On the Interpretation of Disjunction: Asymmetric, Incremental, and Eager for Inconsistency*

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The goal of this paper is to contribute to the proper characterization of a felicity condition on the use of disjunctive sentences. Hurford [16] discovered that disjunctions $\ulcorner X \vee Y \urcorner$ are infelicitous if their disjuncts stand in an entailment relation (eg. # *John was born in Paris or in France*). This condition, which we will refer to as 'Hurford's Constraint,' has since generated much discussion (eg. Gazdar [11], Simons [33], Singh [34], Chierchia, Fox, and Spector [3, 4], Katzir [19]). Chierchia, Fox, and Spector [4] (henceforth CFS) have used Hurford's Constraint to argue that implicatures must sometimes be generated in embedded positions, for if they weren't, sentences like *(A or B) or (Both A and B)* would be ruled out by the constraint. I will follow this line of reasoning in assuming that local implicatures can indeed rescue such disjunctions. However, I will argue that the constraint needs to be modified in two ways.

First, I provide evidence that the rescue strategy of local implicature generation is available only for earlier disjuncts, not for later ones (eg. # *(Both A and B) or (A or B)*). I will conclude from such data that the constraint is checked incrementally, in the left-right order of the disjuncts. Crucially, the incremental checking incorporates a timing principle whereby the constraint is checked *before* local implicatures have a chance to be generated.

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My second modification involves strengthening the constraint to rule out not only entailing disjuncts, but also disjuncts that are even mutually consistent (eg. # *John is from Russia or Asia*). In order for this second modification to go through, I will need to say why some disjunctions that appear to contain mutually consistent disjuncts are nevertheless felicitous (eg. *John is tall or fat*). I will suggest that the difference between the two types of disjunctions involves the availability (or lack thereof) of local implicatures, which will itself depend on the nature of the alternatives involved. Specifically, I will rely on the claim that there exists a signature for 'maximization failure,' i.e. sentences for which, due to the nature of the alternatives involved, exhaustification is impossible (Fox and Hackl [10], Fox [9]). I will use this signature to argue for the existence/lack of local implicatures in the relevant constructions.

1 Background: Hurford's Constraint and Its Obviation by Local Implicature

Hurford's Constraint (hf. HC) states that disjunctions $\ulcorner X$ or $Y \urcorner$ where one disjunct entails the other are infelicitous.[1]

1. #John was born in Paris or in France.

2. #John was born in France or in Paris.

Redundancy Constraint 1 (Hurford's Constraint) *#*$\ulcorner X$ *or* $Y \urcorner$ *if* X *and* Y *are entailing disjuncts.*[2]

Observe that although the disjunctions in (3) and (4) arguably contain entailing disjuncts, they are nonetheless judged felicitous:

Question: Which of John and Mary came to the party?

3. (John or Mary) or (Both John and Mary) [came to the party].

4. John or (John and Mary Both) [came to the party].

Hurford uses the felicity of (3) along with HC to argue that English *or* is ambiguous between an inclusive and an exclusive reading. For if the first disjunct is read exclusively there is no longer any entailment between the two disjuncts. As such, HC is avoided and the sentence is judged felicitous.

Hurford's conclusion was challenged by Gazdar [11] as missing an important generalization. Gazdar argues that the obviation of HC in (3) and (4) is not a fact specific to disjunction, but rather is indicative of a more general phenomenon extending to all scalar items. More specifically, he argues that HC

[1] I will just say "entailment," but I do not mean by this 'logical entailment;' rather, the relevant notion here is 'contextual entailment.'

[2] The term "entailing disjuncts" comes from Simons [33]. I will use it to sometimes denote a relation between sentences and at other times a relation between propositions.

can be obviated anytime a (potential) scalar implicature of one of the disjuncts breaks the entailment relation. For instance, the first disjunct in (3) has an implicature which gives rise to an exclusive reading, which of course breaks the entailment with the second disjunct. Gazdar's observation is that there is nothing special about disjunction here, because the same effect is found with other scalar items, such as quantifiers:

5. John ate some of the cookies or he ate all of them.

Gazdar suggested that a disjunction can obviate HC if the weaker disjunct has a potential scalar implicature that is the negation of the stronger disjunct. However, it is important to note that for Gazdar this does not mean that a local implicature would be computed for the weaker disjunct. His system did not allow for the generation of implicatures within the scope of logical operators. This feature is problematic because, as pointed out by CFS, there are verifiable consequences of having to generate local implicatures in order to obviate HC. For instance, such local implicatures sometimes give rise to readings that Gazdar's system is unable to generate:[3]

6. Peter either solved both the first and second problems or he solved all of them.

The only available reading for this sentence can be paraphrased as 'Peter either solved only the first and second problems, or he solved all of them.' This reading cannot be produced by Gazdar's system, given that no local implicature is available at the first disjunct. Thus for Gazdar this sentence is predicted (incorrectly) to be equivalent to *Peter solved the first and the second problems.*

In light of these and other arguments, CFS propose that Hurford [16] was correct both in the statement of HC and in the idea that apparent violations of the constraint are obviated by ambiguity. However, rather than stipulating *lexical* ambiguities for scalar items like *or*, they propose that sentences containing scalar items (among others) manifest a systematic *structural* ambiguity. The relevant ambiguity follows quite directly from their grammatical theory of scalar implicatures.

Under their theory, implicatures are generated in arbitrarily embedded positions by use of an exhaustive operator (exh) in the syntax.[4] The meaning of exh is based on that of *only*. The function of both exh and *only* is to take a proposition, the so-called 'prejacent' ϕ, and a set of alternative propositions C, $C = ALT(\phi)$, and to negate all the elements of C that are non-weaker than

[3] Example 34 in CFS.

[4] See also Chierchia [2], Fox [7], Fox and Hackl [10], Chierchia, Fox, and Spector [3]. The meaning of exh is based on the semantics of *only*, differing only in that whereas $only(\phi)$ presupposes ϕ, $exh(\phi)$ asserts it. We will assume the following semantics (ignoring presuppositions): Where C is a set of alternative propositions, $only(C)(\phi)(w) = 1$ iff $exh(C)(\phi)(w) = 1$ iff $\phi(w) = 1 \wedge \forall\psi \in C : (\psi(w) = 1 \rightarrow (\phi \rightarrow \psi))$. Groenendijk and Stokhof [13], Spector [36], van Rooij and Schulz [26, 27], and Fox [7] have argued for the need to redefine these entries to ensure that they are 'contradiction free,' but these arguments will not bear in any important way on anything we say here.

ϕ. Formalization of the theory of implicature thus requires an explicit characterization of the set of alternatives for any given construction in any given context.[5]

The source of the alternatives has traditionally been thought to be quite diverse. Sentences containing scalar items have been assumed to come with a linguistically specified set of alternatives (cf. Gazdar [11], Horn [15], Sauerland [30], and Katzir [20]). For example, the grammar itself is taken to specify that *John ate some of the cookies* and *John ate all of the cookies* are alternatives to one another. Alternative sets have also been taken to sometimes be subsets of the focus alternatives (eg. Rooth [28]), as well as the denotation of the question under discussion (eg. Groenendijk and Stokhof [13], Simons [33], van Rooij and Schulz [26], Spector [35, 36], Schulz and van Rooij [32]). C might also include propositions that are relevant for other reasons (eg. Hirschberg [14]). We will assume for now that alternatives can come from diverse sources, and we will make certain assumptions concerning the set of alternatives for each of our examples on a case by case basis. We will investigate the correctness of these assumptions more carefully in Section 3.

Assuming such an architecture, sentences like (5) are ambiguous between a parse with an exh and a parse without:

7. [[John ate some of the cookies] or [he ate all of them]]

8. [[exh[John ate some of the cookies]] or [he ate all of them]]

The parse in (7) violates HC, since the second disjunct entails the first. The parse in (8) escapes HC, given that the first disjunct means 'John ate some but not all of the cookies.' Thus, more generally it is the mechanism of local implicature generation that allows certain sentences to escape HC. Moreover, with the presence of exh in the logical forms of sentences, CFS are able to make precise predictions concerning the readings of various complex sentences, thereby overcoming the limitation of Gazdar's proposal discussed above. The conclusion is that HC plus a grammatical theory of scalar implicatures provides the best account of the facts enumerated in (1)-(6).

Assuming such a theory of implicatures to be correct,[6] my goal in this paper is to try to convince the reader of the need to modify HC. Before turning to

[5]Of course, this holds true of any attempt at providing an explicit theory of implicature. See Fox [7] and Katzir [20] for arguments that implicatures don't even get off the ground unless we are careful about the set of alternatives available. See especially their discussion of the so-called 'symmetry problem,' first discussed in Kroch [23] and given a general characterization in MIT class notes of Kai von Fintel and Irene Heim dating from the late nineties.

[6]Kai von Fintel (p.c.) and Deirdre Wilson (p.c.) have both raised objections concerning the use of the term 'implicature' for meanings that arise through compositional semantics. Speaking for myself only, I use the term much in the way the term 'presupposition' has been and continues to be used, namely, to pick out some stable set of facts which have been used to diagnose some property of natural language (use?). The term 'presupposition' has remained attached to the facts, even though the characterization of those facts has often shifted from the domain of compositional semantics to pragmatics. Thus, I use 'implicature' to pick out the fact that eg. *John ate some of the cookies* implies that he didn't eat all of them (but doesn't have to, and that the latter can be cancelled, reinforced, etc.), in much the same way that I use the term 'presupposition' to allude to the fact that *The king of France isn't bald*

this task, let us agree to call a sentence X's truth-conditional meaning its "basic meaning," and the conjunction of X's basic meaning with its scalar implicatures its "strengthened meaning."

2 Modifying HC: Asymmetry and Inconsistency

This section is dedicated to showing that HC needs to be modified in two independent ways. Section 2.1 argues for the need to modify HC by requiring that it be checked incrementally, at particular points in the left-right interpretation of the disjunction. Section 2.2 argues for the need to strengthen HC by requiring that it rule out not only entailing disjuncts, but even disjuncts that are mutually consistent. I combine the results of these arguments in Section 2.3 by reformulating the redundancy constraint so that it checks that each new disjunct to the right is inconsistent with the information to its left. For my arguments to go through, I need to make certain assumptions concerning the alternatives involved when local implicatures are computed. I revisit these assumptions in Section 3, where I use a diagnostic from Fox and Hackl [10] and Fox [9] to probe the makeup of the alternatives in all the cases discussed here in Section 2. The diagnostic will show that my assumptions concerning alternatives were indeed innocuous.

2.1 Asymmetric Checking of HC

HC predicts that adding an exhaustive operator to a structure should sometimes rescue it from infelicity. We saw that local exhaustification saved sentences (3)-(5) from pragmatic ruin. We might expect, then, that the same rescue strategy should be available if we reverse the order of the disjuncts, under the fairly standard assumption that the order of disjuncts is irrelevant to how a disjunction is interpreted.[7] However, this prediction seems to be incorrect:

9. # (Both John and Mary) or (John or Mary) [came to the party]
10. # (John and Mary Both) or John [came to the party]
11. # John ate all of the cookies or he ate some of them

The puzzle generated by these sentences is this: If exhaustification can save you from HC in (3)-(5), why can't it also do so in (9)-(11)? For note that the sentences violate HC only if there is no exhaustive operator on the second

implies that there is a king of France (but doesn't have to, and that the hearer can object to being forced to 'accommodate' the latter, etc.).

[7] Some theories of interpretation, motivated mostly by data concerning presupposition projection, predict the existence of certain asymmetries between the two disjuncts of a disjunctive phrase (eg. Karttunen [18], Beaver [1], Schlenker [31]). These theories do not discuss the asymmetries discussed immediately below, and it is not clear to me whether the projection facts and the asymmetries discussed here are related in any systematic way.

disjunct. Under the assumption that the exhaustive operator is freely available, this asymmetry is surprising.

I take these facts to be teaching us that *exh* is *not* freely available. I propose to account for this restriction by imposing a temporal ordering between the checking of HC and the process of exhaustification. Specifically, I propose that HC is checked at each new disjunct *before* exhaustification has a chance to take place. I thus need access to theoretical vocabulary that allows me to state the checking of the constraint incrementally. Allowing myself this resource, I can then state the generalization as follows:

Redundancy Constraint 2 (Incremental HC) *#⌜X or Y⌝ if the structure violates HC before Y can be strengthened by exhaustification.*

The intuition behind this constraint is that for each new disjunct Y 'to the right,' its basic meaning itself must ensure that $\ulcorner X$ or $Y \urcorner$ does not result in a violation of HC. The constraint does not 'wait' for exhaustification – the basic meaning is your only chance to get it right. This constraint consequently predicts that adding an overt *only* to each of (9)-(11) should rescue them, for they will then satisfy HC by virtue of the second disjunct's basic meaning being inconsistent with (hence also not entailed by) the first disjunct. The prediction is correct:

12. (Both John and Mary) or only(John OR Mary) [came to the party]
13. (Both John and Mary) or only John [came to the party]
14. John ate all of the cookies or he ate only some of them

Note that these sentences generate the same proposition as would a parse of (9)-(11) with an exhaustive operator appended to the second disjunct. This contrast between *only* and *exh* is unexpected from the perspective of HC. We are accounting for this contrast via use of a timing principle: A parse with an overt *only* satisfies HC at the right time, while a parse waiting for an *exh* is rejected without waiting to see whether an *exh* eventually appears. In this sense, the constraint checking displays a certain kind of eagerness, for it is checked before exhaustification even has a chance to apply.[8] This is the first modification I wished to establish: HC is to be checked incrementally at each disjunct to the right before it can be strengthened by implicature.

2.2 Inconsistency

I am going to conclude in this section that a disjunction $\ulcorner X \vee Y \urcorner$ must satisfy a condition that is stronger than HC, viz. that its disjuncts must be mutually inconsistent. Before presenting my argument in favour of this claim, I should

[8] The timing principle is to be taken literally as enforcing that the checking of HC is ordered before the operation of exhaustification. This is an architectural departure from the original statement of HC, which operates over entire LFs. I thank Kai von Fintel and Danny Fox for discussion.

begin by dispelling what might, prima facie, be an obvious difficulty for any theory arguing that disjuncts are required to be inconsistent. Consider the following disjunctions, whose disjuncts are obviously mutually consistent:[9]

15. The point is on Line A or on Line B (where Line A and Line B intersect)

16. John is either tall or fat

17. John is either rich or famous

Although the disjuncts in these examples are, at the level of basic meanings, consistent with one another, the introduction of local exhaustification forces us to be somewhat more pedantic when using terms like 'consistency.' We saw earlier (eg.(8)) that a disjunct, when parsed with an *exh*, can generate a local implicature. This local implicature can then (sometimes) ensure that the required inconsistency will be met. But in (15)-(17), as opposed to (8), the disjuncts don't seem to be 'inherently scalar,' i.e. the grammar doesn't seem to specify their alternatives context-independently. I will assume that whenever this is the case, the alternatives to each disjunct are the Hamblin denotation of the question under discussion (eg. *Where is the point?*).[10]

Imagine then that the first disjunct in each of (15)-(17) is parsed with an *exh*, and that the set of alternatives, being the Hamblin denotation, includes the conjunction of each disjunct. Under these assumptions, the meaning of the first disjunct will be something like 'The point is only on Line A' (i.e. not on the intersection of Line A and Line B), or 'John is only tall' (i.e. not both tall and fat), etc. As a result, whether or not there is an *exh* on the second disjunct, the disjuncts will in fact be mutually inconsistent. If an *exh* is also appended to the second disjunct, the structure ends up generating an exclusive reading. Without an *exh* on the second disjunct, the structure generates an inclusive reading. Thus, a theory of local implicatures allows for the existence of a constraint requiring inconsistency between disjuncts while simultaneously allowing a disjunction to be read inclusively. Of course, having shown that such an inconsistency requirement is formally possible still leaves us quite far from having argued that it's actually true. Let us turn to this argument now.

The reader will no doubt have noticed that in all cases where we've appealed to local implicatures to obviate HC, the effect of the implicature was the generation of inconsistency between the disjuncts.[11] But the question remains: What happens when local implicatures break the entailment, but don't generate inconsistency? The following suggests that breaking entailment isn't enough; implicatures need to create inconsistency:

[9] Danny Fox p.c., Roni Katzir p.c., Vann McGee p.c.

[10] See Groenendijk and Stokhof [13], van Rooij and Schulz [26], Spector [35], Schulz and van Rooij [32], and several others for possible implementations of the idea that a question denotation can determine the set of alternatives for exhaustification.

[11] It is noteworthy that all the examples presented in Section 3 of CFS using HC to argue for certain local implicatures are such that the forced local implicature is always one that generates inconsistency between the disjuncts.

18. #John ate some of the cookies or he ate at least three of them

The basic meaning of the second disjunct entails the basic meaning of the first. Hence, HC dictates that an implicature is required. Exhaustifying the first disjunct to 'John ate some but not all of the cookies' can break the entailment, but not the consistency (eg. imagine a context where there are five cookies, and John ate four of them). The disjunction is nonetheless infelicitous, a fact that is not predicted by HC.

Once we see that consistency between disjuncts is enough to rule out a disjunction, we can construct disjunctions whose disjuncts' basic meanings are non-entailing, but consistent. Since the sentences generate at least one parse containing non-entailing disjuncts (one with no *exh* appearing anywhere), HC should be happy with them. In all such cases we find that the disjunction is actually infelicitous:

19. #John ate some or not all of the cookies

20. #John was born in Russia or in Asia[12]

In (19), neither disjunct entails the other as a matter of basic meaning.[13] Moreover, running a local implicature on the first disjunct would actually lead to a violation of HC, so the non-exhaustified reading should be forced in order to satisfy HC. Nevertheless, the sentence is infelicitous. In (20), the basic meanings of the disjuncts are non-entailing, but consistent. Thus, assuming there is no implicature for sentences like *John was born in Russia*, the mere overlap between the two disjuncts at the level of basic meanings is enough to rule them out. To account for these facts, I propose a second revision to HC (independent from the modification proposed in Section 2.1):

Redundancy Constraint 3 (Constraint Enforcing Inconsistency) *#⌜X or Y⌝ if X and Y are mutually consistent.*

2.3 Revised Constraint: Incremental Constraint Enforcing Inconsistency

I have argued that the data from Sections 2.1 and 2.2 teach us that we need a constraint that: (i) Is checked incrementally (at the basic meaning of each disjunct to the right), and (ii) Involves a check for inconsistency. I combine these ideas in the following (final) statement of the redundancy constraint:

Redundancy Constraint 4 (Incremental CEI) *#⌜X or Y⌝ if the basic meaning of Y is inconsistent with X.*

[12] Noam Chomsky, p.c.

[13] The first disjunct is true when John ate all of the cookies.

How can we make sense of this incremental constraint checking? I propose to embed the constraint within an architecture that interprets clauses incrementally. More specifically, I provide a procedure for the interpretation of disjunctive sentences that checks for inconsistency at each new disjunct to the right. To facilitate statement of the procedure, I will assume that the interpretation of a disjunction involves the generation of a list of propositions $\mathcal{L}$ (cf. Simons [33], Zimmerman [37], Geurts [12]). I will assume that exhaustification occurs whenever it can, though this isn't in any way essential:[14]

Procedure for the interpretation of disjunctive sentences Let $Z = \ulcorner X_1$ or ... or $X_n \urcorner$ be a disjunctive sentence. Begin with an empty proposition $\mathcal{L}$ (i.e. a set with no worlds). Take each disjunct in the left-right order in which it appears, and check that its basic meaning has no overlap with $\mathcal{L}$, i.e. check that $\mathcal{L} \cap [[X_i]] = \emptyset$. If there is intersection, halt and output '#'. If there is no intersection, compute $exh(X_i)$ and add it to $\mathcal{L}$, so that the new $\mathcal{L}$ is the old $\mathcal{L}$ plus the worlds in $exh(X_i)$. Move to the next disjunct and repeat the above steps. Output $\mathcal{L}$ if all disjuncts satisfy the CEI.

3 Probing Alternatives

It is fairly uncontroversial that *John ate some of the cookies* has *John ate all of the cookies* as a scalar alternative. Thus, the idea that *John ate some of the cookies or he ate all of them* satisfies the Incremental CEI due to a local implicature at the first disjunct follows straightforwardly once we adopt a grammatical theory of implicature. But there were two less straightforward assumptions I had asked the reader to accept in Section 2. These were:

- In sentences like *The point is on Line A or Line B* the first disjunct is exhaustified to mean 'The point is on Line A and not on Line B,' thereby allowing the Incremental CEI to be satisfied. Since the disjuncts are not scalar in any obvious way, exhaustification was assumed to take place with respect to alternatives generated by a question under discussion (eg. *Where is the point?*).

- In sentences like *#John was born in France or Paris* and *#John is from Russia or Asia*, there is no relevant implicature at the first disjunct to

[14] Benjamin Spector has pointed out to me (p.c.) that, for a sentence like $\ulcorner X$ or Y or $Z \urcorner$, this procedure does not generate a reading under which the sentence is true when X and Y are true, and Z is false. This is indeed a difficulty for the system. One option might be that the semantics of *exh* licenses the exclusion of some set of alternatives, with the determination of *which* set being governed by an additional principle, say a preference for stronger meanings (eg. Dalrymple et al. [5]). This preference would then give rise to the maximal exclusions which are currently defined in the semantics of *exh*. Under such a view, one could readily generate a reading 'only X or only (X and Y) or Z,' which would be true in the scenario given. Examining the consequences of such a view would take us too far afield. I acknowledge this as a difficulty for the system presented here. As far as I can tell, there seems to be a genuine difficulty for all systems: Systems that don't allow local strengthening can't account for the Incremental CEI. Systems that do don't seem to be able to generate this reading.

help ensure inconsistency with the second disjunct. Thus, the first disjunct cannot be exhaustified to mean 'John was born in France but not in Paris.' Similarly, mutatis mutandis, for *John is from Russia*. As opposed to the case in the first bullet point, it is apparently not possible for the right kind of question to rescue these disjunctions.

My aim in this section is to argue for the correctness of these assumptions. The argument will mostly rest on certain generalizations found in Fox and Hackl [10] and Fox [7, 9]. To begin with, I will make use of the following two facts. First, Fox [7] and Fox and Hackl [10] observe that there is a very general way to paraphrase the strengthened meaning of any sentence:

Only Implicature Generalization (OIG) The strengthened meaning of a sentence S can always be paraphrased by asserting *only S'*, where S' is like S but with focus on the relevant items.

Thus, one can paraphrase the strengthened meaning of *John ate some of the cookies* by asserting *John only ate SOME of the cookies*.

Second, in dialogues of the following form where the hearer objects *No! Q!*, the meaning of *Q!* must entail *No!* (i.e. it must entail 'not P'):[15]

21. S: Is John from Paris?
    H: No! He's from MEXICO!

22. S: Did John eat all of the cookies?
    H: No! He only ate some of them!

23. S: Did John eat at least four cookies?
    H: #No! He ate seven cookies!

Let us turn now to establishing the soundness of the two assumptions noted at the beginning of this section. The form of the argument runs as follows. I will put forth a dialogue of the sort introduced above. In each such dialogue the speaker raises a question of interest, *Is it the case that P?*, where P asymmetrically entails Q (either logically or with respect to contextual assumptions). To this the hearer responds, *No! Only Q!* If the response is felicitous, then I will take that as evidence that *Only Q* can entail 'Q and not P.' This in turn will be evidence (given the OIG) that Q can be exhaustified to entail $\neg P$. If the response is not felicitous, I will take that as evidence that *Only Q* cannot entail 'Q and not P,' which will teach us (given the OIG) that Q cannot be exhaustified to entail $\neg P$, *even though P has been made explicitly relevant*.

3.1 *Line A or Line B*

Recall sentences (15)-(17) from above, which I repeat here as (24)-(26):

24. The point is on Line A or on Line B (where Line A and Line B intersect)

[15] Danny Fox, p.c.

25. John is either tall or fat

26. John is either rich or famous

I want to establish that the Incremental CEI would be met if the first disjunct could be read as exhaustified with respect to some question under discussion, such as *where is the point*? Crucially, the Hamblin denotation of the question would have to include the conjunctive alternative. By making this conjunctive alternative relevant by asking whether it is true, we can show that the relevant exhaustification can indeed go through, since the response with *only* is felicitous:

27. S: Is the point at the intersection of Line A and Line B?
    H: No! It's only on LINE A!

28. S: Is John both tall and fat?
    H: No! He's only TALL!

29. S: Is John both rich and famous?
    H: No! He's only RICH!

The felicitous dialogues teach us that, should the conjunctive alternative be made relevant by some question under discussion, the first disjunct can be exhaustified with respect to the conjunctive alternative so as to generate the required inconsistency with the second disjunct. For instance, given the felicitous dialogue in (27) we can conclude that $SM(LineA) = LineA \wedge \neg LineB$. Thus, our assumption about the availability of a local implicature in these cases is supported to the extent that we can assume that there is some appropriate question under discussion, or that one can be readily accommodated.

3.2 *France or Paris*

In this section I will try to establish that no local implicature of the required kind is available in sentences like *#John was born in France or in Paris*, or *#John is from Russia or Asia*. Intuition certainly suggests that, for example, *John is from France* does not implicate that John isn't from Paris.[16] But what if the question of whether John is from Paris were made relevant? Would we not get such a reading then? And if the reading is not available, can we understand, formally, why it is not?[17] Let us return to our earlier diagnostic to help answer these questions. The diagnostic reveals that, as opposed to the cases in Section 3.1, it is simply impossible to carry out such a dialogue in our Paris/France example, nor do we fare any better in our Russia/Asia example:[18]

[16]This is an often voiced intuition in the literature, though as far as I know no formal account exists as to why this should be. See Gazdar [11], Hirschberg [14], Krifka [22], among others, for relevant data. One can view this section as an attempt at accounting for the intuition.

[17]I thank Roni Katzir (p.c.) and Bob Stalnaker (p.c.) for raising questions that forced me to work out the mechanics of the implicature computation in these cases.

[18]Irene Heim (p.c.) points out that there is a potential confound in the dialogues, since *John is only from X* might also suffer because people cannot be from more than one place. To

30. S: Is John from Paris?
    H: # No! He's only from FRANCE!

31. S: Is John from Siberia?
    H: #No! He's only from Russia!

32. S: Is John from Asia?
    H: #No! He's only from Russia!

Why should the above dialogues be infelicitous? For instance, why can't the hearer's responses be taken to mean that John is from France but not Paris, or Russia but not Siberia? Focussing on the Paris/France case, given that the speaker has just made the question of John being from Paris relevant,[19] it is quite surprising that this meaning cannot be generated. A clue to the solution comes from the fact that the oddness of the dialogue in (30) is obviated by embedding under a universal modal, but not when embedded under an existential modal:

33. S: Is John required to be from Paris?
    H: No! He's only required to be from FRANCE!

34. S: Is John allowed to be from Paris?
    H: # No! He's only allowed to be from FRANCE!

Building on Fox and Hackl [10], Fox [9] has argued that the pattern: $\#only(\phi)$, $only(\Box\phi)$, $\#only(\Diamond\phi)$, is a signature of 'Maximization Failure.' The pattern indicates that the set of alternatives to ϕ is one that cannot be maximized by maximality operators like *only*, *exh*, questions, and definite descriptions, because the result would be contradictory. The contradiction can be obviated by a necessity modal, but not by a possibility modal.[20] The signature thus provides us with a diagnostic with which to probe the makeup of the alternatives to any given proposition in cases where we are uncertain about the alternatives, like in our case.

For our purposes, this general line of reasoning could be used to account for the facts in (30), (33), and (34) if the sentence *John is from France* were assumed to compete, in this context, with the following alternatives: {John is from Paris, John is from Lyon, John is from Nancy, ... }. With this set of alternatives, the sentence *John is only from FRANCE!* ends up being contradictory, for it ends up meaning 'John is from France but not from Paris, Lyon, Nancy, etc' for all subparts of France.[21] This contradictory meaning then accounts for the oddness of the dialogue. It also accounts for the obviation of the oddness when

control for this, one can substitute a different predicate, such as *visit X* wherever I currently say *is from X*. The same pattern is observed in each case, so I will continue using *from X* for continuity with our earlier examples.

[19] John's being from Paris can be made relevant in other ways, and the same effect is observed. (i) S: John is from Paris. H: No he's not! # He's only from France! (ii) S: I think John is from Paris. H: No! #He's only from France!

[20] See Fox and Hackl [10] and Fox [9] for detailed discussion and proofs.

[21] If the strengthening happens using only logical information, then all the alternatives would be negated, since there is no logical contradiction in being from France but not Paris, Lyon,

embedded under a necessity modal, but not when embedded under a possibility modal. Given the OIG, the lesson we learn from this is that the sentence *John is from France* cannot be exhaustified to mean 'John is from France but not Paris.' Thus, by the time the Incremental CEI is checked at the second disjunct in *John was born in France or in Paris*, the required inconsistency cannot be met, and the disjunction will necessarily be ruled out, as required.[22] A similar line of reasoning can be applied to show that there is no relevant implicature in a sentence like *John is from Russia*.[23]

4 Concluding Remarks

I have argued that natural language disjunctions are subject to a constraint that requires each disjunct to the right to be inconsistent, at the level of basic meanings, with the information to its left. To make the argument, I had to show that the alternatives involved were of the kind required to support the Incremental CEI. Although we were able to use a signature to teach us about the general shape of the alternatives in the relevant cases, we are still left with the question of why the alternatives are what they are. For instance, is the fact that *John is from France* carries along its subparts in dialogue (30) due to general properties of the grammar or contextual reasoning? The question of the interaction between formal alternatives and contextually relevant alternatives seems to be a non-trivial one. For instance, the following dialogue suggests that the proposition that John ate half/one-third/exactly three/most of the cookies cannot be a member of the alternative set C in H's response to S:[24]

35. S: Did John eat half/one-third/exactly three/most of the cookies?
    H: #No! He only ate SOME of them!

etc. The relevant contradiction would then be detected once world knowledge is checked, generating the effect of oddness that has been much discussed by Magri [25]. If the strengthening happens using contextual strength, then the result of applying *only*/*exh* would itself generate a contradiction. The explanation goes through either way.

[22]Kai von Fintel (p.c.) and Irene Heim (p.c.) point out that there are variants of these sentences that make them better, eg. *John was born in Paris, or at least in France*. I read these not as actual disjunctions, but as retractions, whereby the speaker weakens her initial assertion. They are even pronounced differently from normal disjunctions (here, they are pronounced with comma intonation). Indeed, they seem to be felicitous only if pronounced with comma intonation. Of course, it is probably not accidental that one performs this weakening by use of *or*. More will need to be said about these cases. See Jackson [17] for potentially relevant discussion.

[23]It seems fairly plausible to think that the Paris/France propositions stand in a 'lumping' relation (Kratzer [21]). If so, a proposal by Kai von Fintel [6] would prevent the Paris/France propositions from being alternatives to one another. This could then be used to account for the oddness of the dialogue in (30). There are two prima facie difficulties for such a view. First, the oddness is obviated under necessity modals (33). Second, Roni Katzir has observed independently of this paper (p.c.) that such sentences (including many of those discussed by Hirschberg [14]) give rise to implicatures in downward entailing environments, eg. *Every man who is from Paris will win a prize* implicates that it's not the case that every man who is from France will win a prize. Needless to say, my remarks here barely scratch the surface of these complicated issues.

[24]See Fox and Hackl [10] and Fox [8] for related discussion.

Further discussion of the interaction between between formal alternatives and contextual relevance will not be possible here, as it would take us too far from the main focus of the paper, viz. the establishment of the Incremental CEI.

Abstracting away now from the details of my own particular analysis of the facts that drove me to the Incremental CEI, let me state abstractly some of the components I believe are required of any theory wishing to account for these facts. First, one seems to need a theory where implicatures can be computed in embedded positions (cf. CFS). Second, one needs to allow checking of well-formedness constraints in embedded positions. Third, one needs to allow certain well-formedness constraints to be checked incrementally. As far as I can tell, such requirements argue against global, pragmatic theories of implicature (eg. Gazdar [11], Levinson [24], Horn [15], van Rooij and Schulz [26], Sauerland [30], Spector [35], Russell [29], Schulz and van Rooij [32]). In this vein, it is noteworthy that the same effect we observed for root disjunctions shows up in non-asserted positions as well, such as in the restrictor of a quantifier:

36. Every student who reads ((*Syntactic Structures* or *Aspects*) or (Both *Syntactic Structures* and *Aspects*)) becomes a syntactician

37. # Every student who reads ((Both *Syntactic Structures* and *Aspects*) or (*Syntactic Structures* or *Aspects*)) becomes a syntactician

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