

Subclausal Local Contexts

Amir Anvari
Kyle Blumberg*

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Abstract

One of the central topics in semantic theory over the last few decades concerns the nature of *local contexts*. Recently, theorists have tried to develop general, non-stipulative accounts of local contexts (Schlenker, 2009; Ingason, 2016; Mandelkern & Romoli, 2017a). In this paper, we contribute to this literature by drawing attention to the local contexts of *subclausal* expressions. More specifically, we focus on the local contexts of quantificational determiners, e.g. ‘all’, ‘both’, etc. Our central tool for probing the local contexts of subclausal elements is the principle *Maximize Presupposition!* (Percus, 2006; Singh, 2011). The empirical basis of our investigation concerns some data discussed by Anvari (2018b), e.g. the fact that sentences such as ‘All of the two presidential candidates are crooked’ are unacceptable. In order to explain this, we suggest that the local context of determiners needs to contain the information carried by their restrictor. However, no existing non-stipulative account predicts this. Consequently, we think that the local contexts of subclausal expressions will likely have to be stipulated. This result has important consequences for debates in semantics and pragmatics, e.g. those around the so-called “explanatory problem” for dynamic semantics (Soames, 1982; Heim, 1990; Schlenker, 2009).

1 Introduction

One of the central topics in semantic theory over the last few decades concerns the nature of *local contexts*. As a first approximation, the local context of an expression E aggregates information that is relevant for the interpretation of E. More specifically, this information is contributed by the meaning of particular expressions in E’s syntactic environment as well as the common ground. For instance, the local context of Q in a conjunction ‘P and Q’

*The authors contributed equally. Acknowledgments to be added.

is usually taken to carry the information provided by the first conjunct P along with whatever is in the common ground, i.e., the local context of Q is the set of those possible worlds in which P is true and are compatible with the common ground. Similarly, the local context of Q in a conditional ‘If P then Q’ is generally taken to entail the information carried by the antecedent P.

Local contexts have received a great deal of attention because they play an important role in the explanation of various linguistic phenomena. Most prominently, they have been used to explain patterns of presupposition projection. The general idea is that once local contexts have been determined, presupposition projection patterns can be derived on the assumption that presuppositions must be locally entailed, or “satisfied”.¹ To illustrate, consider the contrast between (1a) and (1b):

- (1) a. If Bill used to smoke, then he has stopped smoking.
- b. If Bill has stopped smoking, then I bet he’s feeling anxious.

Both sentences contain ‘Bill stopped smoking’ as a subconstituent. This clause carries the presupposition that Bill used to smoke. However, although (1b) presupposes that Bill used to smoke, (1a) presupposes nothing (or more correctly: it presupposes the tautology). This is usually explained by saying that the local context of the consequent in (1a) contains the information that Bill used to smoke (courtesy of the antecedent), so the presupposition doesn’t project. On the other hand, it is standardly assumed that the local context of the antecedent in (1b) does not contain any information beyond what is common ground; in particular, it does not contain any information pertaining to whether Bill used to smoke or not, so the presupposition projects.

Local contexts also play a central role in accounts of informational redundancy. Again, the idea is that once local contexts have been determined, redundancy effects can be predicted if we require that the information carried by a constituent must not be locally entailed.² For instance, consider the contrast between (2a) and (2b):

- (2) a. # Alex is a widow and she is a woman.
- b. Alex is a woman and she is a widow.

Although these sentences are logically equivalent, (2b) is acceptable while (2a) is not (as indicated by the ‘#’ preceding the example). Theorists explain this by maintaining that the local context of the second conjunct in

¹See, e.g. (Karttunen, 1974), (Stalnaker, 1974), Heim (1983), and (Schlenker, 2009).

²See (Stalnaker, 1974) for a classic reference. See (Schlenker, 2009), (Katzir & Singh, 2014), and (Mayr & Romoli, 2016) for recent developments.

(2a) contains the information that Alex is a widow, which entails that she is a woman. So, the proposition expressed by the second conjunct is entailed by its local context, and is therefore redundant. By contrast, the local context of the second conjunct in (2b) only contains the information that Alex is a woman, so the second conjunct is not redundant (since one can be a woman without being a widow).

A widely discussed issue concerns whether it is legitimate to simply *stipulate* local contexts on a case by case basis, as a matter of the lexical semantics of various expressions, or whether the local context of an expression should be made to follow from a more general theory. For instance, in her entries for the connectives, Heim (1983) essentially stipulated the required informational asymmetries, e.g. one consequence of her lexical entry for ‘and’ is that the local context of Q in ‘P and Q’ contains the information contributed by P, but the local context of P does not contain the information contributed by Q. However, several theorists have objected to such piecemeal stipulations on the grounds that the resulting theories are insufficiently explanatory—the so-called “explanatory problem” for dynamic semantics (Soames, 1982; Heim, 1990; Schlenker, 2009). Consequently, theorists have tried to develop more general, non-stipulative accounts of local contexts. A prominent research program in this area has been to design a theory that can predict the local context of any expression based on its syntactic environment and classical meanings of the logical operators involved.³

What ingredients go into a theory of local contexts? To determine the local context of an expression E which occurs in sentence S, one needs to know what the common ground is, on the one hand, and one needs to have some way of defining an ordering relationship between the sub-constituents of S. The latter is the case so long as one aims to capture one of the core intuitions behind local contexts, namely asymmetry: the local context of E is meant to aggregate information that is encoded by expressions that in some sense or other *precede* E in S. Various possibilities for this ordering relationship are conceivable. The most prominent suggestion has been that the ordering in question is identical to the order of phonological linearization (Schlenker, 2009). A salient alternative postulates that the ordering relevant for computation of local contexts is only sensitive to the structure of the sentence at LF: structurally higher material contributes to the local context of lower material, where “higher” and “lower” are spelled out in terms of notions such as c-command (Ingason, 2016; Mandelkern & Romoli, 2017a).

In this paper, we contribute to this literature by drawing attention to the local contexts of *subclausal* expressions, focusing particularly on quantifica-

³A different response to the challenge instead tries to make dynamic semantics more explanatory (Rothschild, 2011). We will have fairly little to say about this sort of approach to local contexts. Ultimately, though, the motivation for this project might start to seem less compelling in light of our arguments—see §4.5 for discussion.

tional determiners ‘all’ and ‘both’. Although we go into detail below, we will give a brief sketch of our arguments now. Our central tool for probing the local contexts of subclausal elements is the principle *Maximize Presupposition!* (hf. MP). Roughly, MP tells us that there is a *ceteris paribus*-preference for presuppositionally stronger alternatives. For example, it explains why (3b) is acceptable but (3a) is not: (3b) is equivalent to (3a) except the former carries stronger presuppositions.

- (3) a. # All of John’s eyes are open.
 b. Both of John’s eyes are open.

It is generally assumed that, just like presupposition projection, MP competition is sensitive to local contexts.⁴ For instance, Singh (2011), building on (Percus, 2006), considers contrasts such as the following:

- (4) a. # If John has exactly two students and he assigned the same exercise to all of his students, then I’m sure he’s finished grading.
 b. If John has exactly two students and he assigned the same exercise to both of his students, then I’m sure he’s finished grading.

Even if it is not commonly assumed that John has exactly two students, (4a) is unacceptable. This can be explained if MP competition is relativized to the local context of the clause in which the trigger/its non-presuppositional alternative is embedded. Although the global context might not entail that John has exactly two students, the global context updated with the information expressed by the first conjunct in the antecedent will, and the resulting context is precisely the local context for the second conjunct in the antecedent.

We argue that if MP competition is indeed locally modulated, then the local contexts of quantificational determiners are not predicted by existing non-stipulative accounts of these objects. The empirical focal point of our investigation concerns some contrasts first discussed by Anvari (2018b):

- (5) [It is common knowledge that there are exactly two mainstream presidential candidates.]
 a. # All of the two mainstream presidential candidates are crooked.
 b. Both of the two mainstream presidential candidates are crooked.
- (6) [It is common knowledge that John has exactly two students.]

⁴See, e.g. (Singh, 2011; Spector & Sudo, 2017; Anvari, 2018a, 2020).

- a. # I saw all of John’s two students at the bar last night.
- b. I saw both of John’s two students at the bar last night.

Intuitively, the infelicity of these (a) sentences is of a piece with the infelicity of the (a) sentences in (3) and (4). That is, one is inclined to explain the infelicity by appealing to the core MP intuition. However, it is fairly straightforward to show that the MP competition here cannot be operating at the clausal level, since, e.g. the clauses (5a) and (5b) carry *exactly the same presuppositions* (and, more generally, are semantically equivalent). So, the MP competition must be operating at the *subclausal* level. If MP competition is sensitive to local contexts, then the contrast between the (a) and (b) sentences stems from local MP competition between the determiners ‘all’ and ‘both’. In other words: the presupposition triggered by the determiner ‘both’ is satisfied in its local context, which is why (5a) is unacceptable.

Crucially, this explanation requires that the local context of ‘both’ (and ‘all’) includes the information carried by its partitive restrictor ‘of the two main-stream candidates’. But we show that no existing non-stipulative account of local contexts predicts this. For instance, Schlenker’s (2009) algorithm for computing the local context of an expression in a sentence S is based on the linear order of the expressions that occur in S. However, since restrictors linearly *precede* determiners in (5) and (6), Schlenker’s incremental theory does not predict that the local context of ‘both’ should contain the information carried by its restrictor. Moreover, structure-sensitive theories are also inadequate here since restrictors are structurally lower than determiners, and therefore are not predicted to contribute to the local context of the determiner.

Although we do not rule out that a general, predictive theory of local contexts can be provided, the data we discuss suggest to us that—assuming MP competition is sensitive to local contexts—at the subclausal level, local contexts will likely have to be stipulated to some extent. This result has the potential to have a significant impact on debates around the nature of local contexts. For instance, we believe that it casts the explanatory problem for dynamic semantics in a new light.

To be clear, our aims here are relatively modest. Although we will trace out some of the theoretical consequences of our findings, we will by and large leave detailed discussion for future work. Our central concern is with making the findings themselves, as well as the choice points that flow from them, sufficiently precise.

The paper is structured as follows. In §2, we present some background on the principle *Maximize Presupposition!*. We provide our own formulation of this principle in §3, which involves competition between subclausal expressions relative to their local contexts. In §4 we show that neither incremental nor

hierarchical approaches to information aggregation yield appropriate local contexts for determiners, but we stipulate an account that does. We also compare our arguments to some recent work by Schlenker (2019), and draw out some of the theoretical consequences of our findings. §5 considers, but ultimately rejects, an approach on which MP competition is not connected to local contexts. Finally, §6 concludes.

2 Maximize Presupposition!

In this section, we present some background on the principle of *Maximize Presupposition!*, with special focus on accounts that tie MP competition to local contexts, namely the proposal of Singh (2011).

2.1 Global MP

From the discourse perspective, the central function of presuppositions is to signal what information is (or should be) taken for granted in context via the felicity conditions that are associated with them. For instance, in order for an utterance of (7a) to be felicitous, it needs to be commonly assumed that there is exactly one King of Sweden. Similarly, (7b) is felicitous only if it is shared knowledge that John has exactly two dogs. Finally, (7c) is acceptable only if it is commonly assumed that arithmetic is incomplete.

- (7) a. I had dinner with The King of Sweden last night.
- b. Both of John's dogs got tickbite fever last summer.
- c. John knows that arithmetic is incomplete.

Interestingly, there are other sentences whose felicity is tied to certain pieces of information *not* being taken for granted in context. Consider (8a)-(8c):

- (8) a. # A sun is shining.
- b. # All of John's eyes are open.
- c. # John thinks that Berlin is in Germany.

These sentences are all rather odd. A compelling account of this oddness begins with the observation that the following minimally different sentences are perfectly felicitous:

- (9) a. The sun is shining.
- b. Both of John's eyes are open.

c. John knows that Berlin is in Germany.

The examples in (9) are just like those in (8) with the difference that certain presupposition triggering expressions in (9) are replaced in (8) with expressions that have very similar meanings modulo the relevant presuppositions. For instance, the only difference between (9a) and (8a) is that the former uses a presupposition-inducing definite description where the latter uses a non-presuppositional indefinite. Theorists have attempted to turn this correlation into an explanation of the infelicity of the examples in (8), the core idea being that these examples are bad exactly *because* their presuppositional variants are good: there is a *ceteris paribus*-preference for presuppositionally stronger alternatives. Let us call explanations of the infelicity of (8) that are broadly along these lines *Maximize Presupposition!* (MP) views.

A popular way of making the MP intuition precise is what we will call, following Singh (2011), *Global MP* (Heim, 1991; Sauerland, 2003):

Global MP: If ϕ and 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 cannot use ϕ .⁵

Of course, more needs to be said about what constitutes a “contextually equivalent alternative”. The exact definition of this concept is not immediately relevant for our purposes. However, for the sake of concreteness, let us take contexts to be sets of possible worlds and define “contextual equivalence” as follows:

Contextual Equivalence: LFs ϕ and ψ are contextually equivalent with respect to context c iff $\{w \in c : \llbracket \phi \rrbracket(w) = 1\} = \{w \in c : \llbracket \psi \rrbracket(w) = 1\}$

Let us suppose that the “alternatives” to an LF are syntactically generated given certain lexical scales. Lexical scales include $\langle a, the \rangle$, $\langle all, both \rangle$, and $\langle believe, know \rangle$. The alternatives to an LF can then be defined as follows:

Alternatives: If $\langle \alpha, \beta \rangle$ is a scale, and ϕ is an LF containing lexical item α and ψ is an LF identical to ϕ except that at some terminal node it contains β where ϕ contains α , then ϕ and ψ are alternatives.

⁵Our presentation of Global MP essentially follows that of Singh (2011), except Singh has ‘one must use ψ ’ where we have ‘one cannot use ϕ ’. We prefer our formulation since speakers aren’t generally required to utter anything. Thanks to an anonymous reviewer for bringing this to our attention.

Given these definitions, Global MP can explain why the examples in (8) are infelicitous. For instance, (9a) ('The sun is shining') is an alternative for (8a) ('A sun is shining'). Moreover, (9a) carries stronger presuppositions than (8a), and those presuppositions are satisfied in context. Thus, (9a) is predicted to be infelicitous.

2.2 Local MP

The account considered above is called *Global* MP because it only checks for presupposition competition at the discourse level, i.e. at the root. It is exactly this feature that is criticized by Percus (2006). He considers contrasts such as the following:

- (10) a. # Everyone with exactly two students assigned the same exercise to all of his students.
b. Everyone with exactly two students assigned the same exercise to both of his students.

(10a) is infelicitous, and it appears to be infelicitous for a similar reason that the examples in (8) are infelicitous, namely it enters into competition with the minimally different (10b). However, (10a) and (10b) carry the *same* presupposition, namely the tautology. That is, at root they are presuppositionally equivalent. Thus, Global MP can't explain Percus's contrast. As Singh (2011, 154) observes, it is easy to come up with similar contrasts:

- (11) a. # If there is exactly one bird in that tree, then a bird in that tree is a pigeon.
b. If there is exactly one bird in that tree, then the bird in that tree is a pigeon.
- (12) a. # Either John has exactly two students and he assigned the same exercise to all of his students, or he doesn't have any students at all.
b. Either John has exactly two students and he assigned the same exercise to both of his students or he doesn't have any students at all.
- (13) a. # Mary believes that John has exactly two students and that he assigned the same exercise to all of his students.
b. Mary believes that John has exactly two students and that he assigned the same exercise to both of his students.

Singh suggests that Percus's examples can be handled if we relativize MP to the information that has already been taken into account when processing

the sentence. For instance, once we reach the consequent of (11a), we are already taking for granted that there is exactly one bird in the relevant tree. And in this updated context, if we wanted to “maximize presuppositions” we should use ‘the bird’ rather than ‘a bird’. Put another way, Singh proposes that we relativize the functioning of MP to local contexts. This general idea has been taken up by several theorists. Indeed, although it has been implemented in a variety of ways, the claim that MP competition is sensitive to local contexts constitutes an important aspect of most approaches to MP in the literature.⁶ To make the idea more concrete, we’ll present Singh’s particular implementation of it, since it is fairly simple (157):

Local MP: Check that MP is satisfied for each sub-formula S embedded in ϕ in S ’s local context c' .

To illustrate, let us suppose that the local context of Q in a conditional ‘if P then Q ’ is the global context c updated by the proposition expressed by P , i.e. $c \cap \llbracket P \rrbracket$. This means that every world in the local context of the consequents in (11a) and (11b) is one where there is exactly one bird in the relevant tree. So, the presupposition triggered by the definite in the consequent of (11b) will be satisfied in the consequent’s local context. Thus, Local MP predicts that (11a) should be unacceptable, as required.

3 Generalized Local MP

Percus’s data shows that competition effects from MP arise below the matrix level. Singh tries to capture this by having MP operate not just at the root, but at each subformula as well. However, we can construct cases showing that this competition even operates below the *formula* level. Consider the contrast between (5a) and (5b) from §1:

- (5a) # All of the two mainstream presidential candidates are crooked.
 (5b) Both of the two mainstream presidential candidates are crooked.

(5b) is acceptable but (5a) is not.⁷ Intuitively, the infelicity here arises from MP-like competition: one is moved to say that (5a) is problematic exactly

⁶For instance, both Spector & Sudo (2017) and Anvari (2018a, 2020) propose extensions of MP that involves relativization to local contexts. See §5 for further discussion of Anvari’s account.

⁷Some informants report that (5b) is mildly infelicitous owing to the use of ‘of the two candidates’ rather than the more parsimonious ‘of the candidates’ and ‘candidates’. Still, all of our informants reported a strong contrast between (5a) and (5b).

because (5b) is fine.^{8,9}

However, this contrast cannot be captured by Local MP, or, as far as we're aware, any existing account that makes MP competition sensitive to local contexts. Without getting too far into an analysis of partitive constructions, it is plausible that the partitive 'of the two candidates' is a presupposition trigger: it triggers the same presupposition as 'the two candidates', which is that there are exactly two candidates. This can be motivated theoretically (Hoeksema, 2011), but also following Anvari (2018b, 2) we can provide evidence for this by considering the examples below:

- (14) a. Are you critical of (all of) the n candidates?
b. If you are critical of (all of) the n candidates, then I worry for the future of this country.

That there are exactly n candidates "projects" in (14a) and (14b), which is diagnostic of a presupposition.

Now, Local MP asks us to check that MP is satisfied in each subformula of (5a). But the only relevant subformula here, i.e. the only subformula in which (5a) and (5b) differ is simply (5a) itself. We assume, as is standard, that 'both' triggers a presupposition to the effect that the cardinality of its restrictor is exactly two.¹⁰ But then (5a) and (5b) carry *exactly the same presuppositions*. This is because both sentences presuppose that there are exactly two candidates, through the partitive, so the presupposition triggered by 'both' in (5b) is otiose. Thus, no matter what the input context for (5a) and (5b) is, Local MP incorrectly predicts that there should be no difference in acceptability here. More generally, examples such as (5a) and (5b) raise a challenge for all existing accounts that maintain MP competition

⁸Some might try to provide a syntactic account of the contrast between (5a) and (5b). More specifically, the idea is that when the restrictor of a quantifier contains 'two', then it can only agree with 'both'. But the unacceptability of examples such as (1) suggests that this can't be the correct account:

- (1) There are exactly two candidates. # All of them are crooked

Thanks to an anonymous reviewer for helpful discussion here.

⁹Note that (1) is also acceptable:

- (1) Each of the two candidates is crooked

However, it is plausible that 'each' possesses semantic properties that 'both' does not, e.g. distributivity. In that case, we shouldn't expect there to be competition between these items.

¹⁰We follow standard practice in assuming that 'both' and 'all' are determiners, and that the partitive is their restrictor (Barwise & Cooper, 1981; Carnie, 2007). However, except perhaps in one place (§4.2), these assumptions aren't essential to our arguments.

is sensitive to local contexts, since these accounts only appeal to the local contexts of whole formulas.¹¹

At this point, one might wonder how general this problem is. We suggest that it will arise with any determiner that both (i) triggers a presupposition, and (ii) can take a restrictor argument that triggers the same presupposition. In English, there aren't many determiners that satisfy both of these properties. But one further possible example comes from definite and indefinite descriptions. Consider the contrasts below:

- (15) a. # Yesterday I met a woman who is John's wife.
b. Yesterday I met the woman who is John's wife.
- (16) a. # A lion tamer who is the only lion tamer in the world is tough.
b. The lion tamer who is the only lion tamer in the world is tough.

Once again, one is moved to try to explain these contrasts by appealing to MP competition. However, the restrictor in, e.g. (16a) already triggers a presupposition to the effect that there is a unique lion tamer in the world. So, at the clausal level, both (16a) and (16b) carry the same presuppositions. Thus, existing accounts that tie MP competition to the local contexts of whole formulas, e.g. Local MP, can't explain the contrast here. Similarly with (15).

What should we make of the idea that MP competition is sensitive to local contexts in light of these examples? One option is to give it up, and try to explain the observed effects by positing a different mechanism altogether. We will come back to this proposal in §5. But now we will explore a response which builds on the thought that local contexts still play a role in MP competition. We will consider an MP principle that not only checks MP for each sub-formula, but for each *constituent* all the way down to particular lexical items. Again, because Singh's framework is relatively straightforward, we

¹¹For instance, this data also raises a problem for Spector & Sudo's (2017) *Presupposed Ignorance* principle, and Anvari's (2018a; 2020) *Logical Integrity* account. We also believe that our core data are no less of a challenge for accounts that try to capture MP effects through so-called "mismatching implicatures" (Magri, 2009; Sharvit & Gajewski, 2008, 2012; Marty, 2017). In brief, on such accounts MP effects arise through covert exhaustification. An exhaustification operator is assumed to be obligatorily attached to every possible scope site, and contextual factors, primarily relevance, determine whether the operator is semantically vacuous or not. In some contexts, relevance guarantees that certain alternatives are negated by the operator even though the result of this negation is a "contextual contradiction", or "mismatching implicature". The reason that approaches along these lines cannot account for the oddness of (5a) is that (5a) and its alternative (5b) are semantically indistinguishable, so it is impossible for the prejacent (5a) to be entailed by the exhaustification operator *and* the alternative (5b) be negated at the same time, as the two denote the same proposition. See also fn. 27.

will use it to implement this idea. We call this principle *Generalized Local MP*:

Generalized Local MP: Check that MP is satisfied for each constituent v embedded in ϕ in v 's local context c' .

Generalized Local MP aims to stick to Singh's proposal as much as possible. The difference being that Generalized Local MP applies to clausal *as well as subclausal* constituents. Essentially, rather than rejecting the central Local MP intuition, we aim to investigate the idea that Local MP is fundamentally on the right track, but needs to apply all the way down to specific lexical items.¹²

In §4 we will assume that Generalized Local MP explains our target contrasts (as well as Percus's contrasts from §2.2). We will shift our focus from this MP principle to the local contexts that provide a basis for the posited MP competition. Importantly, Generalized Local MP puts constraints on the local contexts of subclausal constituents. For instance, given Generalized Local MP, the local contexts of 'both' and 'all' in our target contrasts need to enable MP competition. That is, the local contexts of 'all' and 'both' need to be such that the presupposition triggered by 'both' is satisfied in this local context. However, as we will show, no existing non-stipulative theory of local contexts delivers this result.

4 The local contexts of determiners

In this section, we consider two general theories of local contexts, namely the incremental account of Schlenker (2009) (§4.1), and the hierarchical approach recently developed by Ingason (2016) and Mandelkern & Romoli (2017a) (§4.2). We argue that neither provides us with appropriate local contexts for subclausal expressions. Then we present a stipulative account that does (§4.3), and briefly compare this proposal with some recent work by Schlenker (2019) on redundancy effects involving nominal modifiers (§4.4). Finally, we draw out some of the broader theoretical consequences of our findings (§4.5).

4.1 Incremental local contexts

The centerpiece of Schlenker's (2009) theory of local contexts is a formal framework with several free parameters. Once these parameters are fixed,

¹²Other accounts on which MP competition is sensitive to local contexts, e.g. (Spector & Sudo, 2017; Anvari, 2018a), can also be adapted to operate at the subclausal level. To repeat, we only focus on Singh's proposal because it is fairly simple.

this generates an algorithm that determines, for any expression, what its local context is given the larger expression in which it is embedded along with the global context. This account is “incremental” in the sense that it keeps fixed all of the syntactic material that occurs to the left of the expression in question *in order of pronunciation/externalization*. The incremental conception of local contexts is supposed to be motivated by general facts about linguistic communication and interpretation, namely that hearers process strings in a linear, or left-to-right fashion (Schlenker, 2009, 9-10).

The preference for incremental local contexts is supposed to explain the contrast between (17a) and (17b):

- (17) a. Mary came to the party and Bill came to the party too.
 b. # Bill came to the party too and Mary came to the party.

The incremental local context of the second conjunct in (17a) takes into account all of the material that occurs to its left. Thus, it takes into account the information carried by the first conjunct. So, this local context entails that Mary attended the party. This means that the presupposition carried by the second conjunct, namely that someone distinct from Bill attended the party, will be satisfied in its local context. Consequently, this presupposition won’t project, which explains why (17a) only presupposes the tautology. By contrast, although the second conjunct in (17b) carries the information that Mary came to the party, this information doesn’t impact the first conjunct’s local context (since incremental local contexts are calculated left-to-right). Hence, the local context of the first conjunct is just the global context, which, we may suppose, doesn’t carry the information that anyone apart from Bill came to the party. This means that the presupposition triggered by the first conjunct in (17b) isn’t satisfied in its local context. This explains why (17b) is unacceptable (along with the fact that the presupposition triggered by ‘too’ is hard to accommodate).

It will be helpful to present Schlenker’s account a bit more formally. We will follow Schlenker’s notation, so that where E and E' are two expressions, $E' E$ denotes the (generalized) conjunction of E and E' , i.e. $E \wedge E'$. Thus, if under assignment g the variable c' is assigned the proposition that Mary came to the party, then $c' \text{ Bill came to the party}$ denotes the proposition that both Mary and Bill came to the party. Then the incremental account can be expressed as follows:

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The incremental local context of an expression d which occurs in a syntactic environment a_b in a context c is the (logically) strongest element x of the same type as d which guarantees that

for any expression d' of the same type as d , for all strings b' for which $a d' b'$ is a well-formed sentence:

$$c \models^{c' \rightarrow x} a d' b' \leftrightarrow a d' b'$$

To repeat, this account is “incremental” in the sense that it keeps fixed all of the syntactic material that occurs to the left of the target expression, i.e. the set of alternative strings $a d' b'$ that are quantified over all include a , which appears to the left of the target expression d .¹³

We are investigating whether Schlenker’s account provides us with suitable local contexts for the determiners ‘all’ and ‘both’ in the following sentences:

(5a) # All of the two mainstream presidential candidates are crooked.

(5b) Both of the two mainstream presidential candidates are crooked.

The short answer is that it does not. Intuitively, this is because the pre-supposition of ‘both’ is “forward-looking”, it concerns the cardinality of its restrictor, which appears after it. But incremental local contexts are “backward-looking”, they concern the material that precedes the relevant expression. So, the incremental local context of ‘both’ won’t carry any information about its restrictor.

In more detail, since both ‘all’ and ‘both’ are at the beginning of each sentence, and they are of the same type, their local contexts must be the same. Since they are quantificational determiners, the local context must be of the type that takes a world, a predicate, and another predicate, to a truth-value.¹⁴ It is fairly straightforward to show that the local context x must be $\lambda w \lambda P_{\langle s, \langle e, t \rangle \rangle} \lambda Q_{\langle s, \langle e, t \rangle \rangle} . w \in c$, where c is the global context. That is, all x does is check whether $w \in c$, and relates all other predicate values whatever.¹⁵

¹³We can show that the local context of the second conjunct in (17a) entails that Mary came to the party. Let c be an arbitrary context and consider $x = c \cap \{w : \text{Mary came to the party in } w\}$. Clearly, x satisfies $c \models^{c' \rightarrow x} \text{Mary came to the party}^c d' \leftrightarrow \text{Mary came to the party } d'$. To show that it is the strongest such restriction, consider another restriction y that excludes some world $w \in c$ in which Mary attended the party. Then $w \models \text{Mary came to the party and Mary came to the party}$, but $w \not\models \text{Mary came to the party}^y (\text{Mary came to the party})$. Hence, $c \not\models^{c' \rightarrow y} \text{Mary came to the party}^c d' \leftrightarrow \text{Mary came to the party } d'$. It is also fairly straightforward to show that the local context of the first conjunct in (17b) is just c .

¹⁴More formally, it must be of type $\langle s, \langle \langle s, \langle e, t \rangle \rangle, \langle \langle s, \langle e, t \rangle \rangle, t \rangle \rangle$.

¹⁵It’s easy to check that $c \models^{c' \rightarrow x} a d' b' \leftrightarrow a d' b'$ (in this case a is just the empty string). To show that it is the strongest such restriction, consider some restriction r smaller than x . So, for some $w \in c$, and predicates P, Q : $\langle w, P, Q \rangle$ isn’t in r . But now consider G, P , and Q such that $\llbracket G \rrbracket = \{\langle w, P, Q \rangle\}$, $\llbracket P \rrbracket = P$, and $\llbracket Q \rrbracket = Q$. Then $w \models \text{GPQ}$, but $w \not\models {}^r \text{GPQ}$. Thus, $c \not\models^{c' \rightarrow r} a d' b' \leftrightarrow a d' b'$.

Now, the fact that ‘both’ triggers a presupposition raises a problem. We can represent this presupposition as follows: $\lambda w \lambda P_{\langle s, \langle e, t \rangle \rangle} \lambda Q_{\langle s, \langle e, t \rangle \rangle} . |P(w)| = 2$. That is, the presupposition triggered by ‘both’ checks that the extension of the restrictor contains exactly two individuals at each world. But as we have just seen, x only checks that $w \in c$, and relates all other predicate meanings whatever, i.e. there will be $\langle w, P, Q \rangle \in x$ such that $|P(w)| \neq 2$. Thus, it is *not* the case that the presupposition triggered by ‘both’ will be satisfied in its local context.¹⁶

It is worth emphasizing the above result: *even if it is common knowledge that there are exactly two candidates*, Schlenker’s incremental algorithm predicts that (5b) (‘Both of the two mainstream presidential candidates are crooked’) should be infelicitous. Thus, the problem is not so much that Schlenker’s algorithm does not allow us to explain the contrast based on Generalized Local MP, but rather that Schlenker’s algorithm, applied at the lexical level, predicts that (5b) can never be used felicitously to begin with.¹⁷

One might be tempted to get around this problem by maintaining that in this case ‘both of the two students’ should be treated as a grammatical unit, and that the presupposition it triggers is satisfied in context, namely that there are exactly two candidates. This move solves the issue mentioned above but it doesn’t help with our original problem: by parity of reasoning ‘all of the two students’ should *also* then be interpreted as a single unit. But then ‘both of the two students’ and ‘all of the two students’ will trigger the same presupposition and cannot be distinguished via Generalized Local MP.

In short, Schlenker’s theory doesn’t provide us with suitable local contexts

If we restricted attention to conservative quantifier meanings, then a similar argument could be used to show that the local context of ‘all’ and ‘both’ is the largest quantifier meaning that obeys conservativity.

¹⁶Put another way, the incremental local context of ‘both’ does not entail its presupposition, given the following generalized notion of entailment (Schlenker, 2009, 14):

Generalized Entailment: If z and z' are two objects of a type τ that ‘ends in t' , and can take at most n arguments, z *entails* z' just in case whenever y_1, \dots, y_n are objects of the appropriate type, if $z(y_1) \dots (y_n) = 1$, then $z'(y_1) \dots (y_n) = 1$.

Let x be the local context of ‘both’, and let x' be its presupposition. Then x doesn’t entail x' since there are w, P, Q such that $x(w)(P)(Q) = 1$, but $x'(w)(P)(Q) = 0$.

¹⁷Also note that the problem here has nothing especially to do with ‘both’, but arises with virtually any argument-taking presupposition trigger whose presupposition puts constraints on its argument. For instance, consider the verb ‘know’. This verb checks that its propositional complement is true at the world of evaluation, i.e. its presupposition is $\lambda e \lambda w \lambda p_{\langle s, t \rangle} . w \in p$. Then even if it is common ground that Paris is in France, ‘I know that Paris is in France’ will suffer from presupposition failure if the presupposition of ‘know’ needs to be satisfied in its incremental local context. This is because this local context will just be $\lambda e \lambda w \lambda p_{\langle s, t \rangle} . w \in c$. Intuitively, this local context cannot “see” what the prejacent of ‘know’ is, and whether this proposition is true in worlds in the context set.

for subclausal expressions: not only do we not predict that ‘all of the two’ should be unacceptable, but we also incorrectly predict that ‘both of the two’ should be unacceptable in general.¹⁸

4.2 Hierarchical local contexts

Schlenker’s theory is the most widely discussed non-stipulative account of local contexts. However, both Ingason (2016) and Mandelkern & Romoli (2017a) have recently suggested a different approach. On this account, the local context of an expression is determined by the material that hierarchically precedes it in terms of syntactic structure, i.e., is higher up in the structure, rather than the material that linearly precedes it.

The hierarchical theory is motivated by several data points that pose a problem for the incremental account. In a nutshell, since the incremental account relies on linear precedence, it predicts that the computation of local contexts should be sensitive to externalization: even if two sentences S and S’ are semantically identical and structurally isomorphic, if they are externalized in different ways then local context computations should yield different results. But it has been argued that this makes incorrect predictions. To illustrate, let us consider Ingason’s central argument. First, consider the contrast between (18a) and (18b):

¹⁸Theorists have observed that sometimes the information that occurs to the right of the expression is also taken into account (such examples are usually attributed to Barbara Partee):

- (1) a. The bathroom is well hidden or there is a no bathroom.
b. If the bathroom is not hidden, there is no bathroom.

These sentences are acceptable, but the incremental algorithm predicts that they shouldn’t be. This moves Schlenker to define a notion of *symmetric* local contexts, which essentially keeps fixed all of the syntactic material that occurs to the left *and right* of the presupposition trigger, i.e. the set of alternative strings quantified over only includes those of the form *a d’ b*. The idea is that although the use of symmetric local contexts is generally dispreferred, they can be employed in special circumstances. It can be shown that the symmetric local context of ‘both’ and ‘all’ in our target sentences *does* provide a basis for MP competition, i.e. the presupposition triggered by ‘both’ is satisfied in its symmetric local context. Given this result, a reviewer suggests that MP competition could generally go by symmetric local contexts. However, consider the contrast below:

- (2) a. # No teacher who has exactly two students invited all of them.
b. No teacher who invited all of their students has exactly two students.

For any predicates P and Q, $\llbracket \text{no}(P)(Q) \rrbracket = \llbracket \text{no}(Q)(P) \rrbracket$ (‘no’ arguably triggers a non-emptiness presupposition for its restrictor, but we can assume that these presuppositions are satisfied in context). But then the symmetric local context of ‘all’ in (2a) is the same as the symmetric local context of ‘all’ in (2b). So, if MP competition tracked symmetric local contexts, then we would predict (2b) to be infelicitous, and we wouldn’t be able to explain the contrast here.

- (18) a. John met a man who is an uncle.
 b. # John met an uncle who is a man.

(18a) is acceptable, but (18b) is not. This is predicted by the incremental account of local contexts considered in §4.1, since the local context for *is a man* will entail *is a man* in (18b) but not (18a).

The sentences in (18) are in English, a head-initial language, where hierarchical structure and linear order of relative clauses correspond. However, Korean and Japanese are head-final languages, where hierarchical structure comes apart from linear order. Ingason points out that in such languages, redundancy effects appear to track hierarchical structure. Here is his data from Korean:

- (19) a. Mary-nun [[accesi-in] sengin namca-lul] mannassta.
 Mary-TOP [[mister-ADN] adult male-ACC] met.
 ‘Mary met an adult man who is a mister/uncle.’
 b. # Mary-nun [[sengin namjcaa-in] acesi-lul] mannassta.
 Mary-TOP [[adult male-ADN] mister-ACC] met.
 ‘Mary met a mister/uncle who is an adult male.’

The relative clauses are pronounced before the head noun. So, if local contexts tracked linear order we would predict that (19b) should be acceptable, and (19a) should be unacceptable. However, this is exactly the opposite of what we find. Ingason suggests that these observations can be explained if local contexts instead track hierarchical structure: assuming that head nouns attach higher in the syntactic tree than relative clauses (Partee, 1975; Wiltschko, 2013), the local contexts of relative clauses will include the material contributed by the head noun. So, even though the head noun *uncle* is pronounced after the relative clause *who is an adult male* in (19b), the latter’s local context will include the information contributed by the former. Thus, the relative clause will be redundant in its local context.

A further data point involves conditionals (Mandelkern & Romoli, 2017b,a). The core observation is that in sentences of the form ‘if A, B’ and ‘B, if A’, the local context of the antecedent is the same. For example, both sentences below presuppose that John is in France. Although the incremental theory correctly predicts this to be the case for (20a), since there the antecedent linearly precedes the consequent, it incorrectly predicts that in (20b) the presupposition triggered in the antecedent must be filtered through the consequent.

- (20) a. If John regrets being in France, he is not in Paris
 b. John isn’t in Paris, if he regrets being in France.

By contrast, the hierarchical theory makes the correct predictions here on the assumption that the *if*-clause is structurally higher than the consequent, regardless of the order of pronunciation.

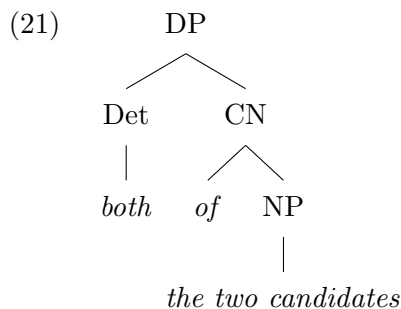
We can give a characterization of the hierarchical approach by introducing the following definition. If E is an expression in a sentence S, then E’s *hierarchical material* in S is all of the material that either dominates E in S, or asymmetrically c-commands E in S.¹⁹ Essentially, the proposal is:

Hierarchical Local Contexts: The hierarchical local context of an expression E in a sentence S is the weakest meaning of the same type as E that entails E’s hierarchical material in S.

This formulation of the account is fairly informal.²⁰ We won’t spend time making it more precise because even at this level it is easy to see that it doesn’t help us in our primary task. Recall that we are trying to account for the contrast between (5a) and (5b):

- (5a) # All of the two mainstream presidential candidates are crooked.
 (5b) Both of the two mainstream presidential candidates are crooked.

To do this, we need to assign local contexts to determiners in such a way that the presupposition of ‘both’ is satisfied in its local context. That is, we need the local context of ‘both’ to take into account the material in its restrictor. So, if hierarchical local contexts are to be of any help, restrictors either need to syntactically dominate determiners, or asymmetrically c-command them. But this isn’t the case—determiners are standardly taken to asymmetrically c-command their restrictors. For instance, the quantifier in (5b) has the following structure (Barwise & Cooper, 1981; Carnie, 2007):



¹⁹See (Carnie, 2007) for a definition of the notion of *c-command*.

²⁰See (Mandelkern & Romoli, 2017a) for a more rigorous statement of the view.

So, unless one is willing to adopt a revisionary syntax for quantifiers (or, at least, the specific case of ‘all’ and ‘both’), the hierarchical approach doesn’t provide us with suitable local contexts to account for the contrast in our target examples.²¹

4.3 Stipulating local contexts

To summarize what we have seen so far, neither the incremental nor hierarchical approach provides us with appropriate local contexts for determiners. Essentially, we require that the local context of a determiner includes the material from its restrictor, even though the restrictor neither linearly nor hierarchically precedes the determiner.

Absent a general, non-stipulative account of the local contexts of determiners, one could simply stipulate what’s needed. One way of making this precise is by utilizing Schlenker’s framework, and positing the following construction-specific algorithm for quantified formulas:²²

Local Contexts for Determiners

The local context of a quantificational determiner D which occurs in a syntactic environment $_F G$ in a context c is the (logically) strongest element x of the same type as D which guarantees that for any expression D' of the same type as D , for all strings G' for which $D' F G'$ is a well-formed sentence:

$$C \models^{c' \rightarrow x} c' D' F G' \leftrightarrow D' F G'$$

Note that here the restrictor F is kept fixed in the local context calculation. That is, the proposed local context takes into account the material in the restrictor of the quantifier, and ignores material that occurs in and beyond its scope.²³ Our target sentences are:

- (5a) # All of the two mainstream presidential candidates are crooked.
 (5b) Both of the two mainstream presidential candidates are crooked.

²¹It is worth noting that even if it was somehow maintained that restrictors asymmetrically c-command determiners, Mandelkern & Romoli’s account isn’t well-suited to generating local contexts for sub-clausal expressions. See (Mandelkern & Romoli, 2017a, 27, fn.15) for discussion.

²²This formulation of a construction-specific algorithm for determiners is partly inspired by Schlenker (2019), whose arguments we turn to in the next subsection.

²³This means that, unlike the proposal considered in fn.18, we do not predict that (2b) (‘No teacher who invited all of their students has exactly two students’) should be infelicitous, since the material in the scope isn’t taken into account in the MP calculation.

One can show that the “determiner” local context of ‘all’ and ‘both’ in these sentences is given by the following quantifier meaning u : $\lambda w \lambda P_{\langle s, \langle e, t \rangle \rangle} \lambda Q_{\langle s, \langle e, t \rangle \rangle} \cdot w \in c, P = \llbracket \text{candidate} \rrbracket, |P(w)| = 2$.²⁴ Recall that the presupposition of ‘both’ is the following: $\lambda w \lambda P_{\langle s, \langle e, t \rangle \rangle} \lambda Q_{\langle s, \langle e, t \rangle \rangle} \cdot |P(w)| = 2$. This presupposition is satisfied in u .²⁵ Now recall the principle of Generalized Local MP from §3:

Generalized Local MP: Check that MP is satisfied for each constituent v embedded in ϕ in v ’s local context c' .

Given Generalized Local MP, (5a) is predicted to be unacceptable: ‘all’ does *not* satisfy MP in its local context, since ‘both’ is equivalent to ‘all’ modulo presuppositions, and the presuppositions triggered by ‘both’ are satisfied in this local context.^{26,27}

²⁴It is straightforward to show that $c \models^{c' \rightarrow u} c' D'$ of the two candidates $G' \leftrightarrow D'$ of the two candidates G' . To show that it is the smallest such restriction, consider some restriction t smaller than u . So, for some $w \in c$, and predicate meaning Q , $|P(w)| = 2$ but $\langle w, P, Q \rangle \notin t$. Then $w \models \text{GPQ}$, but $w \not\models {}^t \text{GPQ}$, where $\llbracket \text{G} \rrbracket = \{\langle w, P, Q \rangle\}$. Hence, $c \not\models^{c' \rightarrow t} c' D'$ of the two candidates $Q \leftrightarrow D'$ of the two candidates Q .

²⁵To see this, let u' be the presupposition triggered by ‘both’. Let w, P , and Q be arbitrary, and suppose $u(w)(P)(Q) = 1$. Then $|P(w)| = 2$. Hence, $u'(w)(P)(Q) = 1$ as well (recall the generalized notion of entailment from fn.16).

²⁶A reviewer suggests that examples such as (1) pose a problem for Generalized Local MP combined with our stipulated local contexts for determiners:

- (1) Yesterday I met a woman that turned out to be John’s wife.

Through the indefinite’s restrictor, (1) presupposes that there is a unique (female) wife of John. But then it seems like the account we’ve sketched here predicts that (1) should be dispreferred to its definite-variant. However, (1) is perfectly felicitous.

In response, we suggest that the acceptability of (1) turns on the semantic properties of ‘turn out’. Evidence for this comes from the fact—noted in §3—that the relevant variants of (1) without ‘turn out’ pattern exactly as predicted (repeated from above):

- (15) a. # Yesterday I met a woman who is John’s wife.
b. Yesterday I met the woman who is John’s wife.

Why should ‘turn out’ have this effect? We aren’t exactly sure at this stage. But it’s clear that ‘turn out’ has some interesting semantic features. For instance, it seems to introduce some sort of *de re* modality:

- (2) The woman I met turned out to be John’s father.

(2) is acceptable so long as I *thought* I met a woman, though in fact it was John’s father. How exactly these features can be used to explain why (1) should be acceptable must be left for future work.

²⁷In fn. 11, we briefly pointed out that our target examples cannot be accounted for by extant “mismatching implicatures” proposals which appeal to covert exhaustification. It is worth noting that exhaustification is more or less universally assumed to be based

We think that positing stipulative, construction-specific algorithms for local contexts like the one presented here have important consequences for debates in semantics and pragmatics. We will draw out some of these in §4.5. But first we want to briefly compare our arguments with some recent work by Schlenker (2019).²⁸

4.4 Schlenker on nominal modifiers

Our discussion thus far makes contact with some arguments by Schlenker (2019) on redundancy effects involving nominal modifiers. In short, although there are some important differences between Schlenker’s claims and our own, his work can also be seen to highlight the idea that subclausal local contexts function in unexpected ways.

Schlenker’s primary aim is to explain the contrast between examples such as (22a) and (22b):

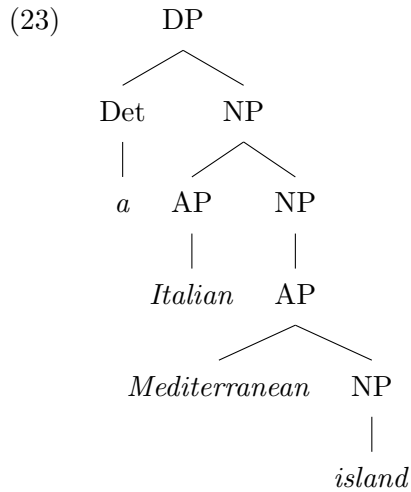
- (22) [It is known that all Italian islands are in the Mediterranean, whereas some French islands are in the Mediterranean and some are not (e.g. some are in the Atlantic).] This is...
- a. an Italian Mediterranean island.
 - b. # a Mediterranean Italian island.

Although (22a) is acceptable, (22b) is not. As Schlenker points out, this is not what is predicted on general, non-stipulative approaches to local contexts. For instance, since ‘Italian’ linearly precedes ‘Mediterranean’ in (22a), and being an Italian island entails being a Mediterranean island, the incremental approach predicts that ‘Mediterranean’ should be redundant, and that (22a) should be infelicitous. On the other hand, ‘Mediterranean’ linearly precedes ‘Italian’ in (22b), so the incremental approach predicts that there should be no redundancy here. However, this is the opposite of what we find.

The hierarchical approach fares no better, given a standard syntax for pre-nominal modifiers (Cinque, 2010). Essentially, it is generally assumed that linear order tracks hierarchical order. For instance, (22a) is taken to have the following structure at LF:

on competition at the clausal level. So, if the contrast between, e.g. (5a) and (5b), should be explained by competition between ‘all’ and ‘both’, it is unclear how mismatching implicature theories can be suitably generalized to capture this.

²⁸§4.4 can be skipped without loss of continuity.



Clearly, ‘Italian’ c-commands ‘Mediterranean’. So, the hierarchical approach predicts that (22a) should be unacceptable. For similar reasons, it predicts that (22b) should be acceptable.

Schlenker tries to explain this data by maintaining that the local contexts of nominal modifiers are computed “inside out”: the innermost modifier and the noun is computed before the outermost modifier. So, the local context of ‘Italian’ in (22a) carries the information contributed by ‘Mediterranean island’. Since not all Mediterranean islands are Italian, (22a) is not predicted to be infelicitous. By contrast, the local context of ‘Mediterranean’ in (22b) already carries the information contributed by ‘Italian island’, and is therefore redundant. If we make use of Schlenker’s general framework, the proposal can be expressed as follows (Schlenker, 2019, 12-13):

Local Contexts for Nominal Modifiers

The local context of a restrictive modifier M modifying a Noun-Phrase N in a sentence $a M N b$ in context c is the (logically) strongest element x of the same type as M which guarantees that for any expression M' of the same type as M , for all appropriately defined alternatives a'_b' to a_b :

$$C \models^{c \rightarrow x} a' \ c' \ M' \ N \ b' \leftrightarrow a' \ M' \ N \ b'$$

Note that the “inside out” order is captured by the fact that the noun-phrase N is held fixed. This ensures that the information carried by the inner noun-phrase always contributes to the local context of the modifier. As Schlenker notes, this algorithm for calculating the local contexts of nominal modifiers is stipulated, and doesn’t follow from more general principles.

It is worth bringing out a contrast between Schlenker’s arguments from redundancy and our arguments involving MP effects. Many theorists assume that local contexts are univocal, in the sense that the local contexts used in the calculation of presupposition projection, and the local contexts used in determining redundancy effects, must be the same. However, it is conceptually possible that these two uses of local context actually come apart, i.e. that one notion of local context is in play when it comes to presupposition, and another notion is in play when it comes to redundancy. Thus, Schlenker’s arguments leave open the possibility that the local contexts relevant for presupposition projection can be predicted by more general theories, e.g. the incremental or hierarchical approach. By contrast, our arguments involving MP effects speak directly to the nature of local contexts relevant for presupposition projection. We see very little room to maintain that the local contexts involved in MP competition can come apart from the local contexts involved in capturing presupposition projection. So, although our arguments and Schlenker’s have a similar overall structure, it is possible that their conclusions target distinct notions of local context. That said, it should be clear that Schlenker’s claims complement our own. His arguments support our general verdict: information aggregation at the subclausal level appears to work in surprising ways.

4.5 The explanatory problem

We’ll close this section by revisiting the “explanatory problem” for dynamic semantics briefly discussed in §1. The problem, recall, centers around frameworks that simply stipulate what the local contexts of sentential connectives should be. For instance, in her entries for the connectives, Heim (1983) essentially stipulated the required informational asymmetries, e.g. one consequence of her lexical entry for ‘and’ is that the local context of Q in $\lceil P \text{ and } Q \rceil$ contains the information contributed by P , but the local context of P does not contain the information contributed by Q . Critics have argued that such stipulations are problematic since they are non-explanatory (Soames, 1982; Heim, 1990; Schlenker, 2009). The aim in much subsequent work has therefore been to try to deliver such local contexts from more general principles.

We think that the contours of this “explanatory challenge” start to look less clear once the local contexts of subclausal elements are considered. Taken to its principled conclusion, this challenge requires that we provide a general, non-stipulative theory that can predict the appropriate local context for each expression, both clausal and subclausal. For instance, the required theory needs to be able to predict that the local context of Q in $\lceil P \text{ and } Q \rceil$ contains the information contributed by P , but also that the local contexts of quantificational determiners contain the information carried by their restrictors.

Of course, we can't prove that no such general account could be developed. However, it seems hard to see how the deliverances of a construction-specific algorithm for determiners (like the one considered above) could be generated alongside an incremental algorithm needed to handle, e.g. conjunction.²⁹ It could be argued that if *everyone* needs to stipulate construction-specific algorithms for subclausal expressions, then the explanatory challenge appears to lose at least some of its bite. Put another way: if every account needs to stipulate the local contexts of certain expressions, then the differences between purportedly explanatory theories, e.g. (Schlenker, 2009), and stipulative accounts, e.g. (Heim, 1983), become less distinct.

On the other hand, proponents of purportedly explanatory theories could maintain that their accounts are still in a stronger position, since they need to make fewer stipulations. To our minds, this would be more compelling if it could be established that there is a significant difference between the clausal and subclausal levels, so that stipulations involving the former, e.g. as in Heim's account, are somehow more problematic than those involving the latter, e.g. the determiner-specific algorithm sketched in §4.3.

There is obviously much more to say about how our findings impact the dialectic surrounding the explanatory problem. But we won't trace out more of these consequences here. Our primary aim has been more modest; we have tried to make the findings themselves sufficiently clear. In short: if we assume that MP competition is sensitive to local contexts, then we must make a careful study of the local contexts of subclausal elements. Although our discussion has been far from exhaustive, we have tried to show that such a study yields a number of surprising results which should be of fairly broad theoretical interest.

5 Lexical MP

Our discussion in §4 proceeded under the assumption that MP competition is tied to local contexts. But one might think that our target contrasts put pressure on this idea. In this section, we consider what the consequences are if we give it up.

Apart from Global MP, there is further precedent for an approach that denies MP competition is sensitive to local contexts. More specifically, Percus (2006) links MP to direct competition between lexical items, rather than competition that is modulated by contextual meanings. He tries to explain contrasts such as the following (repeated from above):

²⁹See (Mandelkern *et al.*, forthcoming) for compelling empirical evidence that the local contexts for natural language conjunction are incremental.

- (10) a. # Everyone with exactly two students assigned the same exercise to all of his students.
 b. Everyone with exactly two students assigned the same exercise to both of his students.

The basic idea is that (10a) is unacceptable because ‘both’ and ‘all’ are in “lexical competition”. Since ‘both’ beats ‘all’, and (10a)-(10b) are contextually equivalent, (10a) is predicted to be unacceptable.

It will be helpful to present Percus’s theory more formally. To this end, we reproduce Percus’s central definitions:

Lexical Presuppositional Strength: Lexical item α is presuppositionally stronger than lexical item β iff the domain of $\llbracket\beta\rrbracket^*$ properly includes the domain of $\llbracket\alpha\rrbracket^*$, where $\llbracket\alpha\rrbracket^*$ and $\llbracket\beta\rrbracket^*$ are $\llbracket\alpha\rrbracket$ and $\llbracket\beta\rrbracket$ adjusted to apply to sequences.³⁰

Lexical Alternatives: The lexical alternatives of a lexical item α are all presuppositionally stronger lexical items β of the same category.

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

Percus’s account, which we call *Lexical MP*, can then be expressed as follows:

Lexical MP: Let ψ be a member of the Alternative-Family of ϕ , and suppose ϕ and ψ are contextually equivalent. Then one must not use ϕ if the use of ψ would be felicitous in c .

To illustrate, ‘both’ is presuppositionally stronger than ‘every’. Hence, (10b) is a member of the Alternative-Family for (10a). These two sentences are contextually equivalent, so Lexical MP predicts that (10a) should be infelicitous.

In fact, Lexical MP can also explain our target contrasts:

- (5a) # All of the two mainstream presidential candidates are crooked.
 (5b) Both of the two mainstream presidential candidates are crooked.

³⁰For instance, if A and B are sets of individuals, $\langle A, B \rangle$ is in the domain of $\llbracket\text{every}\rrbracket^*$ just in case $\llbracket A \rrbracket \subseteq \llbracket B \rrbracket$.

(5b) is a member of the Alternative-Family of (5a). So, since (5a) and (5b) are contextually equivalent, Lexical MP predicts that (5a) should be infelicitous.

Even though Lexical MP can account for our central data, we are still inclined towards thinking that MP competition should be connected to local contexts. Our reasons are broadly theoretical, and concern what strike us as explanatory limitations of Percus's approach.³¹ To make this clearer, it is worth reiterating that we structured our discussion in §§2-4 around Singh's theory of Local MP because it is fairly straightforward. However, the idea that MP competition is sensitive to local contexts constitutes an important aspect of several other approaches to MP in the literature. Moreover, these approaches have fairly broad explanatory ambitions; they aren't only interested in capturing MP effects, but also distinct, yet plausibly related phenomena. To illustrate, let us briefly consider Anvari's (2018a) principle called *Logical Integrity* (hf. LI). Roughly, a sentence is unacceptable according to LI if it has a logically non-weaker alternative that it contextually entails.³² To see how this works, consider the following classic MP-effect:

- (24) [It is known that John has exactly two students.]
- a. John invited both of his students.
 - b. # John invited all of his students.

(24b) does not logically entail (24a): in a world in which John has three students and invited all of them, (24b) is true but (24a) is not (the latter will be undefined). However, (24b) does contextually entail (24a): there is no world in the specified context-set in which (24b) is true but (24a) is not. Thus, LI predicts that (24b) should be unacceptable, as required.

Importantly, LI is able to explain a range of effects that isn't covered by Lexical MP. For one thing, consider the following contrast (Percus, 2010):

- (25) [It is known that Mary takes two students on at a time; she either has two students or she has no students.]
- a. Mary invited both of her students.
 - b. # Mary invited all of her students.

Notice that in this example the presupposition of (25a) is not satisfied in context, but still (25b) is blocked. This is predicted by LI: (25b) contextually

³¹Singh (2011, 158-160) presents more direct empirical arguments against Lexical MP. Singh's claims appeal to mechanisms of presupposition accommodation and cancellation. However, the way these mechanisms function is fairly controversial and not very well understood. For this reason, we are hesitant to rely on Singh's criticisms.

³²We refer readers to (Anvari, 2018a) for a more precise statement of the principle which explicitly takes into account local contexts.

entails (25a). However, assuming that an utterance is “felicitous” in the sense relevant for Lexical MP only if its presupposition is satisfied in the target context, Lexical MP fails to predict that there should be a contrast here.³³

For another, consider the way scalar items interact with presuppositions. Observe that there is a contrast between (26a) and (26b) (Sharvit & Gajewski, 2008, 2012):

- (26) [It is common knowledge that all of the students smoke.]
- a. John is unaware that all of the students smoke.
 - b. # John is unaware that some of the students smoke.

Intuitively, (26b) is infelicitous because its presupposition is not as strong as it should be; the sentence seems to compete with (26a). But since (26a) and (26b) aren’t contextually equivalent, Lexical MP can’t explain this. By contrast, LI predicts that (26b) should be unacceptable, since (26b) contextually entails (26a) (but the former does not logically entail the latter).

To summarize, given the subclausal local contexts suggested in §4.3, sophisticated approaches that tie MP competition to local contexts, e.g. Anvari’s Logical Integrity, are not only able to account for our target contrasts, but examples such as (25)-(26) as well. By comparison, Lexical MP cannot explain this broader range of data. Of course, we cannot rule out that there are ways of developing an account which both gives up the idea that MP competition is sensitive to local contexts, but is also able to explain examples such as (25)-(26). But absent such a proposal, our sense is that, overall, theories

³³In response, it might be maintained that an utterance is “felicitous” in the relevant sense only if either its presupposition is satisfied in the context or, if not, the sentence can be rescued from presupposition failure by auxiliary repair-mechanisms, e.g. accommodation. However, consider the following example:

- (1) [It is common ground that every professor has *at least* two French students: some professors have exactly two students, both of whom are French, some have two French students plus other students, and some have three or more French students (perhaps with other students).]
- a. Some professor who invited all of their French students has exactly two students.
 - b. Some professor who invited both of their French students has exactly two students.

To our ears, both (1a) and (1b) are acceptable in the given context. This appears to be problematic for Lexical MP with the broad definition of felicity just discussed: (1b) is entirely felicitous, which means that (1a) should be blocked. By contrast, granted plausible assumptions about the way presuppositions project from the restrictors of quantifiers, LI does not predict that (1a) should be unacceptable.

that tie MP competition to local contexts are at an advantage compared to those that do not.³⁴

6 Conclusion

In this paper, we considered some contrasts first presented by Anvari (2018b), and tried to draw out some of the theoretical consequences of this data. Assuming that MP competition is sensitive to local contexts, Anvari’s examples force us to think carefully about the local contexts of subclausal elements. Ultimately, the required local contexts are not predicted by non-stipulative accounts of these objects, and we suggested that the target data can only be handled if we posit construction-specific local context algorithms. We are inclined to think that MP competition is indeed locally modulated, and so take our discussion to shed light on the nature of subclausal local contexts. Our study has likely raised more questions than it has answered, but hopefully it will help to open up new areas of inquiry, and prove beneficial to theorists working on a variety of topics.

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³⁴Singh (2011) also levels a more theoretical objection against Lexical MP. He comments that ‘as a constraint regulating the semantics/pragmatics interface, [lexical MP] strikes me as somewhat unnatural. I know of no other principles of semantics/pragmatics that display preferences among LFs ϕ , ψ that are sensitive not to their semantic or contextual meanings but rather solely to the lexical items contained within them’ (156). As we understand this concern, it is that Lexical MP is insufficiently explanatory: it seems hard to explain why there should be competition between lexical items from more general linguistic principles. But if our arguments in §4 are on the right track, then a similar charge could be leveled against accounts that appeal to local contexts in order to explain MP competition: the local contexts of determiners will also have to be stipulated, and so won’t follow from more general linguistic principles. By our lights, a more serious theoretical concern with Lexical MP is the one that we outline in the main text: by adopting Lexical MP, one loses the ability to explain a range of related effects, e.g. the way that presuppositions interact with scalar implicatures. Thanks to an anonymous reviewer for helpful discussion on these points.

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