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A puzzle for theories of redundancy: Exhaustification, incrementality, and the notion of local context*

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Abstract The present paper discusses novel data which are problematic for assertability conditions based on redundancy (Stalnaker 1979, Fox 2008, Schlenker 2009, Singh 2007, Chierchia 2009, Meyer 2013, Katzir & Singh 2014 among others). The problem comes from disjunctions like *Either Mary isn't pregnant or (she is and) it doesn't show* and in particular from the optional presence of *she is (pregnant)*. These data are even more puzzling if compared to corresponding conditionals like *If Mary is pregnant, (#she is and) it doesn't show* where the *she is (pregnant)* part is unacceptable as expected. In response to this puzzle, we present a solution based on two ingredients: (i) exhaustification and (ii) a notion of incremental redundancy. As we show, exhaustifying a sentence has an effect on the (incremental) redundancy status of its constituents. As a consequence of this, *she is (pregnant)* is actually not redundant in the disjunctive sentence above, provided the latter is exhaustified. We explore two possible ways of implementing this solution. The first is based on a definition of incremental redundancy which does not make use of local contexts as proposed by Fox (2008, 2013), building

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on Schlenker 2008. The second is based on Schlenker's (2009) incremental theory of local contexts. We then briefly compare the two implementations and point to a potential advantage of the one based on local contexts in dealing with the different readings of the disjunctive sentence above.

Keywords: redundancy, scalar implicatures, exhaustification, local context, incrementality, presuppositions, alternatives

1 Introduction

Consider the contrast between (1a) and (1b): intuitively, the reason why (1a) is degraded is that it contains redundant material, namely *and she is pregnant*. That is, (1a) as a whole means the same as the less complex (1b), which does not contain *and she is pregnant*. Put differently, *and she is pregnant* in (1a) does not add information beyond what is already expressed by (1b).

(1) a. #Mary is expecting a daughter and she is pregnant.
 b. Mary is expecting a daughter.

Contrasts like (1) motivate the need for a theory of assertability based on redundancy. Following Stalnaker 1979, a number of such theories have recently been proposed (Singh 2007, Fox 2008, Schlenker 2008, 2009, Chierchia 2009, Meyer 2013, 2015, Katzir & Singh 2014). The present paper discusses data that are problematic for all of these accounts. In particular, we focus on the examples in (2) from Mayr & Romoli 2013 (see also Chierchia 2009, Katzir & Singh 2014 and Meyer 2015). The problem is that (2a) and (2b) appear to provide exactly the same information.[1] Therefore, on the face of it, *she is (pregnant) and* in (2a) should be as redundant as *and she is pregnant* in (1a), and make (2a) unassertable in the same way. Yet, it is acceptable. All current theories of redundancy mentioned above incorrectly predict (2a) to be degraded for the same reason why they predict (1a) to be so.[2]

(2) a. Either Mary isn't pregnant, or she is and it doesn't show.

1 For details regarding this point see Section 5.1 below.

2 Note that the example in (2a) has the property that the problematic part *she is (pregnant)* satisfies the factive presupposition of the second conjunct in the second disjunct (*it doesn't show (that she is pregnant)*). While this may play a role in improving the naturalness of the example, it is not a necessary feature of the relevant cases: consider, for instance, the case in (i), that we will use below.

b. Either Mary isn't pregnant, or it doesn't show.

We propose a solution to this problem based on two ingredients: (i) exhaustification and (ii) a notion of incremental redundancy. As we will show, exhaustifying a sentence can have an effect on the (incremental) redundancy status of its constituents. As a consequence of this, *she is (pregnant)* is not redundant in the disjunctive sentence in (2a), provided the latter is exhaustified.

We explore two ways of implementing this solution. The first implementation is based on a definition of *incremental* redundancy, as proposed by Fox (2008, 2013), building on Schlenker 2008. As we discuss, this implementation also needs a constraint on the interaction between redundancy and exhaustification, independently proposed in Meyer 2013. Given these ingredients, we will show that, when exhaustified, sentences like (2a) are not (incrementally) redundant.

The second implementation is based on a theory of redundancy relying on local contexts. In particular, we make use of the theory of local contexts by Schlenker (2009). We will show that in Schlenker's 2009 approach local contexts can change depending on whether scalar implicatures are taken into account. In particular, while the local context of *she is (pregnant)* in (2a) without exhaustification is the global context intersected with the negation of the first disjunct, the local context of *she is (pregnant)* when (2a) is exhaustified is simply the global context. As a consequence, when (2a) is exhaustified, *she is (pregnant)* is not redundant in its local context and thus (2a) is correctly predicted to be acceptable. As we will discuss, this second implementation is not readily reproducible in a dynamic semantics approach, where local contexts are computed recursively on the syntactic structure of the sentence in question (Heim 1983, Beaver 2001; see also Chierchia 2009 for discussion). Therefore if this implementation is on the right track, it constitutes an argument for the incremental approach to local contexts by Schlenker (2009). More generally, redundancy could be taken as a testing ground for the two different approaches to local contexts mentioned, which are provably equivalent in the domain of presupposition projection (Schlenker 2007, 2009; see also Chierchia 2009).

The paper is organized as follows: Section 2 discusses the need for a theory of redundancy and the challenges for such a theory created by (2a).

(i) Either Mary isn't pregnant, or she is and she is happy.

Section 3 introduces our first proposal based on incrementality. Section 4 discusses the second implementation based on local contexts. Section 5 discusses issues and potential problems arising with both implementations related to embeddings, the effect of exhaustification, and the calculation of alternatives. It is shown that a more realistic view of the available alternatives creates certain non-trivial issues for the first account; issues that do not extend to the implementation based on local contexts. Section 6 concludes the paper.

2 A challenge for global and incremental theories of redundancy

This section shows why a theory of redundancy is necessary. It first discusses a natural way of implementing such a theory by checking redundancy at the global level only. After this some well-known reasons for modifying the global approach are introduced. As a first step leading to the solution we propose below, we consider an incrementalized version of the global approach.

2.1 A global theory of redundancy

Considering the difference in acceptability between (3a) and (3b), both repeated from (1), one is led to conclude that the material *and she is pregnant* is somehow redundant and that this is the reason why (3a) is degraded relative to (3b). In other words, a theory of redundancy blocking (3a) appears necessary.

(3) a. #Mary is expecting a daughter and she is pregnant.
    b. Mary is expecting a daughter.

Following Stalnaker 1979 but extending his proposal in crucial ways, Meyer 2013 and Katzir & Singh (2014), among others, develop a theory of non-redundancy based on the condition in (4).[3] The intuition behind such a proposal is that less complex utterances are to be preferred over equivalent but more complex competitors because the former are more economical than

3 We thank Raj Singh (p.c.) for suggesting the specific formulation in (4). Meyer (2013) calls this condition BREVITY, discusses its problems and proposes a more elaborate version, EFFICIENCY, based on Katzir's (2007) notion of structural complexity and a constraint which disallows disregarding covert operators. We will stick to BREVITY for now — but see below for a discussion of how moving to EFFICIENCY is necessary for the first solution we propose to the puzzle raised by cases like (2a).

the latter. More concretely, (3b) is a simplification of (3a) given (4b). Moreover (3a) and (3b) are equivalent. Therefore, by (4a), (3a) is blocked by (3b). Given that such an analysis only makes reference to the global meanings of two potential utterances we refer to this approach as the *global redundancy account*.[4]

(4) **Global non-redundancy condition**

a. ϕ cannot be used in context c if ϕ is contextually equivalent to ψ, and ψ is a simplification of ϕ.

b. ψ is a simplification of ϕ if ψ can be derived from ϕ by replacing nodes in ϕ with their subconstituents.

Such a theory immediately extends to the data in (5) and (6). In both (5a) and (6a) *and she is (pregnant)* is obviously redundant because the competitor sentences in (5b) and (6b) are equivalent and structurally less complex, respectively.

(5) a. #Mary is pregnant, and she is and she is expecting a daughter.
b. Mary is pregnant, and she is expecting a daughter.

(6) a. #If Mary is pregnant, then she is and she is expecting a daughter.
b. If Mary is pregnant, then she is expecting a daughter.

A global redundancy account is therefore quite successful. We believe, however, that there are reasons for assuming an alternative approach to redundancy sensitive to incrementality, which we discuss in the following.

2.2 An incrementalized theory of redundancy

Consider the contrast between (7a), repeated from (3a), and (7b): the difference in acceptability shows that the theory of redundancy we are after has to be sensitive to order somehow (Horn 1972, van der Sandt 1992, among others). This fact, however, is problematic for the global redundancy account. According to this account, (7b) should be blocked for the same reasons as (7a)

4 Where for our purposes, contextual equivalence can be defined as in (i) (from Singh 2011):

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

is. In both cases, the potential competitor assertion is (7c). As both (7a) and (7b) are equivalent to and moreover more complex than (7c), they should be equally degraded. But only (7a) is. In other words, complexity and equivalence do not appear to be sufficient reasons for deciding whether some material in a sentence is redundant and the sentence therefore is degraded. Rather some way of introducing asymmetry between the conjuncts in (7a) appears to be necessary in order to distinguish it from (7b).[5]

(7) a. #Mary is expecting a daughter, and she is pregnant.
b. Mary is pregnant, and she is expecting a daughter.
c. Mary is expecting a daughter.

Fox (2008), building on Schlenker 2008, suggests that the relevant notion of redundancy should be an incremental one, where redundancy is evaluated while the sentence is parsed following linear order. Incremental redundancy is based on global redundancy. So we first need to define what it means for part of a sentence to be globally redundant:

(8) **Global redundancy**
a. ψ is globally redundant in ϕ given a context c if ϕ is contextually equivalent to ϕ', where ϕ' is a simplification of ϕ without ψ.

5 Katzir & Singh (2014) discuss cases similar to (7b) and argue that the asymmetry might instead be due to two extraneous sources. First, in cases like (7b) it would be due to the fact that one of the conjuncts satisfies the presupposition of the other (i.e., *Mary is expecting a daughter* plausibly presupposes that she is pregnant) and it is presupposition projection, rather than redundancy, that would work in an asymmetric fashion. Second, in other cases, the asymmetry might be related to a reanalysis of the verbs involved in the sentence. The contrast, however, remains also in cases where it is unclear that any presupposition is involved and the verb is the same in the two conjuncts.

(i) a. #Jack is a syntactician and he is a linguist, (therefore he is the right person to hire).
b. Jack is a linguist and he is a syntactician, (therefore he is the right person to hire).

Katzir & Singh (2014) also present some cases in which the asymmetry is absent. While (iia) is expected to be degraded, (iib) is not predicted to be so by the asymmetric approaches to redundancy we will adopt below. We leave this case as an open problem for now.

(ii) a. #John lives in Paris and in France.
b. #John lives in France and in Paris. (Katzir & Singh 2014: (22))

b. ψ is a simplification of ϕ if ψ can be derived from ϕ by replacing nodes in ϕ with their subconstituents.

From (8), we can now define a notion of incremental redundancy following Fox 2008. The idea is that as we process the sentence from left to right we can evaluate whether a constituent is contributing to the meaning of the sentence, regardless of what comes after that constituent. One way of implementing this is to quantify over all possible continuations at each point in a sentence (Schlenker 2007, 2008):

(9) **Incremental redundancy**

a. ψ is incrementally redundant in ϕ given a context c if it is globally redundant in all ϕ', where ϕ' is a possible continuation of ϕ at point ψ.

b. ϕ' is a possible continuation of ϕ at point ψ iff it is like ϕ in its structure and number of constituents, but the constituents pronounced after ψ are possibly different.

Given the notion defined in (9), we are now in position to define an incremental non-redundancy condition.

(10) **Incremental non-redundancy condition**: ϕ cannot be used in context c if any part ψ of ϕ is incrementally redundant in ϕ given c.

This incrementalized version of the global redundancy condition can account for the data in (7) above. First notice that the global condition and the incremental condition both predict (7a) to be deviant. We already know from above that the second conjunct is globally redundant given the existence of the equivalent simplification in (7c). The second conjunct is also incrementally redundant for the simple reason that it is the last constituent in the sentence linearly speaking, and therefore no possible continuations need to be considered when evaluating redundancy. If a final constituent is globally redundant, it is always incrementally redundant as well.

The theories, however, diverge on (7b): while the global condition predicts (7b) to be as bad as (7a), the incremental condition does not. The reason is that while the first conjunct is globally redundant given the existence of the equivalent simplification in (7c) again, it is not incrementally so. That is, upon its evaluation there are possible continuations that do not make it globally redundant. (11a), for instance, would be such a case because it is equivalent to neither of its simplifications in (11b) and (11c). The possibility of continuations like that in (11a) prevents the first conjunct in (7b) from becoming incrementally redundant and the sentence from becoming non-assertable.

(11) a. Mary is pregnant and she is happy.
b. Mary is pregnant.
c. Mary is happy.

In sum, the incremental redundancy approach improves over the global one on data like (7a) versus (7b). In the next section, we move on to illustrate a problem for both the global and the incremental approach to redundancy.

2.3 A general problem for theories of redundancy

Both the global and the incremental redundancy approach face problems with disjunctive sentences like (12a), repeated from (2a), in that they predict that the example should be deviant, contrary to intuitions.

(12) a. Either Mary isn't pregnant, or she is and it doesn't show.
b. Either Mary isn't pregnant, or it doesn't show.

Notice that (12a) and (12b) are truth-conditionally equivalent. Schematically, it holds in the general case that for any p and q, $p \vee q$ and $p \vee (\neg p \wedge q)$ are equivalent. The global redundancy condition therefore incorrectly predicts (12a) to be infelicitous, as the less complex competitor (12b) should be preferred over it.

The incremental redundancy condition does not fare better here. As it is easy to verify, the *she is (pregnant)* part is incrementally redundant, because it is globally redundant no matter what constituent it is followed by. Consider (13a), for instance: in parallel to (12a), *she is (pregnant)* here is globally redundant as (13a) is equivalent to its simplification in (13b). Thus also the incremental redundancy condition wrongly predicts (12a) to be non-assertable.

(13) a. Either Mary isn't pregnant, or she is and she is happy.
b. Either Mary isn't pregnant, or she is happy.

The acceptability of (12a) therefore constitutes a general problem for theories of redundancy. Both the global and the incremental redundancy conditions incorrectly predict it to be degraded.[6]

Notice that any solution to the puzzle raised by (12a) should not affect the existing explanations for the degradedness of the conditional in (14a) and the conjunction in (15a). For both (14a) and (15a) we saw above that the global redundancy condition and therefore also the incrementalized version thereof predicts them to be degraded, a result that we want to maintain.

(14) a. #If Mary is pregnant, then she is and it doesn't show.
b. If Mary is pregnant, it doesn't show.

(15) a. #Mary is pregnant, and she is and it doesn't show.
b. Mary is pregnant, and it doesn't show.

Before going on, let us briefly discuss two proposed solutions to the problem above by Chierchia (2009) and Katzir & Singh (2014). We think they are problematic precisely because they do not account for the contrast between the disjunction case, on the one hand, and the conditional and conjunction cases on the other.[7]

Chierchia 2009 is a theory of redundancy making use of the notion of local contexts, like the one we will explore in Section 4. Chierchia, however, modifies the non-redundancy condition, so that it operates at an intermediate level rather than a local level: the level of binary operators, sometimes called the *molecular* level.[8] The definition in (16) is rephrased from (29) in Chierchia 2009.

(16) **Chierchia's non-redundancy condition**
For any ϕ, ψ, binary operator O, and context $c : c[\phi] \neq c[O(\phi)(\psi)]$.

6 Notice that (ia) and (ib) with a conditional rather than a conjunction in the second disjunct constitute an analogous problematic pair. Given that their discussion would involve a discussion of the semantics of conditionals, we focus on the conjunction case in this paper.

(i) a. Either Mary isn't pregnant or if she is, it doesn't show.
b. Either Mary isn't pregnant, or it doesn't show.

7 We briefly discuss a third solution proposed by Meyer (2015) in Section 5.1.3.

8 Chierchia's account is a reaction to the first author's pointing out to him the crucial data discussed.

What (16) requires is that for any binary operator the update of the context with its first argument alone should not be equivalent to the update of the context with the operator applied to the first and the second argument. As the reader can verify, (16) does succeed in allowing cases like (12a). This is because (16) does not evaluate *she is (pregnant)* with respect to its local context, where it would be redundant, but rather compares its contribution to the local context to the contribution of the entire conjunction *she is (pregnant) and it doesn't show* to that same context. Given that these contributions are different, the sentence in (12a) is correctly predicted to be felicitous. While successful with (12a), Chierchia's (2009) analysis problematically predicts the conditional and the conjunction in (14a) and (15a) above not to be deviant, for the same reason that it predicts the disjunction case to be felicitous.

Katzir & Singh (2014) propose an account that is based on general dispreference for redundant material. Their condition in (17) applies at the local level banning a function and its arguments if the same information could be conveyed with one of the arguments alone in a given context (where $\Leftrightarrow_c$ indicates contextual equivalence, cf. footnote 4).

(17) **Katzir & Singh's non-redundancy condition**:
S is deviant if S contains γ and $[\![\gamma]\!] = [\![O(\alpha,\beta)]\!] \Leftrightarrow_c [\![\delta]\!]$, $\delta \in \{\alpha,\beta\}$

As the reader can verify, (17) correctly allows the disjunction case in (12a). However, while Katzir & Singh do not have problems with the conjunction case in (15a), which is blocked at the global level, the problem for them reemerges in (18). On their account, (18) is incorrectly predicted to be assertable in the same way as (19) given that neither at the global nor at the local level is there a constituent that is equivalent to some of its parts.[9]

(18) #Mary is beautiful and married, and she is pregnant and married.

(19) Mary is beautiful and married, and she is pregnant.

9 As they discuss, their account doesn't immediately block the conditional case in (14a) either. The reason for this is that neither the whole conditional is equivalent to its antecedent or its consequent, nor the embedded conjunction to any of its conjuncts. In response to this, they argue for a solution based on domain restriction and a treatment of conditionals as generalized quantifiers. We refer the reader to their work for the details of this proposal in connection to conditionals.

Summing up, Chierchia's (2009) and Katzir & Singh's (2014) proposals solve the problem of disjunction but they run into trouble with similar cases involving conditionals or conjunctions.

3 The first implementation: Incremental redundancy plus exhaustification

In this section, we show that the incremental redundancy condition predicts (20), repeated from above, to be assertable when exhaustified.[10] It will become clear that the crucial component of our explanation is the combination of incrementality and exhaustification.

(20) Either Mary isn't pregnant or she is and it doesn't show.

3.1 Exhaustification

In order to implement our proposal, we need a theory of scalar implicatures as these will play a crucial role. We adopt an exhaustification-based approach to scalar implicatures (Groenendijk & Stokhof 1984, van Rooij & Schulz 2004, Spector 2007, Fox 2007, Chierchia, Fox & Spector 2012 among others). In this approach, scalar implicatures are obtained through an exhaustification process, indicated as EXH. We assume that EXH has the meaning in (21): it applies to a proposition and affirms it, while negating a subset of its alternatives, the excludable alternatives, indicated as $\mathcal{E}xcl(p, \mathcal{A}lt(p))$.[11]

(21) $[\![\text{EXH}]\!](p)(w) = p(w) \wedge \forall q \in \mathcal{E}xcl(p, \mathcal{A}lt(p))[\neg q(w)]$

$\mathcal{E}xcl$ is defined in (22). We assume that it yields the following alternatives: first all the ones that can be consistently negated without contradicting the prejacent — that is, the proposition p. Second, the set does not include alternatives whose negation would together with the prejacent lead to the

10 We are grateful to Danny Fox (p.c.) who suggested to make use of exhaustification.

11 Notice that here and throughout for convenience we are speaking as if the function $\mathcal{A}lt$ was a function from propositions to sets of propositions. More precisely, however, it should be treated as a function from sentences to sets of propositions, as in (i); see Sauerland 2004 among others for discussion.

(i) $[\![\text{EXH } S]\!](w) = [\![S]\!](w) \wedge \forall q \in \mathcal{E}xcl([\![S]\!], \mathcal{A}lt(S))[\neg q(w)]$

automatic affirmation of another alternative (Sauerland 2004, Fox 2007; see also Gazdar 1979).[12]

(22) $\mathcal{E}xcl(p, P) = \{q \in P\colon\ p \nsubseteq q \wedge \neg\exists r[r \in P \wedge (p \wedge \neg q) \subseteq r]\}$

For the moment, we think of the relevant alternatives as those created by replacing Horn-alternatives with each other (Horn 1972). For instance, {*or*, *and*} and {*some*, *all*} form Horn-alternatives. A more accurate definition of alternative construction is given in Section 5.1.2 below.

Let us now go back to a variant of the disjunctive examples we used above:[13]

(23) Either Mary isn't pregnant, or she is and she is happy.

(24) Either Mary isn't pregnant, or she is happy.

The simple disjunction in (24) has the alternatives in (26). Exhaustification of the disjunctive proposition negates its stronger alternative with conjunction. The result of this is the exclusive interpretation in (26).

(25) $\mathcal{A}lt$(⟦Mary isn't pregnant or she is happy⟧) =
{⟦Mary isn't pregnant or she is happy⟧,
⟦Mary isn't pregnant and she is happy⟧}

(26) ⟦EXH [either Mary isn't pregnant or she is happy]⟧ =
⟦either Mary isn't pregnant or she is happy⟧ ∧
¬⟦Mary isn't pregnant and she is happy⟧

12 This is called *innocent exclusion* in Fox 2007. (22) in the text is not the final version of innocent exclusion used by Fox, but it is enough for our purposes. For discussion see Fox 2007.

13 We are not using the above examples, repeated in (i), anymore because the inclusive and exclusive readings do not differ in either of the examples. This is because the two disjuncts cannot be true together: it can't both be true that Mary is not pregnant and it doesn't show that she is pregnant. This is not the case for the example in (24), which allows us to discuss the effect of exhaustification.

(i) a. Either Mary isn't pregnant, or she is and it doesn't show.
b. Either Mary isn't pregnant, or it doesn't show.

Crucially, the alternatives to our case in (23), on the other hand, are as in (27).[14] Note that the presence of *she is (pregnant)* in the second disjunct renders the alternative with *and* in (27) extra strong, in fact contradictory (i.e., abstractly, it is of the form $\neg p \wedge (p \wedge q)$).

(27) $\mathcal{A}lt$(⟦Mary isn't pregnant or she is and she is happy⟧) =
{⟦Mary isn't pregnant or she is and she is happy⟧,
⟦Mary isn't pregnant and she is and she is happy⟧}

Consequently, the exhaustification as in (28) amounts to negating a contradiction. This does not have an effect on the basic meaning of (23), as a tautology is added to the plain meaning. In other words, exhaustification is vacuous in this case.

(28) ⟦EXH [either Mary isn't pregnant or she is and she is happy]⟧ =
⟦either Mary isn't pregnant or she is and she is happy⟧

3.2 Accounting for the data

We now show what happens with respect to (non-)redundancy if our crucial example, repeated once more in (29a), is exhaustified as in (30). In order for *she is (pregnant)* not to count as redundant under the incremental redundancy condition it must as a first step not be globally redundant. And note that exhaustification *per se* does not help because even under the parse in (30a), (29b) without EXH should count as a simplification, as in (30b). Since we have just seen that exhaustification in the case of (30a) is vacuous, the unexhaustifed (30b) would still be equivalent to it. From this it would follow that *she is (pregnant)* is still globally redundant.

(29) a. Either Mary isn't pregnant, or she is and she is happy.
b. Either Mary isn't pregnant, or she is happy.

(30) a. EXH [either Mary isn't pregnant or she is and she is happy]
b. [either Mary isn't pregnant or she is happy]

Moreover, it is easy to show that *she is (pregnant)* in (30a) is also incrementally redundant. That is, it is globally redundant for any of its possible

14 This is strictly speaking not correct. The conjunction embedded in the second disjunct itself introduces further alternatives so that the set of alternatives would actually be larger. We ignore this complication for the moment and return to discussion of it in Section 5.1.2.

continuations. For instance, if we replace the final constituent in (30a) with for instance the one in (31a), we find that *she is (pregnant)* is still globally redundant when compared to the equivalent simplification in (31b). Therefore (29a) is predicted to be non-assertable, even if exhaustified as in (30a).

(31) a. EXH [either Mary isn't pregnant or she is and it doesn't show]
b. [either Mary isn't pregnant or it doesn't show]

There is, however, a simple way of modifying the notion of global redundancy suggested by Meyer (2013), based on Katzir 2007, Fox & Katzir 2011, which allows exhaustification to become a solution here. The idea is essentially to disallow EXH to be deleted when constructing simplifications. For our purposes, we can express this as an extra clause of the definition of global redundancy in (8) as in the underlined part in (32).[15] The notion of incremental redundancy and the incremental non-redundancy condition from (9) and (10), respectively, above remain untouched by this move.

(32) **Global redundancy with Meyer's constraint**
a. ψ is globally redundant in ϕ given a context c if ϕ is contextually equivalent to ϕ', where ϕ' is a simplification of ϕ without ψ.
b. ψ is a simplification of ϕ if ψ can be derived from ϕ by replacing nodes in ϕ with their subconstituents,
without deleting any instance of EXH *present in* ϕ.

This means that (29b) analyzed as in (30b) without EXH is a legitimate simplification of (29a) only if the latter is not exhaustified either. If that is the case, (29b) blocks (29a) from being assertable as before. As soon as (29a) is exhaustified, however, its simplification must be exhaustified too according to (32b). That is, the competitors are as in (33). Now we know from the preceding section that these are not equivalent. In particular, while exhaustification is vacuous in (33a), it is not so in (33b). Therefore *she is (pregnant)* is not globally redundant and that entails that it is also not incrementally redundant. In other words, (29a) becomes assertable when exhaustified.

(33) a. EXH [either Mary isn't pregnant or she is and she is happy]
b. EXH [either Mary isn't pregnant or she is happy]

15 This modification of the global redundancy condition is what Meyer (2013) calls EFFICIENCY (see footnote 3 above). She motivates this on the basis of data related to Hurford's constraint (see Meyer 2013: 81-86 for discussion).

3.3 Another argument for incrementality

Since we have just seen that *she is (pregnant)* is not even globally redundant in (33a), one might wonder whether the global redundancy condition might not have sufficed for the data considered in this paper. That is, if we ignore the order-related effects discussed in Section 2.2, do we need incremental redundancy for accounting for the disjunction puzzle we are focusing on in this paper? As we will see now, we do need incremental redundancy even for explaining our case alone, as the global redundancy condition cannot account for the felicity of simple variants of our crucial example like (34).

(34) Either Mary isn't pregnant, or she is and she is expecting a daughter.

The crucial property of (34) is that in the second disjunct the second conjunct (*she is expecting a daughter*) entails the first one (*she is (pregnant)*). This makes it so that when we exhaustify (34) as in (35a), its exhaustified simplification in (35b) comes out as equivalent to it.

(35) a. EXH [Mary isn't pregnant or she is and she is expecting a daughter]
b. EXH [Mary isn't pregnant or she is expecting a daughter]

We know from before that the exhaustification of (35a) is vacuous. The exhaustification of (35b) is vacuous for the same reason: the conjunctive alternative of (35b) in (36) is contradictory and therefore its exclusion only adds a tautological meaning to the literal meaning of (35b). Therefore the two sentences are equivalent and, as a consequence, (34) should not be assertable under the global redundancy condition.

(36) Mary isn't pregnant and she is expecting a daughter.

The incremental redundancy condition, on the other hand, can account for the assertability of (34) if it is exhaustified as in (35a). This is because *she is (pregnant)* is not incrementally redundant. That is, it is not true that for any possible way of continuing the sentence after *she is (pregnant)* in (35a), *she is (pregnant)* is going to end up globally redundant. Indeed, the problematic disjunction we started our discussion with constitutes a case in which it is not globally redundant provided the sentence is exhaustified, as in (37).

(37) EXH [either Mary isn't pregnant or she is and she is happy]

In sum, the incremental redundancy condition proposed by Fox (2008), together with exhaustification and Meyer's (2013) constraint on deletion of EXH, can account for all variants of the puzzling disjunctive data discussed. This implementation is based on a theory of redundancy which doesn't make use of a notion of local context. In the next section, we consider, instead, an alternative implementation based on local contexts. As we will show, within this approach, not all ways of implementing local contexts will do. In Section 5.1.3 we will briefly compare the two solutions proposed and point to an advantage of the implementation based on local contexts.

4 The second implementation: Local contexts plus exhaustification

4.1 Local contexts and redundancy

Stalnaker's original intuition regarding redundancy was that a sentence is redundant and thus non-assertable if the context entails it. This principle allows a straightforward account of the oddness of (38) in the indicated context (adapted from Schlenker 2008). The context already entails the information that Mary is pregnant, so the sentence in (38) does not add anything to it. It is redundant and thus non-assertable.

(38) *Context: Mary just announced she is expecting a daughter.*
Her husband adds:
#She is pregnant.

The contrast between (39a) and (39b), repeated from (7) above, could also be accounted for provided that Stalnaker's non-redundancy condition is relativized to local contexts, as in (40) (Singh 2007, Fox 2008, Schlenker 2008, 2009, Chierchia 2009 among others). We will refer to an analysis based on (40) as a *local redundancy account*.

(39) a. #Mary is expecting a daughter, and she is pregnant.
b. Mary is pregnant, and she is expecting a daughter.

(40) **Local non-redundancy condition**
ϕ cannot be used in context c if there is any part ψ of ϕ such that the local context of ψ entails ψ.

For the sake of presentation we will make use of the notion of Context Change Potentials (CCPs) from the dynamic framework for the moment, as they transparently express local contexts. Following Karttunen 1974, Heim 1983, Beaver 2001, Schlenker 2009 among others, the local context for the second conjunct of a conjunction is the initial context c intersected with the first conjunct. Following Heim 1983 in particular, the CCP of a conjunction encoding in which order the parts of the conjunction get added to the context c has to be stated as in (41), where $c[\phi]$ stands for those worlds in c in which ϕ is true, i.e., $\{w \in c : \phi(w) = 1\}$ (provided that ϕ is defined in c).

(41) $c[\phi \text{ and } \psi] = c[\phi][\psi]$

Given (41), there is now a difference between the second conjuncts of (39a) and (39b) with respect to whether they add information to their respective local contexts. In the former case the local context of the second conjunct entails that Mary is pregnant. Therefore the second conjunct is redundant in its local context, and the sentence is non-assertable given (40). In the case of (39b), on the other hand, the local context of the second conjunct does not entail that Mary is expecting a daughter. As such the second conjunct is not redundant, and (39b) is predicted to be acceptable.

Notice that the contrast just discussed is also found at embedded levels as in (42) (adapted from Singh 2007). While the two sentences provide the same semantic information at the global level, only (42a) is degraded.[16] The asymmetry between the conjuncts introduced by (41) together with the local non-redundancy condition (40) accounts for the difference in acceptability.

(42) a. #Every woman who is expecting a daughter and is pregnant will get a tax discount.
b. Every woman who is pregnant and expecting a daughter will get a tax discount.

Given that the works cited above argue that the local context for the consequent of a conditional is the initial context c intersected with the antecedent as in (43), the account just presented immediately extends to the acceptability contrast found in the conditionals in (44).[17]

16 Note that given the observed asymmetry at the embedded level only the incremental redundancy condition but not the global one could account for these data.

17 The CCP in (43) mirrors the truth-conditions of material implication. That is, the update of a context c with a conditional *if* ϕ *then* ψ leaves in c only those worlds in which it is not true that ϕ holds and ψ doesn't. This semantics of conditionals has been argued by many to be inadequate. Notice, however, that nothing would change with respect to the conclusions drawn in the text if we were to adopt a more sophisticated semantics for conditionals. Given

(43) $c[\text{if } \phi \text{ then } \psi] = c - (c[\phi] - c[\phi][\psi])$

(44) a. #If Mary is expecting a daughter, she is pregnant.
b. If Mary is pregnant, she is expecting a daughter.

The local redundancy account coupled with the CCPs in (41) and (43) also accounts for the contrasts in (45) and (46), repeated from above. In both (45a) and (46a) *she is (pregnant)* is redundant because the local contexts entail that Mary is pregnant.

(45) a. #Mary is pregnant, and she is and she is expecting a daughter.
b. Mary is pregnant, and she is expecting a daughter.

(46) a. #If Mary is pregnant, then she is and she is expecting a daughter.
b. If Mary is pregnant, then she is expecting a daughter.

Summing up, by extending Stalnaker's (1979) constraint on speech acts to the local level in the way of the local non-redundancy condition we obtain a general theory of redundancy. With this in mind, let us now turn to the problematic disjunctive data.

4.2 The local contexts of disjunction

Is (47), repeated from above, predicted to be degraded because of redundancy under the view just outlined? In order to know whether *she is (pregnant)* counts as redundant one needs to know what the local context of the second disjunct is.

(47) Either Mary isn't pregnant, or she is and she is happy.

Beaver 2001 and Schlenker 2009 among others argue that the local context of the second disjunct of a disjunction is the global context c updated with the negation of the first disjunct. In other words, the CCP for disjunction is as in (48).

(48) $c[\phi \text{ or } \psi] = c[\phi] \cup (c - [\phi])[\psi]$

By (48), (47) is predicted to be deviant by the local redundancy account, too. The reason is that the local context for the second disjunct, *she is (pregnant)*

that the conditional in (44a) is true if the antecedent is true, the consequent is redundant in all semantics of conditionals that we are aware of (see von Fintel 2012 for a discussion of the different options in the literature).

and she is happy in (47) entails that Mary is pregnant due to the negation of *Mary isn't pregnant*. Given the standard assumption that the local context of the first conjunct of a conjunction is the same as the context of the whole conjunction (cf. (41)), the local context of the first conjunct *she is (pregnant)* would also entail that Mary is pregnant. As a result, *she is (pregnant)* should be redundant and (47) degraded.

That $\neg p$ is entailed by the local context of q in $p \vee q$ has been argued for on the basis of presupposition projection. For instance, for the presupposition triggered by *stopped* in (49) that Mary used to smoke to be satisfied, the negation of the first disjunct must be true (Gazdar 1979, Roberts 1989, Schlenker 2009). That is, a disjunction $p \vee q$, where q has a presupposition r, presupposes the conditional statement $\neg p \rightarrow r$.[18]

(49) Either Mary never smoked, or she stopped.

This hypothesis on the local context of the second disjunct of a disjunction is further supported by recent predictive accounts of local contexts. Such accounts all predict that the second disjunct of a disjunction entails the negation of the first (Schlenker 2009, Rothschild 2011 among others).

Geurts 1996, however, argues that the local context for both disjuncts in $p \vee q$ should be the global context c. Crucially, according to him, the one for q does not include $\neg p$. In other words, Geurts assumes a CCP for disjunction as in (50) (see also Simons 2000). This would have the immediate consequence that when we evaluate whether *she is (pregnant)* in (47) is redundant, the first disjunct becomes immaterial. As a result *she is (pregnant)* is not predicted to be redundant.

(50) $c[\phi \text{ or } \psi] = c[\phi] \cup c[\psi]$

For the presuppositional case in (49), Geurts suggests that the presupposition of the second disjunct is locally accommodated. That is, the local context for *she stopped (smoking)* is c intersected with the set of worlds where Mary used to smoke so that the appropriate paraphrase for (49) would be *Either*

18 Disjunction might in fact be symmetric with respect to local contexts. This is supported by the fact that (i) appears to have exactly the same properties with respect to presupposition projection as (49). We will briefly return to this issue in Section 5.4.

(i) Either Mary stopped smoking, or she never smoked in the first place.

Mary never smoked or she did smoke and stopped.[19] In sum, Geurts' analysis complemented with a theory of local accommodation can account for (49). This approach has, however, problems with other cases. In the following, we illustrate one.[20]

Consider a sentence like (51), which is felicitous out of the blue and intuitively presuppositionless.

(51) Either John doesn't smoke, or Mary does too.

As discussed, in Geurts's (1996) account this would be explained by the assumption that the presupposition of *too* is locally accommodated in the second disjunct. However, as is well-known in the literature, the presupposition of *too* is very hard if not impossible to locally accommodate (Abusch 2002, Simons 2001, Romoli 2012, Klinedinst 2012, Chemla & Schlenker 2012). Chemla & Schlenker (2012), building on Klinedinst (2012), for instance, observe the contrast between a case like (52) and cases like (53).

(52) Teacher: Johnny claims that you gave him a black eye. Is this true?
Bill: I don't know, #but if I gave Susie a black eye too, they'll be twins.

(53) Teacher: Johnny claims that Mary participated in the Marathon. Is this true?
Bill: I don't know, but if she won, we should celebrate with her.

In both cases Bill is explicitly saying that he is ignorant about the presupposition of the sentence within the antecedent of the uttered conditional. So the only option to rescue these sentences is by local accommodation of the presupposition within the antecedent. However, while this is easily done in the case of *win*, it appears very hard in that of *too*. In other words, while (53) can be read as *I don't know but if (she participated and) she won, we should celebrate with her*, (52) does not appear to have a reading similar to *If (I gave Johnny a black eye and) I gave Susie a black eye, they'll be twins.*

19 It remains to be explained why the presupposition cannot be globally accommodated, where the sentence would have the unattested meaning paraphrasable as *Mary used to smoke, and either she never smoked or she stopped*. There is a natural reason blocking global accommodation in this case, though. As is clear from the paraphrase, global accommodation would conflict with the felicity condition of disjunctions requiring the disjuncts not to be settled in the context (Gazdar 1979; see also Heim 1992 and Schlenker 2008).

20 For other arguments in favour of the local context proposed by Beaver/Schlenker see Schlenker 2008: p.187-188.

The question for an advocate of Geurts's (1996) approach then is why local accommodation with *too* would go nice and smoothly in (51) but not in (52)? Notice that, as Chemla & Schlenker (2012) discuss, the anaphoric component of *too* is satisfied in both (51) and (52). In other words, the explanation for the felicity of (51) cannot be that the presence of *John* in the first disjunct allows for *too* to be anaphoric to it, which in turn allows local accommodation of *John used to smoke* in the second disjunct so that the presupposition is satisfied. The same should be possible in (52), contrary to fact. In other words, Geurts's (1996) account does not predict the difference in felicity between (51) and (52).

Notice that, on the other hand, under an analysis where the local context of the second disjunct includes the negation of the first one the acceptability of (51) is straightforwardly predicted: the local context entails that a salient individual in the context different from Mary smokes and this satisfies the presupposition, with no need for local accommodation.

The predicament we find ourselves in is the following: on the one hand, the data presented in this paper appear to support Geurts's (1996) view that the local context for q in a disjunction $p \vee q$ is the global context without any contribution by p, because only then the local non-redundancy condition would not be violated. On the other hand, for the reasons just discussed there appears to be evidence for Beaver's (2001) and Schlenker's (2009) views that the local context of q is indeed the local context enriched with the negation of p. The latter view, however, creates the problem that our crucial data should be non-assertable given the local non-redundancy condition. It would be ideal, therefore, if these views could be reconciled somehow.

One could at this point assume a lexical ambiguity: that is, one could assume that *or* would have both the lexical entry proposed by Geurts, and the one argued for by Beaver, Schlenker, and others. Moreover, for this move not to be *ad hoc* for the problem above, one might try to align this ambiguity with the inclusive-exclusive distinction in the interpretation of disjunction. In other words, one could associate one of these lexical entries with the exclusive interpretation of disjunction and the other one with the inclusive interpretation.[21] We think that there is something to this idea, but we do not think that lexical ambiguity is the right way to go. The reason is that there are various arguments in the literature against a lexical ambiguity account of the exclusive versus inclusive distinction. An account based on scalar implicature is empirically more adequate than a lexical ambiguity account

21 Thanks to an anonymous reviewer for discussion on this point.

(see Sauerland 2012 and references therein for discussion).[22] In the following, we will suggest something similar to aligning one local context of disjunction with the exclusive interpretation of *or* and the other with the inclusive one. However, we will argue for a structural ambiguity analysis of the inclusive-exclusive distinction by adopting the exhaustification-based view of this distinction discussed in section 3, which will avoid the problems for the lexical ambiguity approach. We show that Schlenker's (2009) view of local contexts together with the local non-redundancy condition just introduced makes exactly the right predictions for the problematic disjunctions.

Before moving on to Schlenker's (2009) system, however, let us discuss briefly how simply adopting exhaustification within a dynamic system, does not provide a solution to the disjunctive problem we are focusing on here. In particular, the obstacle we see is the following. In a dynamic approach, local contexts are determined by the CCPs assumed for lexical items together with the syntactic structure of the sentence. In the case at hand, the local context of the second disjunct of a disjunction embedded in some more complex structure is going to be determined by the way disjunction combines with its propositional arguments before it combines with anything else. More specifically, the meaning of an exhaustified disjunctive sentence of the form [EXH [A or B]] is determined by its components EXH and [A or B]. Therefore, we need to have a meaning for [A or B], independently from EXH. As shown above, there are reasons for assuming a CCP for disjunction like (54). And, as we know, (54) together with the local non-redundancy condition incorrectly rules out our sentence (55), without exhaustification.

22 For instance, Spector (2009) points out a problem for the lexical ambiguity account having to do with cases of ellipsis. Ellipsis being subject to a parallelism constraint would lead us to expect that disjunction in (i) is interpreted in the same way in both VPs, but it is not. The salient interpretation of (i) is that Jack solved either problem 1 or problem 2 but not both, whereas Mary did not solve any of the problems. That is, in the first case disjunction is interpreted exclusively, and in the second one inclusively. This is unexpected under the lexical ambiguity view, but follows directly in a scalar implicature based account where negation would disallow the exclusive reading in the second case. In the first, however, the exclusive interpretation would not be blocked given that negation is absent.

(i) Jack solved either problem 1 or problem 2, but Mary didn't.

As a consequence, specifying one CCP for *or* modeled on the inclusive interpretation and another one modeled on the exclusive interpretation would not be in accordance with the facts about the inclusive-exclusive distinction.

(54) $c[\phi \text{ or } \psi] = c[\phi] \cup (c - \phi)[\psi]$

(55) Either Mary isn't pregnant, or she is and she is happy.

Would exhaustification help rescue (55)? It is not clear to us how it could. The problem is that when EXH combines with its prejacent, redundancy will arise given the CCP of the latter. This is because EXH is defined as to assert its prejacent. Consider a natural way of defining a dynamic version of EXH:

(56) $c[\text{EXH}(\phi)] = c[\phi] \cap (c - \bigcup \mathcal{E}xcl(\phi, \mathcal{A}lt(\phi)))$

Once we have a CCP for EXH like (56) and apply it together with the CCP for disjunction in (54) to a sentence like (55), we run into redundancy again. More specifically, redundancy arises in the part corresponding to the prejacent. The computation in (57) shows that ϕ ends up being redundant in its local context, $c -$ *not* ϕ (= $c[\phi]$). We know that the exhaustification on the right hand side is vacuous. But on the left hand side, which corresponds to the prejacent, we run into redundancy. This becomes particularly evident in the last line of (57).

(57) $c[\text{EXH}(\text{not } \phi \text{ or } (\phi \text{ and } \psi))] =$
$c[\text{not } \phi \text{ or } (\phi \text{ and } \psi)] \cap (c - \bigcup \mathcal{E}xcl(\text{not } \phi \text{ or } (\phi \text{ and } \psi), \mathcal{A}lt(\phi \text{ or } (\phi \text{ and } \psi)))) =$
$c[\text{not } \phi \text{ or } (\phi \text{ and } \psi)] \cap (c - \emptyset) =$
$c[\text{not } \phi] \cup (c - \text{not } \phi)[\phi \text{ and } \psi] =$
$c[\text{not } \phi] \cup (c[\phi])[\phi][\psi] = \ldots$

For this reason, as far as we can see, it is not obvious how to obtain a solution to our problem in a dynamic system based on Context Change Potentials. As we will see now, however, a solution is available in a static theory of local contexts like Schlenker's (2009) (see also Section 5.5).[23]

23 As discussed in footnote 22 there are good reasons for thinking that a lexical account of the exclusive-inclusive disjunction is not on the right track. But even if one were to push such an account, it should be noticed that there is nothing in the exclusivity of disjunction that would force one to adopt (i) over (ii) as the CCP for exclusive disjunction. Clearly, only (i) would avoid the problematic redundancy, however (thanks to an anonymous reviewer for discussion on this point).

(i) $c[\phi \text{ or}_{ex} \psi] = (c[\phi] \cup c[\psi]) - c(\phi \cap \psi)$

(ii) $c[\phi \text{ or}_{ex} \psi] = (c[\phi] \cup (c - \phi)[\psi]) - c(\phi \cap \psi)$

4.3 Local contexts in Schlenker's style

In Schlenker's (2009) system, local contexts arise from a pragmatic algorithm that operates incrementally on a sentence S. The procedure is based on the standard idea that when we interpret a sentence S in a given context (set) c we try to determine which worlds of c are compatible with the content of S — that is, the task in the end is to disregard any c-world that does not make S true. Schlenker assumes that this process is based on two ingredients: first, it proceeds left-to-right, whereby for any two subparts s and s' of S such that s precedes s', the compatibility of c-worlds with s is determined before that of s' is.[24] Second, the procedure is based on a minimal-effort principle: at any given point s of the sentence S, we limit our attention to those worlds for which the value of s can make a difference on the overall value of S, given everything else we have already seen in the incremental parsing of the sentence. The result is that we often evaluate s not with respect to the entire context c but with respect to a subset of it, call it c'. This c' is the local context of s.

More formally, the notion of local context is defined in (58), where $lc(c, d, a\_b)$ refers to the local context of an expression d in a given string adb uttered in context c.[25] The local context of d corresponds to exactly that set of worlds x in c that can affect the overall value of adb. That is, by interpreting d with respect to this restricted set of worlds x, the same outcome is ensured as when no such restriction applies. Given that evaluation with respect to a smaller set of worlds is more economical, one must restrict the context whenever possible. Moreover, this procedure neither looks at the actual content of d nor at what actually follows d. By quantifying over replacements of d, it is ensured that the notion of local context derived is general rather than specific to a particular construction at hand. By quantifying over grammatical endings — what is sometimes referred to as *good finals* — the left-right parsing asymmetry is built into the system.

(58) **Local context of** d **in** $adb = lc(c, d, a\_b) =$
the strongest element of $\{x\colon\ x$ is an object of the type specified by

24 Notice that Schlenker (2009) has also proposed a last-resort symmetrical strategy, in addition to the incremental one. In the case relevant for us both strategies make the same prediction. See Section 5.4 and also Rothschild 2011 for discussion.

25 Two things: first we are assuming for present purposes that the material d and d' can range over are only propositions. Second, the condition here has to be relativized to those cases in which a local context exists; see Schlenker 2009 for discussion.

d such that for any d' of the same type as d and every grammatical b' that can linearly follow d, $a[c' \,\&\, d']b' \Leftrightarrow_c ad'b'$, where x is the semantic value of c'}

To illustrate with an example, consider the conjunction in (59) uttered in some context c. The algorithm demands that we ask whether any worlds in c can be ignored when computing the value of (59) and thus whether (59) can be interpreted relative to a (proper) subset of c. Since the interpretation procedure proceeds incrementally, it follows that the first conjunct of (59) is processed first. As a consequence asking whether (59) can be interpreted relative to a subset of c is tantamount to asking whether the first conjunct can be interpreted relative to a subset of c. At this point, we do not know anything about the content of the sentence to follow. Therefore we cannot restrict c to a proper subset by leaving out some world w and interpret the first conjunct relative to that subset. If we did and it turned out that both conjuncts are true at w, it would follow that we excluded a world from c that might be relevant given that it would make (59) true. Thus we do not restrict c and determine that c is the local context for the first conjunct in (59).

(59) Mary is pregnant, and she is expecting a daughter.

At the point of interpretation of the second conjunct, things are different as the content of the first conjunct has been processed. Worlds in c making the first conjunct false make the whole (59) false, regardless of the value of the second conjunct. Therefore, we avoid evaluating the second conjunct in those worlds in c in which the first conjunct is false, i.e., we restrict c to that subset where the first conjunct is true — the local context of the second conjunct. More schematically, the local context of the first and second conjuncts of a conjunction of the form p and q are defined in (60) and (61).

(60) $lc(c, p, (\_ \; and \; q)) = c$

(61) $lc(c, q, (p \; and \; \_)) = c \cap [\![p]\!]$

Let us now turn to disjunction. Consider first (62) under the inclusive interpretation. Given that the local context is defined incrementally, *Mary isn't pregnant* has the same local context as the first conjunct in a conjunction, the initial context c.

(62) Mary isn't pregnant or she is happy.

What is the local context of the second disjunct instead? The first disjunct has been processed at this point. If it is true, the whole disjunction is true, and the hearer need not worry about the truth of the second disjunct at all. From this it follows that the truth of the second disjunct is only relevant in case the first disjunct is false. That is, the local context of *she is happy* in (62) corresponds to the intersection of the initial context c and the negation of the first disjunct, $c - [\![\text{Mary isn't pregnant}]\!]$ ($= c \cap [\![\text{Mary is pregnant}]\!]$). Could we leave out a world w in which Mary is pregnant from the local context — i.e., a world in which the negation of the first disjunct is true? No, because in that case, the value of the whole disjunction in w would depend on the value of the proposition that Mary is happy in w: if the latter is true, the whole disjunction would be true in w, otherwise it would be false. But then we cannot avoid considering w when evaluating the second disjunct. So we conclude that the local context for the second disjunct is exactly $c - [\![\text{Mary isn't pregnant}]\!]$. More schematically, the local contexts of a disjunction of the form *p or q* are defined as in (63) and (64).

(63) $lc(c, p, (\_\ or\ q)) = c$

(64) $lc(c, q, (p\ or\ \_)) = c - [\![p]\!]$

Since the local contexts for conjunction and disjunction correspond to the ones assumed in Sections 4.1 and 4.2, the predictions of the local non-redundancy condition discussed there carry over once one adopts Schlenker's view. In particular, the familiar (65) is predicted to be degraded contrary to fact.

(65) Either Mary isn't pregnant, or she is and she is happy.

To illustrate, consider the schematic version *not-p or (p and q)*: we know from above that the local context of the second disjunct *(p and q)* in some context c is as in (66).

(66) $lc(c, (p\ and\ q), not\text{-}p\ or\ \_) = c - [\![not\ p]\!]$

Moreover, we know that the local context of the first conjunct p of a conjunction of the form $(p\ and\ q)$ in some c is simply c:

(67) $lc(c, p, (\_\ and\ q)) = c$

From these two things together, it follows that the local context of p in *not-p or (p and q)* in a context c is:

(68) $lc(c, p, not\text{-}p$ or $(\_\ and\ q)) = c - [\![not\ p]\!] = c \cap [\![p]\!]$

And of course, for any p and c, $(c \cap [\![p]\!]) \subseteq [\![p]\!]$. Therefore we have that p is redundant in its local context and that a sentence like (65) is incorrectly blocked also in this approach. Given our solution for the acceptability of (65) based on the incremental redundancy condition, however, we should now ask whether exhaustification has an effect on the local context for the second disjunction. We will show in the next section that it indeed does. In particular, we show that exhaustification makes *she is (pregnant)* in (65) non-redundant in its local context.

4.4 Back to the problem

4.4.1 Exhaustification and local contexts of disjunction

Consider again the disjunction in (62), but this time exhaustified as in (69).

(69) EXH [Mary isn't pregnant or she is happy]

Let us now show that exhaustification does not affect the local context of the first disjunct, but modifies the one of the second disjunct so that it becomes simply the global context c. In order to facilitate discussion, let us make the interpretation of (69) a bit more concrete as in (70):

(70) $[\![$Mary isn't pregnant or she is happy$]\!] \wedge$
$\neg[\![$Mary isn't pregnant and she is happy$]\!]$

The question is again which worlds we can disregard when evaluating the second disjunct. In the case of (62) we could ignore worlds in which the first disjunct was true because those would have made the entire disjunction true anyway, regardless of the value of the second disjunct. (70), however, shows that if the first disjunct in (69) is true, (69) is not automatically true: it is true only if the second disjunct is false. In other words, given exhaustification, the value of the second disjunct is not only relevant in the case where the first disjunct is false, as before, but in addition also in the case where it is true. Thus the local context of *she is happy* in (69) must include both worlds where Mary is pregnant and where she is not. This, in turn, means that we cannot leave out any world w from c in which Mary is not pregnant. So we conclude that the local context for the second disjunct is exactly c, i.e., no further restriction is possible. More formally, the local context of p in a sentence of the form EXH(not-p or (p and q)) is as in (71).

(71) $lc(c, p, \text{EXH}(not\text{-}p\ or\ (\_\ and\ q))) = c$

To illustrate, consider that by definition, the local context of p is the strongest x such that for any c' denoting x such that for all p' of the same type as p and good finals d:

(72) $\text{EXH}(not\text{-}p\ or\ (c'\ \&\ p'\ d \Leftrightarrow_c \text{EXH}(not\text{-}p\ or\ (p'\ d$

For convenience, take the good final d to just be and $\top$)), where $\top$ is the tautology (plus the appropriate number of closing parentheses).

(73) $\text{EXH}(not\text{-}p\ or\ (c'\ \&\ p'\ and\ \top)) \Leftrightarrow_c \text{EXH}(not\text{-}p\ or\ (p'\ and\ \top))$

Now suppose, for contradiction, that we try to restrict the context expressed by c' by leaving out some world w. That is, some world w of c is not in $[\![c']\!]$. Assume further that p' is true in w. Then, we would have that p' and $\top$ is true in w but c' & p' and $\top$ is not true in w. But then it immediately follows that:

(74) $\text{EXH}(not\text{-}p\ or\ (c'\ \&\ p'\ and\ \top)) \not\Leftrightarrow_c \text{EXH}(not\text{-}p\ or\ (p'\ and\ \top))$

This is because for at least one world in c, if not-p is true, the right-hand side is false, as both disjuncts are true, whereas the left-hand side is true; and if not-p is false, the right-hand side is true and the left-hand side is false, as both disjuncts are false. Therefore the local context of p in EXH(not-p or (p and q)) uttered in some context c is indeed simply c. That is, no world w of c can be left out in considering p.

Before we turn to applying this result to the crucial puzzle, let us mention how this account does not run into trouble with cases like (75), which were problematic for theories like Geurts 1996, according to which the local context of the second disjunct is the global context. The specific problem was that the presupposition of *too* would not be satisfied that way. Also recall that we argued against local accommodation of that presupposition in the second disjunct.

(75) Either John doesn't smoke, or Mary does, too.

In Schlenker's (2009) account, (75) is clearly accounted for if no exhaustivity operator is present. In that case, the local context for the second disjunct includes the negation of the first one, and the presupposition is satisfied. But what about the parse with the exhaustivity operator present? If it were the preferred one, we would run into the same problem as Geurts 1996 because the local context for the second disjunct would become the global context and the presupposition of *too* would not be satisfied. It thus follows that the need to satisfy the presupposition of *too* necessitates the absence of the exhaustivity operator in (75). Since the sentence would have an undefined value otherwise, it is natural to assume that speakers parse (75) without exhaustivity operator. Note moreover that this does not affect the truth-conditions of the sentence. There is thus no reason for which (75) should be given the parsing with exhaustification.[26]

4.4.2 Exhaustification and non-redundancy

Having seen the effect of exhaustification on local contexts in Schlenker's system, we can show how the central problem in this paper can be addressed. (76), repeated from above, is not predicted to be deviant by the local non-redundancy condition anymore, provided it is exhaustified as in (77). This is so because the local context of the first conjunct in the second disjunct, *she is (pregnant)*, becomes the global context once an exhaustivity operator is present in the structure. More precisely, as seen above, the local context of the entire second disjunct becomes the global context and in turn, given the prediction of Schlenker's (2009) system for the first conjunct of a conjunction, the local context of the first conjunct is also the global context. As a consequence, *she is (pregnant)* is not redundant anymore.

(76) Either Mary isn't pregnant, or she is and it doesn't show.

(77) EXH [Mary isn't pregnant or she is and it doesn't show]

This proposal importantly does not over-generate with respect to simple disjunctions. That is, we do not predict that the degraded (78) should be acceptable when read exhaustively because it can have a reading in which *she is pregnant* is not locally redundant.

26 See Section 5.3 for discussion on how our proposal relates to economy constraints on the distribution of exhaustification.

(78) #Either Mary isn't expecting a daughter, or she is pregnant.

While exhaustification indeed would make *she is pregnant* non-redundant in its local context, there is another reason for the oddness of (78). It is a tautological sentence. To see this, consider the corresponding conditional in (79).[27] Thereby (78) is redundant in the global context, and thus it is blocked by the local non-redundancy condition at that level.

(79) #If Mary is expecting a daughter, she is pregnant.

The degraded status of (80) and (81), repeated from (14a) and (15a), also remains unaffected by the present proposal.

(80) #If Mary is pregnant, then she is and it doesn't show.

(81) #Mary is pregnant, and she is and it doesn't show.

Consider first the case of (80). Here we have to side with those in the literature that assume that conditionals do not have the same scalar alternatives as disjunctions.[28] As a consequence, unlike in the case of disjunction, exhaustification does not have an effect on the local context of the consequent of (80) and therefore (80) is predicted to be deviant, whether exhaustified or not.

(82) ⟦EXH [If Mary is pregnant, she is and it doesn't show]⟧ =
⟦If Mary is pregnant, she is and it doesn't show⟧

Parallel reasoning applies to the conjunctive case in (81). Even though *and* has *or* as a scalar alternative, exhaustification does not have an effect on (81). The reason is that in this case the alternative with *or* is already entailed by the assertion with *and*. Consequently it does not wind up being negated by exhaustification. Again this vacuity of exhaustification is already apparent once *and* has been parsed. So there is no effect on the local context of *she is (pregnant)*:

27 We are not claiming here that (78) and (79) are equivalent. We are only using the latter because we think it helps in illustrating the tautological status of the former.

28 In particular, we have to assume that conditional perfection of a conditional *if* p, q is not obtained via exhaustification of the conjunctive alternative $\neg p \wedge q$ of the corresponding disjunction $\neg p \vee q$ (see Franke 2011 for discussion). Notice that this is compatible with conditionals having different alternatives, for instance alternatives corresponding to the antecedent and the consequent (thanks to Raj Singh (p.c.) for pointing this out).

(83) $[\![$EXH [Mary is pregnant, and she is and it doesn't show]$]\!] =$
$[\![$Mary is pregnant, and she is and it doesn't show$]\!]$

In sum, by adopting Schlenker's theory of local contexts in addition to the local redundancy account, we can account for our disjunctive puzzle above. And this constitutes our second implementation of the proposed solution to the problem.

In the next section, we turn to discussing various issues related to the effect of exhaustification and assumptions about alternatives. Each of these cases is significant for both implementations discussed above.

5 Discussion

5.1 Semantic effects of exhaustification

In this section, we discuss the possible readings of our crucial sentence and a more realistic view of alternatives. In addition, in Section 5.1.3, we go back to a comparison between the two implementations proposed above and we identify a potential argument for the local context-based one.

5.1.1 Is exhaustification really vacuous?

Consider a variant of our crucial example in (84). In the preceding sections, we claimed that exhaustification in (84) is truth-conditionally vacuous. That is, (84) would be true in a world where Mary is not pregnant but happy in contrast to (85), where exhaustification does lead to the familiar exclusive interpretation.

(84) Either Mary isn't pregnant, or she is and she is happy.

(85) Either Mary isn't pregnant, or she is happy.

That disjunctions like (84) can indeed be true in situations verifying the inclusive interpretation of (85) can be shown as follows. The first part of the speaker's utterance in (86) asserts that it is possible that Sue did both of the readings. From the felicity of the disjunction we conclude that it can be true in such a situation.

(86) I don't know whether Sue did both of the readings assigned, but at least she did the first or she didn't do it but did the second.

(87) shows something similar. Catholic priests are not allowed to marry. Therefore the possibility that John both became a priest and got married is contextually prohibited. It must thus be possible for the disjunction to be true in a situation where both John became a priest and didn't get married.[29]

(87) *Context: Speaking about priests in the Catholic church.*
Either John became a priest or he didn't {and/ but} didn't get married.

Nevertheless intuition tells us that disjunctions like (84) can have a stronger interpretation, which is, in fact, arguably the preferred interpretation. It seems quite clear that they can license the bi-conditional inference in (88), which is equivalent to the exclusive interpretation of the simple disjunction (85).

(88) Mary is pregnant if and only if she is happy.

Recall that disjunctions like (84) depend on exhaustification because without it *she is (pregnant)* would be redundant. But then the fact in (88) appears to go against our claim from Section 3.1 that exhaustification of (84) is vacuous. The interpretation in (88) should not be available.

5.1.2 Looking closer at the alternatives

We will now show that the interpretation in (88) is also available in our proposal. For this to be seen clearly, however, it is necessary to look at the way alternatives are generated a bit more carefully than done so far. In the following, (89) will stay in schematically for (84).

(89) $\neg p \vee (p \wedge q)$

Sauerland (2004) assumes that a disjunctive sentence of the form in (90) has the alternatives in (91), that is the disjunction itself, the corresponding conjunction, and its disjuncts.[30]

(90) $p \vee q$

29 That (86) and (87) are acceptable is unexpected on Meyer's (2015) account who argues that cases like (84) can only be true in situations verifying the exclusive but not the inclusive interpretation of (85).

30 Sauerland 2004 shows that this assumption is necessary to deal with the scalar implicatures of certain embedded types of disjunctions noticed by Chierchia 2004. Fox 2007 adopts this view to deal with free-choice inferences of disjunctions embedded under existential modals.

(91) $\mathcal{A}lt(p \vee q) = \left\{ \ p \vee q, p, q, p \wedge q \ \right\}$

Furthermore, following Sauerland (2004) again, assume that scalar alternatives are obtained by an algorithm like (92), where scale-mates correspond to what we termed Horn-alternatives above, with one twist however: in order for (91) to be the set of relevant alternatives, it follows from (92) that the disjuncts p and q must count as scale-mates for disjunction. See Sauerland 2004 for discussion of this point.[31]

(92) **Sauerland's Algorithm**: the set $\mathcal{A}lt(p)$ contains all and only those alternatives that can be obtained from p by replacing one or more scalar items in p with their scale-mates.

Going back to the disjunctive case in (89), we can now see that if one simply computes all its possible permutations following the algorithm in (92) we obtain the set of alternatives in (93).

(93) $\mathcal{A}lt(\neg p \vee (p \wedge q)) = \left\{ \begin{array}{l} \neg p \vee (p \wedge q), \top, \bot, \neg p \vee q, \\ \neg p \wedge q, p \wedge q, p \vee q, \neg p, p, q \end{array} \right\}$

What is the set of excludable alternatives constructed from (93)? Remember that the set of excludable alternatives is defined as in (94), repeated from (22) above.

(94) $\mathcal{E}xcl(p, P) = \{q \in P : p \nsubseteq q \wedge \neg\exists r[r \in P \wedge (p \wedge \neg q) \subseteq r]\}$

As the reader can verify, the excludable alternatives of (93) are as in (95).

(95) $\mathcal{E}xcl((\neg p \vee (p \wedge q)), \mathcal{A}lt(\neg p \vee (p \wedge q))) = \left\{ \ \bot, \neg p \wedge q \ \right\}$

(95) includes $\neg p \wedge q$, the negation of which leads to the biconditional interpretation. But then there is a way to generate the exclusive interpretation for (89) after all. This has the consequence that our crucial example in (84), has to be read exclusively when it is exhaustified. That is, it gets the bi-conditional inference in (88).[32]

31 Note that in light of this last assumption a potentially more adequate way of establishing the correct set of alternatives might be Fox & Katzir's (2011) one (see also Katzir 2007).

32 It should be noted here that there are good independent reasons not to adopt an alternative construction algorithm as unconstrained as the one in (92) (Fox 2007, Magri 2009, Chemla 2008, Romoli 2012). What is crucial for us, though, is that the algorithm must also not be too constrained. In particular, Fox's 2007 one in (i) cannot be adopted as it is as it would block

5.1.3 Consequences of non-vacuous exhaustification

As we have just seen, exhaustification in (84) is not vacuous anymore, and as we have also seen this is a good result. But then the question is how we account for the fact that disjunctions parallel to (84) are assertable in contexts where the bi-conditional inference in (88) is absent, such as (96) repeated from above. Here crucially, it cannot be required that Mary did not do the first assignment only if she did the second one.

(96) I don't know whether Sue did both of the readings assigned, but at least she did the first or she didn't do it but did the second.

A simple answer to the issue presented by (96) is that in such cases the context (the linguistic context in (96) to be precise) blocks the crucial alternative necessary for generating the exclusive interpretation from being in the set of alternatives. In the case of (96) that crucial alternative would be $p \wedge q$ — i.e., the proposition that Sue did both readings. The speaker's ignorance assertion effectively amounts to the assertion that Sue might have done both readings. So it seems reasonable not to include the alternative in the relevant ones as this would have the consequence that exhaustification excludes it, which would defeat the first part of (96). For this to go through, it is necessary to assume that context can restrict the set of alternatives from the set of excludable ones before exhaustification takes place (cf. Rooth 1992, Fox & Katzir 2011 among others).

What are the consequences of all this for the two accounts of our crucial examples discussed in the preceding sections? Nothing really changes for the local non-redundancy account. Since exhaustification makes the global

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the proposition $\neg p \wedge q$, which is crucial for deriving the bi-conditional inference, from being in the set of excludable alternatives in (95) as the reader can check.

(i) **Fox's Algorithm**: for any p, $\mathcal{A}lt(p)$ is the smallest set, such that:

a. $p \in \mathcal{A}lt(p)$

b. If $q \in \mathcal{A}lt(p)$ and r can be derived from q by replacement of a single scalar item with one of its scale-mates, and q does not entail r, $r \in \mathcal{A}lt(p)$.

Rather what is needed for our purposes is a modification of (ib) where q *does not entail* r is replaced with q *does not asymmetrically entail* r (Magri 2009). Again, the reader can check that this does leave $\neg p \wedge q$ in the set of excludable alternatives as desired. For the sake of presentation, we will go on using the simpler algorithm stated in the text.

context also the local one for *she is (pregnant)*, it is made non-redundant and the sentence is assertable.

Things are, however, different for the incremental non-redundancy condition. Recall that under this account (84) is only assertable if no material is incrementally redundant, a prerequisite of which is that no material is globally redundant to begin with. Now, *she is (pregnant)* is not globally redundant if no simplification of the exhaustification of (84) — that is, (97a) — can be found that is equivalent to (97a). We have just seen that (97a) is equivalent to (88), which is in turn equivalent to (97b). But since (97b) is a simplification of (97a), it would follow that *she is (pregnant)* is globally and incrementally redundant. Therefore (84) should be non-assertable after all under the incremental non-redundancy condition.

(97) a. EXH [Mary isn't pregnant, or she is and she is happy]
b. EXH [Mary isn't pregnant, or she is happy]

There are two possible responses to consider in defense of the incremental non-redundancy condition at this point as far as we can see. First, one might change the alternative algorithm so that no bi-conditional interpretation is derived for (97a). This way, the solution along the lines of the incremental non-redundancy condition discussed would be left in tact. This would, however, mean that the observed bi-conditional interpretation must come about by some other means.

Alternatively or in addition to this first way of dealing with the issue, one might think that the bi-conditional interpretation is derived by embedded exhaustification (see Meyer 2015 for a proposal along these lines). In particular, for (98), it would mean having EXH embedded in the first disjunct.

(98) [EXH Mary isn't pregnant], or she is and she is happy

The problem that we see for an LF like (98), however, is that it would not straightforwardly derive the desired bi-conditional interpretation. What are the alternatives that EXH in (98) would negate?[33] The minimal set of alternatives to the first disjunct in (98) includes *Mary isn't pregnant* and *Mary isn't happy*. Only the latter will be excluded by EXH, which means that (98) would

33 Notice that, as Meyer (2015) discusses, this line of thinking works well if there is no negation in the first disjunct. With negation present, however, we do not see how this account could work.

be equivalent to (99), which is equivalent to saying that Mary is happy. This, however, is clearly not an attested interpretation of (98).

(99) Mary isn't pregnant and she is happy, or she is pregnant and she is happy.

It therefore seems to us that the local non-redundancy condition is better equipped to handle the bi-conditional interpretation of (84). We leave a more detailed comparison between the incremental non-redundancy account and the local context-based one for future research.

5.2 Extension to embeddings

One question at this point is what happens in cases in which the disjunction is embedded in a more complex sentence. Consider for instance the example in (100), which is again acceptable with or without the parts in parentheses.

(100) If Mary isn't pregnant or (she is and) she hides it, she can take the plane.

A simple extension of both strategies above is to allow exhaustification to happen also at embedded levels. One way to do this is in a grammatical approach to scalar implicatures, where EXH is conceived as an actual covert operator in the Logical Form of sentences, which can, therefore, quite naturally appear at embedded levels (see Magri 2011, Fox 2007, Chierchia, Fox & Spector 2012 and Sauerland 2012 among others). In the case of (100), in particular, we assume that EXH is embedded in the antecedent. As is easy to show both implementations above make the right predictions. As for the second implementation, in particular, the local context of the relevant part corresponds to the context of the entire embedded disjunction — that is, exhaustification has the same effect as discussed for our crucial examples but at an embedded level. As for the first implementation, it is easy to show that exhaustification would make it so that at the point of *she is*, *she is* is not incrementally redundant and thus the sentence below is not predicted to be infelicitous.

(101) If EXH [Mary isn't pregnant or she is and she hides it], she can take the plane

In sum, by allowing embedded exhaustification, we are able to extend both of the strategies above to cases like (100), where our disjunctive case appears embedded in a more complex sentence. And, conversely, if our proposal is on the right track, it can also be taken as an argument for the possibility of embedded exhaustification and approaches allowing it like the grammatical approach to scalar implicatures.

5.3 Economy considerations on exhaustification and assertability

Let us briefly discuss how our proposal relates to the fact that exhaustification is generally assumed to be constrained by economy conditions (Fox 2007, Chierchia, Fox & Spector 2012 among others).[34] For instance, Chierchia, Fox & Spector (2012) argue that EXH should not be inserted if it does not lead to a stronger meaning overall, a requirement we could formulate as in (102).

(102) Do not insert EXH in a sentence *S* if it leads to an equivalent or weaker meaning than *S* itself.

Conditions like (102), however, are also assumed to be overridden if exhaustification applies for independent reasons. In particular, exhaustification is generally assumed to be possible whenever it rescues the sentence from non-assertability. A case at hand are so-called *Hurford disjunctions* like (103), which are assumed to involve exhaustification as in (104) (see Section 5.4 below). Crucially, cases like (103) can also appear in downward entailing contexts like (105), which requires embedded exhaustification as in (106), in violation of (102). In cases like (106), the assumption is that (102) can be overridden by the necessity of rescuing the sentence from being non-assertable.

(103) John solved some of the problems or he solved them all.

(104) EXH [John solved some of the problems] or he solved them all

(105) If John solved some or all of the problems, he will pass the exam.

(106) If [EXH [John solved some of the problems]] or he solved them all, he will pass the exam

Similarly, we argue that EXH can always be inserted in cases like (107) or embedded cases like (100), regardless of whether it ends up strengthening

34 Thanks to Raj Singh (p.c.) and Daniel Rothschild (p.c.) for suggesting this discussion here.

the meaning or not. This is because it is justified by the fact that it rescues the sentence from violating the non-redundancy condition.

(107) EXH [either Mary isn't pregnant or she is and it doesn't show]

5.4 The problem of Hurford disjunctions

We have discussed two problems for the global redundancy condition, but we have not mentioned one potential motivation for it: so-called Hurford disjunctions (Hurford 1974, Singh 2008, Chierchia, Fox & Spector 2012), such as (108a) and (108b) (Meyer 2013, Katzir & Singh 2014). Here the disjuncts stand in an entailment relation to each other. One natural way to account for the degraded status of (108a) and (108b) is to appeal to the fact that they are equivalent to the structurally less complex (108c). Thus *she is expecting a daughter* is redundant, and by the global redundancy condition (108a) and (108b) are blocked.

(108) a. #Either Mary is pregnant, or she is expecting a daughter.
b. #Either Mary is expecting a daughter, or she is pregnant.
c. Mary is pregnant.

If we turn to our two proposals above, however, we can see that while they can account for the non-assertability of (108a), they both have problems in accounting for the non-assertability of (108b).

Consider the incremental implementation first. It is clear that it predicts (108a) to be deviant. When the second disjunct is evaluated, it is not followed by any other constituent. Therefore, *she is expecting a daughter* is both globally and incrementally redundant. On the other hand, the incremental condition incorrectly predicts (108b) to be assertable. The reason is that *Mary is expecting a daughter* as the first disjunct does have continuations, such as in (109), which render it globally informative. Therefore, it does not count as incrementally redundant in (108b).

(109) Either Mary is expecting a daughter, or she is not pregnant at all.

Consider now the second implementation based on local contexts. The proposal as it stands cannot even account for the deviance of (108a). The negation of the first disjunct in (108a) does not entail that Mary is expecting a daughter — in fact it entails the opposite as it states that she isn't pregnant at all. As discussed by Schlenker (2009), however, if we assume that sentences should not only add information to their local contexts but also be compatible with them, we can account for the deviancy of (108a) (see also Büring 2003). *She is expecting a daughter* is not redundant in its local context but rather contradicts it, a situation which is also to be ruled out. This, however, still leaves open why the symmetric version of (108a) in (108b) is also degraded. (108b) is not accounted for because this time *Mary is pregnant* does not contradict its local context (i.e. the global context updated with the negation that *Mary is expecting a daughter*).

This situation is therefore puzzling. On the one hand, we established that incrementality is called for to account for order effects and for our disjunction puzzle. That is, the incremental version is necessary to account for both the examples with conjunction in Section 2.2 and the disjunctions discussed in Section 3.3. The global redundancy condition, on the other hand, now appears to be necessary in the Hurford disjunction cases above. Here the incremental redundancy condition and the local context solution seem to make the wrong predictions.

One line to explore in response to this problem is to assume that disjunctions are symmetric when it comes to local contexts (see Schlenker 2009 and Rothschild 2011 and footnote 18 for discussion). What this would mean is considering a symmetric version of incrementality (maybe to be used as a last resort). For discussion on this option, see Schlenker 2008, 2009. We leave a more thorough investigation of Hurford's disjunctions within the incremental approach and the local redundancy approach for future research.[35] We turn now to a brief discussion of the consequences of our second solution for the way one thinks about local contexts.

5.5 Dynamic versus static

In the last few years, a debate has emerged in the literature on presuppositions between the traditional approach to presupposition projection based on dynamic semantics (Karttunen 1974, Heim 1983, Beaver 2001, Chierchia 2009) and more recent proposals (Schlenker 2008, 2009, Fox 2008, Chemla 2008, George 2008; see also Rothschild 2011 for a response from the dynamic perspective). The main point of contention is the claim that the dynamic approach is not explanatory and parsimonious enough when it comes to predicting the projection of presuppositions in a sentence from the meaning

35 Notice that the global account needs various further assumptions to account for these Hurford's cases; see Meyer 2013 for discussion.

of its parts (Schlenker 2008, 2009; see also Soames 1989, Heim 1990, 1992). Most of the new proposals abandon the notion of local context together with dynamicity. As we have seen, Schlenker (2009), instead, reconstructs this notion in his static system. While these two approaches to local contexts are provably equivalent in the domain of presupposition projection (Schlenker 2007, 2009), we have shown above that the account of redundancy in disjunction given in this paper can be taken to be an argument for Schlenker's system as a dynamic system based on Context Change Potentials cannot easily adopt the same solution (Section 4.2). In this section, we also want to show that the problem pointed out above with dynamic semantics is independent, as far as we can see, from the above mentioned explanatory problem.

To illustrate this point, it is instructive to briefly see how Schlenker's (2009) dynamic implementation of his incremental system deals with the problematic data with redundancy considered in the present paper. Schlenker shows that while in his system an incremental algorithm can be combined with a purely static semantics, there is no technical difficulty in using it to constrain the lexical entries of a dynamic semantics.[36] The latter, constrained in this way, would not run into trouble with the explanatory problem anymore. Then Schlenker goes on to say that the reason for not choosing the dynamic implementation would just be Occam's razor.[37] Essentially, what the dynamic implementation of Schlenker's system is doing is using the incremental algorithm for deciding among possible lexical entries for the CCP of unary and binary connectives. So for instance, disjunction would be defined as in (110).[38]

(110) $c[\phi \text{ or } \psi] \neq \#$ iff

a. $lc(c, \phi, (\_\ or\ \psi))$ doesn't entail ϕ and

b. $lc(c, \psi, (\phi\ or\ \_))$ doesn't entail ψ

if $\neq \#$, $c[\phi \text{ or } \psi] = \{w \in c : \phi(w)\} \cup \{w' \in c : \psi(w')\}$

Crucially, the local contexts here are computed via the incremental algorithm indicated above. Therefore in the case of (110) we would have the local context of ϕ as c and the local context of ψ as $c - \phi$. But then, for the same reason

36 For a different way of constraining dynamic semantics see Rothschild 2011. As far as we can see, all the points we make below with respect to Schlenker's system extend also to Rothschild's one.

37 Thanks to Kjell Johan Sæbø for discussion on this point.

38 Notice that for simplicity we are disregarding the conditions about presuppositions, which should also enter into the definition of the CCP.

as above our crucial disjunctive sentence is predicted to be degraded. This is because the local context of the second disjunct is computed compositionally at the level of the disjunction, so when the latter is combined with EXH, we have the same problem as before — i.e., EXH will assert the prejacent and this will lead to redundancy.

In sum, we think that the fact that Schlenker's dynamic system also has problems with the redundancy case discussed here is interesting for three reasons: first, it shows the independence between the explanatory problem for dynamic semantics and the problem arising with redundancy. Second, it shows that in order to solve the problem above, it is not enough to make dynamic semantics "incremental", so to speak, in the way Schlenker does. Third, the redundancy case might indeed be giving us a potential reason beyond parsimony to choose between the static and the dynamic versions of Schlenker's system, favouring the static version.

5.6 A potential problem: conjunction under negation

In this paper, we propose that a sentence like the by now familiar (111) is assertable because it is exhaustified. This was either because exhaustification would make the *she is (pregnant)* part not incrementally redundant (first solution), or because in this case in Schlenker's (2009) system, the local context of *she is (pregnant)* would not include the negation of the first disjunct but would simply be the global context (second solution).

(111) Either Mary isn't pregnant, or she is and it doesn't show.

For the same reason, however, we predict that we should be able to rescue (112), with the intended reading schematised in (113), by exhaustifying it.

(112) #It's not the case that Mary is expecting a daughter and she is pregnant.

(113) $\neg(p \wedge q)$

For concreteness, let us illustrate the problem using the second solution based on local contexts, it is easy to see that the problem extends to the first approach based on incremental redundancy. Consider the prediction of Schlenker (2009) for (113). (113) is equivalent to $\neg p \vee \neg q$. Therefore, if $\neg p$ is true, then the whole negated conjunction is predicted to be true. Consequently, in evaluating q we can restrict the context to p-worlds. This, in turn, means that the local context of q in (113) is the global context intersected with p.

In parallel to the disjunction case, however, if we exhaustify (113) as in (114) we cannot ignore $\neg p$-worlds anymore, when evaluating the second conjunct q. This is because if $\neg p$ is true the truth-value of the whole sentence will not automatically be true anymore, but rather it will depend on the truth-value of q: if q is false, the whole sentence will be false, but if q is true, the whole sentence will be true. As seen above, in Schlenker's (2009) system, this means that we have to consider now both p- and $\neg p$-worlds in evaluating q. In other words, in a negated conjunction, the local context of the second conjunct q is the global context.

(114) $\text{EXH}[\neg(p \wedge q)] \equiv \neg(p \wedge q) \wedge (p \vee q)$

In sum, we appear to have an incorrect prediction here: if (111) is rescued by exhaustification, we should be able to rescue (112) in the same way. The latter, however, is hopelessly unassertable.

There is, however, a crucial difference between (111) and (112): the exhaustification of the latter, but not the former, gives rise to a result that is in conflict with plausible pragmatic conditions on its assertability. To illustrate, consider what the alternatives of (113) are, when p entails q, as in the case in (112).

(115) $$\mathcal{A}lt(\neg(p \wedge q)) = \left\{ \begin{array}{l} \neg(p \wedge q) = \neg p \\ \neg p \\ \neg q \\ \neg(p \vee q) = \neg q \end{array} \right\} = \left\{ \begin{array}{l} \neg p \\ \neg q \end{array} \right\}$$

The problem is that only $\neg q$ is excludable. As a consequence the exhaustification of $\neg(p \wedge q)$ becomes $\neg p \wedge q$ assuming that p entails q. This, however, means that by hearing (112) we should conclude that Mary is pregnant (and that she isn't expecting a daughter). In other words, from a negated conjunction, we should conclude the falsity of one of its conjuncts and the truth of the other. There are good reasons to believe that this should be blocked independently. In particular, it is natural to think that a negated conjunction $\neg(p \wedge q)$ — like its corresponding disjunction $\neg p \vee \neg q$ — should not be assertable unless both $\neg p$ and $\neg q$ have a chance of being true (Gazdar 1979, Fox 2007 among many others for discussion). A condition like this, however, is enough to rule the assertion of (112) out. That is, it rules (112) out, when the latter is exhaustified. When (112) is not exhaustified, it is blocked by the local redundancy condition because the second conjunct is redundant in its local context. In other words, (112) is correctly predicted to have no way of being assertable.

6 Conclusion

The present paper discussed novel data which are problematic for assertability conditions based on redundancy (Stalnaker 1979, Fox 2008, Schlenker 2009, Singh 2007, Chierchia 2009, Meyer 2013, Katzir & Singh 2014, among others). The specific problem was constituted by disjunctions like *Either Mary isn't pregnant, or she is and it doesn't show*. The optional presence of *she is (pregnant)* is not predicted by non-redundancy conditions in the literature. In response to the puzzle, we have proposed a solution based on exhaustification and a notion of redundancy relying on incrementality. We have then explored two ways of implementing this solution. The first implementation is based on the notion of incremental redundancy by Fox (2008, 2013), which does not make use of local contexts. We showed that this approach, together with exhaustification and a constraint on the interaction between exhaustification and redundancy (Meyer 2013), can account for the disjunctive puzzle above. The second implementation is based on a theory of redundancy based on local contexts whereby a sentence is not assertable if any of its parts is redundant in its local context (Schlenker 2009 among many others). Moreover, crucially, we also showed that Schlenker's (2009) incremental theory of local contexts needs to be adopted. This way, exhaustifying the problematic sentence leads to a modification of the local context of *she is (pregnant)*, so that the latter is not locally redundant anymore.

We argued that both implementations of the solution improve over competing approaches to the current puzzle. But we also pointed out that the incremental approach might have problems in deriving the correct interpretations via exhaustification once a more realistic view of the set of available alternatives is adopted, problems which the account based on local contexts avoids. Since we also argued that the latter account crucially relies on Schlenker's approach to local contexts rather than the one of dynamic semantics — where local contexts are computed compositionally on the basis of syntactic structure — all of this together might entail that the solution to our crucial example provides evidence for Schlenker's view of local contexts.

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