemla-Schlenker observation, we might be led to believe that the difficulty lies not in the application of scalar reasoning to MP phenomena, but in the theory of scalar implicature itself. Indeed, working within a theory of scalar implicature whereby implicatures are computed within the grammar (eg. Chierchia 2004, Fox and Hackl 2006, Fox 2007, Chierchia, Fox, and Spector 2008), Magri (To Appear) develops a general theory of oddness along lines envisioned by Heim (1991), one that readily accounts for the oddness of sentences like (4). My claim here is that Heim's derivation of MP from scalar implicature also goes through if one adopts Magri's theory of oddness. Let me say a bit about the latter.

3.1 Mismatches and Oddness

Magri (To Appear) develops and defends at length the idea that scalar implicatures are computed on the basis of *semantic* asymmetric entailment relations, without access to contextual information, such as that there is only one sun, etc. He calls this the Blindness Hypothesis (since the implicature system is 'blind' to common knowledge):[8]

Blindness Hypothesis (BH) Implicatures are computed over the output of semantics without access to contextual information.

[7] Percus (2006) and Sauerland (2008) make a similar argument.

[8] For further arguments in favour of the Blindness Hypothesis, see Fox and Hackl (2006), Chierchia, Fox, and Spector (2008).

BH can be implemented in several different ways. For concreteness, we'll assume that given the proposition denoted by the asserted sentence ϕ, and a set C of alternative propositions (the propositions denoted by the scalar alternatives of ϕ), $\neg\psi$ will be a blind scalar implicature of ϕ if only if:[9] (i) $\psi \in C$, (ii) ψ entails ϕ, (iii) $\phi \wedge \neg\psi$ is consistent.[10]

Magri also generalizes Heim's observation concerning the interaction of scalar implicatures and common knowledge by defending a principle from Hawkins (1991) that he calls the *Mismatch Hypothesis* (MH). MH states that whenever a (blind) scalar implicature contradicts common knowledge, the result is a sensation of oddness:

Mismatch Hypothesis (MH) If the blind scalar implicatures of the asserted sentence contradict common knowledge, the result is odd.

As Magri points out, BH and MH together (I'll write this as BH/MH from now on) correctly predict the oddness of the Chemla-Schlenker sentence (4). He further shows that BH/MH can be used to account for a host of complex properties concerning individual level predicates, such as that the following sentence is odd (inter alia):

5. #John is sometimes tall

The above sentence generates the implicature that John isn't always tall, which contradicts our common knowledge that *tallness* is a permanent property. I refer the reader to Magri's paper for many further applications of BH/MH.

3.2 Mismatches and MP

The claim I wish to defend here is that BH/MH is all that is needed to derive MP:

Claim: *Maximize Presupposition!* follows as a consequence of BH/MH.

I will try to argue that Heim's argument goes through unencumbered so long as implicature computation is divorced from contextual reasoning. For note that what prevented Heim's derivation from succeeding was the idea that the implicature system had access to common knowledge, since it (the implicature system) was thought to be pragmatic. Relatived to contextual information, it could deduce that the two sentences contribute the same new information to the context. However, if implicatures are computed within the grammar, hence encapsulated

[9]Our notation does not distinguish between sentences and the propositions they denote, but the reasoning works over content, not form.

[10]Various considerations require this statement to be modified (cf. Groenendijk and Stokhof 1984, van Rooij and Schulz 2004, Spector 2006, Fox 2007), but these complications need not detain us at this point.

from common knowledge, the implicature system cannot make this deduction. Working with semantic information alone, *the sun is shining* asymmetrically entails *a sun is shining*, and the desired implicature can thus be computed.[11]

But why am I putting this forth as a claim here if it's an obvious consequence of BH/MH? The reason is that Magri, having defended these principles, presents new data suggesting that MP might not actually be derivable from them. Consider contrasts like the following (from Magri (To Appear)):

6. Context: Every child inherits the last name of their father.
   (a) # Every child of Couple C has a French last name
   (b) The children of Couple C have a French last name

Magri suggests that the oddness of (6a) should be related to the oddness of (1a) (# *A sun is shining*) and (2a) (# *All of John's eyes are open*). To use BH/MH, first, we need a competitor to (6a). Magri proposes that (6b) is a scalar alternative of (6a). This is derived by assuming that <every, the> is a Horn scale. Second, he argues that due to certain properties of distributive predication with plural definites, (6b) has a homogeneity presupposition that (6a) lacks, viz. that either every child of Couple C has a French last name or none of them do. Thus, (6b) has a stronger presupposition than (6a). Despite this, the two sentences end up semantically equivalent, both conveying the proposition that every one of the children of Couple C has a French last name.[12] As such, even under the assumption that implicatures are computed blindly, when (6a) is uttered there is no relevant implicature that can be generated in order for MH to be applicable. The oddness of (6a) is hence left unaccounted for, at least if BH/MH are the only operative principles.

Magri concludes from this difficulty that the difference in *presuppositional* strength between (6a) and (6b) should be held responsible for the oddness of the former. He thus needs a principle that is sensitive not to the semantic content of the alternatives, but to their presupposed content alone. The technical innovation involves formulating a Blindness Hypothesis and a Mismatch Hypothesis for presuppositions, BHP and MHP. These principles work separately from the Blindness Hypothesis and the Mismatch Hypothesis for semantic content. Very roughly, these principles use the same objects as BH/MH (the scalar alternatives of the sentence), and the same method of computing inferences, but instead of working with the propositions denoted by the alternatives, they use the projected

[11] $[[a(n)\ X]\ Y]$ is true in a set of worlds E where there exists an individual that is both an X and a Y. $[[the\ X]\ Y]$ is true in that subset of E, U, where there is a unique individual that is an X, and that that unique individual is also a Y. A blind implicature thus generates the proposition $E \setminus U$. When common knowledge entails U, the result is odd (under MH).

[12] This example differs in important ways from examples like (1)/(2) in that (6b) has the curious property of being a sentence whose asserted meaning (that every child of Couple C has a French last name) entails its presupposed meaning (that either every child of Couple C has a French last name or no child of Couple C does).

presuppositions of the alternatives. More specifically, under BHP, the grammatical system considers the presuppositions of the scalar alternatives, and for those alternative presuppositions that are stronger than those of the asserted sentence, the system concludes (blindly) that they are false. Call such inferences *blind implicated presuppositions* to distinguish them from the outputs of BH (blind scalar implicatures). In addition, under MHP, if these blind implicated presuppositions contradict common knowledge, the result is odd (in parallel with BH/MH).

With BHP and MHP in place, the oddness of (6a) can be derived. When (6a) is asserted, the system computes (by BHP) that the homogeneity presupposition of (6b) is false, i.e. it infers that some but not all of the children of Couple C have a French last name. But this of course contradicts the common knowledge that all the children of Couple C have the same last name, and (given MHP) the sentence is destined to be odd.

Thus, we have four principles, BH and MH for semantic content, and BHP and MHP for presuppositional content. Independent of *Maximize Presupposition!* related facts, we have seen evidence (eg. the Chemla-Schlenker sentences like (4)) that something like BH/MH is needed. We saw furthermore that BH/MH can in fact be extended to the cases we started out with (examples (1) and (2)), as desired, but, as observed by Magri, they have nothing to offer in accounting for the oddness of (6a). This fact led Magri to propose that the linguistic system also incorporates principles like BHP and MHP, principles sensitive solely to presupposed information. This move, in effect, concedes that MP cannot be reduced to standard implicature reasoning (BH/MH). However, I believe that the introduction of BHP/MHP should be met with some caution. For note that BHP/MHP introduce a redundancy in the theoretical account of standard MP facts (eg. (1) and (2)), in that their oddness now has two distinct explanations, one deriving from BH/MH, and the other from BHP/MHP. The apparent need for BHP/MHP arises only under the assumption that the oddness of (6a) is indeed related to the oddness of (1a) and (2a). If so, one needs an account in terms of alternatives, and, as argued by Magri, (6b) presents just the right kind of alternative. Against this idea, I will present evidence that (6a) and (6b) cannot be alternatives. If the argument is sound, then the oddness of (6a) probably has a different source. I will suggest that this source is a separate pragmatic constraint governing felicitous discourse, and will try to present evidence that such a constraint is needed on independent grounds. To the extent that the argument is correct, (6a) will no longer stand as a barrier to the reduction of MP to BH/MH.

3.3 No Escape from Oddness: Alternatives and Relevance

There are four prima facie worries about the assumption that (6a) and (6b) are alternatives. First, one would have to make sense of the fact that the subjects in the alternatives differ in number (singular versus plural). Second, assuming that the distributive operator $DIST$ is represented at LF, (6b) would not be an alternative to (6a) under Katzir's (2007) theory of alternatives, for it is strictly more complex than (6a).[13] If it is indeed better to have an intensional characterization of the alternatives than a stipulative one, and if Katzir's arguments in favour of his particular characterization are sound, this might be problematic. Third, scalar alternatives are normally ordered by asymmetric entailment, whereas (6a) and (6b) are in fact equivalent. Fourth, members of a scale are normally the same semantic type. It is not at all clear that *every* and *the* can be thought to satisfy this condition.

Putting these worries aside, I think that there is a good diagnostic for probing whether two hypothesized alternatives actually are alternatives. Let's consider the basic MP effect again. The current proposals argue that the oddness of the asserted sentence ϕ arises because ϕ generates a scalar implicature that contradicts common knowledge. But if that's the account, there seems to be an obvious escape hatch: given the optionality of implicature computation, why not simply exploit this optionality to avoid or cancel the offending inference?

Magri (To Appear) proposes a very interesting response. He argues that in the cases under consideration the escape hatch is actually unavailable, i.e. that the implicatures in such cases are mandatory. He locates the cause of the mandatoriness in the contextual equivalence of the alternatives. By virtue of having been asserted, ϕ can be assumed to be relevant. But since ϕ and ψ are contextually equivalent, under the assumption that relevance is contextually determined, it is natural to conclude that ψ will also be relevant. Assuming furthermore that a scalar alternative must be relevant if it is to be considered in implicature reasoning (eg. Gamut 1991), then ψ will necessarily be included in the reasoning, and the implicature will be mandatory. This accounts for why there is no escape from the oddness of sentences like (1a), (2a), (6a), and others like them.

Returning now to the issue of disputed alternatives, the above reasoning makes a clear prediction. Suppose we have reason to believe ϕ and ψ are alternatives (and ψ is stronger along some dimension of interest), but are unsure whether they in fact are. The above reasoning provides a way to at least determine a negative answer: if we can find contexts in which ϕ and ψ are equivalent, but in which ϕ is NOT odd, then it can't be that ϕ and ψ are alternatives (since there should be no escape from oddness). Returning to the question of whether (6a) and (6b) are actually alternatives, consider the following dialogue:[14]

7. Q: Who here has a French last name?
   (a) Well, John, Mary, every child of Couple C, my neighbours
   (b) Well, John, Mary, the children of Couple C, my neighbours

The fact that there is no oddness to (7a) in the way there is with (6a) suggests that <every, the> is not really a scale at all. The reasoning that leads

[13]In the normal case, Katzir allows only those LFs that are at most as complex as the asserted sentence to be alternatives to it.

[14]Irene Heim, p.c.

to the conclusion that (1a), (2a), (4), and the like are necessarily odd also leads to the conclusion that (6a) should necessarily be odd. Note that the reasoning itself seems correct. For example, putting (6a) as part of a list answer obviates its oddness, but the same trick does not work in cases like (4), where the existence of a scale like <some, all> is generally taken to be true:

8. Context: John gave the same grade to all his students.
   Q: Who got an A this year?
   A: # Well, half of Ms. Smith's class, some of John's students, and all of Mary's students

Other attempts to obviate the oddness of (6a) can readily be found, while the oddness of (4) seems mandatory, as predicted by Magri's assumptions about relevance and mandatoriness. These facts in turn question the status of principles like BHP and MHP. If (6a) is not competing with (6b), then something else must be behind its oddness.

I would like to suggest that (6a) is odd because it tends to be read with focus on *every*, which, for whatever reason, suggests it is being offered as an answer to the question, *How many children of Couple C have a French last name?* And in the given context, this is an odd question to raise. It is odd even if asked overtly in such a context. It seems to be odd for the reason that Magri offered, namely, it suggests (in contradiction with common knowledge) that the names of the children of Couple C might well not be the same. However, Magri's account of the oddness in terms of competition with an alternative that grammatically encodes a homogeneity presupposition seems to be unable to make sense of the fact that the oddness disappears in certain contexts (cf. (6)-(8)). I am offering the alternative hypothesis that the oddness of (6a) instead has to do with broader discourse level concerns (eg. what makes certain questions appropriate in certain contexts). If this approach is on the right track, we expect to find an oddness similar to (6a) if we introduce the same information as (6a) by using a different linguistic form that probably does not generate alternatives with homogeneity presuppositions, but which nonetheless suggests (because of focus placement) that it is an answer to the odd question *How many children of Couple of C have a French last name?*. For example, suppose it is common knowledge that Couple C has five children:

9. (a) # FIVE children of Couple C have a French last name
   (b) # The number of children of Couple C with a French last name is FIVE

The alternatives to (9a) are presumably of the form $\{$*n children of Couple C have a French last name*: $n \in \mathbb{N}\}$, while the set of alternatives to (9b) is presumably $\{$*The number of children of Couple C with a French last name is* $n : n \in \mathbb{N}\}$. I do not see how a competition based account like BHP/MHP could be extended to these cases.

These facts suggest that there is a maxim of language use that might be stated in something like the following terms:[15]

Maintain Uniformity! Do not introduce questions into the discourse that have possible answers (qua cells of a partition, eg. Groenendijk and Stokhof 1984) that contradict common knowledge of uniformity of some set!

I am suggesting that, given the facts in (7)-(9), BH/MH along with the above maxim are better predictors of the data discussed in this paper than the combination of BH/MH and BHP/MHP. Crucially, both BH/MH and *Maintain Uniformity!* seem to receive support from cases where there are no presuppositions involved that seem directly related to MP (eg. (4), (9)). Ideally, nothing else should be needed. We might thus examine whether this proposal has any consequences for some of the other facts discussed by Magri. Although our discussion here will have to be limited, consider, for example, the oddness of the following (cf. also (5)):

10. # John is always tall

Magri argues that (10) competes with a structure that is like (10) except it contains a GEN operator in place of *always*. He proposes that these structures are alternatives. Now, although the two structures are semantically equivalent (both conveying the proposition that John is always tall), the structure with GEN introduces a homogeneity presupposition that (10) lacks (that either John is always tall, or he never is). It thus presupposes more than (10) and, therefore, would be odd under BHP/MHP. However, if (10) has a structure with GEN in place of *always* as an alternative, there should be no way for it to escape oddness, given our earlier discussion about Magri's (apparently correct, cf. (8)) assumptions about relevance and the mandatoriness of implicatures. But even here, it seems that the oddness of (10) is much reduced by asking the right kind of question. Consider the following dialogue, for instance:

11. Q: What property does John always have?
    Well, he's always tall, for one.

The above is funny, though not quite as odd as (10). It is funny in the same way that the answer, *Well, he's always identical with himself* might be funny. It is funny because it is entirely uninformative. But it doesn't feel odd in the way that (10) feels odd. If this judgment is correct, then we must reject the assumption that the LF with *always* and the one with GEN are alternatives at all. Instead, the oddness of (10) might better be explained as a violation of *Maintain Uniformity!* The sentence seems to me to be offered as an answer to a question like, *How*

[15] Of course, it is to be hoped that this maxim follows from more general principles.

often is John tall, or *Who is always tall?* (depending on focus marking). Forcing the hearer to accommodate such a question into the discourse violates *Maintain Uniformity!*.

Let me try to summarize where we are. The goal of this paper was to try to argue that *Maximize Presupposition!* can and should be eliminated from the basic inventory of linguistic principles. In so doing, we attempted to show that Heim's (1991) attempted derivation could go through by adopting a grammatical theory of implicature (the Blindness Hypothesis) along with the Mismatch Hypothesis (Hawkins 1991, Fox and Hackl 2006, Magri 2007). We were met with the counterexample of (6a), which cannot be accounted for by BH/MH. This (and other facts, eg. (10)) led Magri (To Appear) to formulate a new pair of principles (BHP/MHP) that essentially end up restating MP. Magri defended his analysis over an intricate, non-trivial set of data, and I cannot do full justice to that work in the space allotted to me here. Limiting ourselves to the data discussed in this paper, I have argued that BH/MH and *Maintain Uniformity!* provide a better account of these facts than BH/MH and BHP/MHP. But with this we seem to be back at the problem we started with: we seem to have gotten rid of *Maximize Presupposition!* well enough, but we've replaced it with another principle we don't understand, *Maintain Uniformity!*. Given the facts in (6)-(11), the latter would seem to be needed anyhow (in place of BHP/MHP), and (4) teaches us that we need BH/MH. Since BH/MH also captures (1)/(2), we should enrich the theory beyond BH/MH and *Maximize Uniformity!* only if necessary. If the preliminary investigations here can be further supported, we will have gone some way toward simplifying the inventory of linguistic principles.

4 More Concerns About the Reduction of MP to Implicatures

Suppose that the cases of MP discussed above (eg. (1), (2)) can indeed be reduced to the theory of implicature (BH/MH). The prospects for a more general reduction of MP facts to implicature would still be faced with at least three difficulties.

First, the epistemic status of the implicatures predicted by the system assumed here are 'secondary implicatures,' i.e. of the form 'it is certain that not *p*' (cf. Footnote 11). For example, sentences with an indefinite are currently predicted to generate the implicature that the speaker is certain that the presupposition of the definite does not hold. However, Sauerland (2008) has argued that such implicatures have the weaker status of primary implicatures, i.e. of the form 'it is not certain that *p*.' He argues that this difference in epistemic status is one reason to think that these inferences are due to a mechanism that is different from the one responsible for scalar implicature.

Second, Percus (2006) discovered a class of sentences that carry identical presuppositions, and are semantically equivalent, and yet still undergo something very much like an MP competition. For example, (12a) and (12b) both presuppose nothing (under standard theories of presupposition projection, eg. Karttunen and Peters 1979, Heim 1983, Schlenker 2007), and are truth-conditionally equivalent, but (12b) seems to be blocking (12a) nonetheless:

12. (a) # Every teacher with exactly two students gave them all an A
    (b) Every teacher with exactly two students gave them both an A

Neither a Gricean, context-sensitive implicature system, nor a grammatical, context-blind one that operates over semantic propositions, seems capable of delivering the required implicature here, since (12a) and (12b) denote the same proposition.

Third, if MP effects were due to implicature computation, we would need to make sense of the fact that unlike run of the mill cases of implicatures (eg. (13b)), the implicature shows up in downward entailing environments (eg. (13a)):

13. (a) # A sun isn't shining
    (b) John didn't eat beef or pork at the party

The second sentence does not (without marked intonation) generate the implicature that John ate beef and pork at the party ($= \neg(\neg(B \wedge P))$). However, if (13a) is to be accounted for by BH/MH, we would need the implicature (that the speaker is uncertain that there is exactly one sun) to be generated here, despite the DE environment (and the lack of marked intonation). Sauerland (2008) has cited this divergence in DE environments as yet a further reason to keep MP and the theory of implicature apart.

Despite these objections, I believe each of these difficulties can be overcome. The second difficulty can be overcome if implicatures are computed by a 'supermodular' system, one that operates over logical forms that are stripped of all non-logical information. More precisely, the level of representation that's needed is a structure in which all non-logical symbols are replaced by variables, but whose logical terms remain visible. Evidence that the semantic system employs such a level of representation is given in Gajewski (2004), and Fox and Hackl (2006) argue (from different data) that such a level is the one used by the implicature system. If their arguments are correct, then the oddness of (12a) would be readily predicted. The first and third difficulties can be overcome by adopting revisions to the theory of implicature that I've argued elsewhere (Singh 2008) are needed independently to solve certain problems that arise in the theory of presupposition (cf. the proviso problem of Geurts 1996). Support for these assertions will have to wait for a future occasion.

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