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Filtering free choice[*]

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Abstract Sentences involving disjunctions under a possibility modal give rise to so-called 'free choice' inferences, i.e. inferences to the effect that each disjunct is possible. This note investigates the interaction between free choice and presuppositions. We focus on sentences embedding both a disjunction in the scope of a possibility modal and a presupposition trigger, and we investigate how the free choice inference triggered by the former can contribute to filtering the presupposition of the latter. We consider three cases: conditionals, disjunctions and *unless* sentences. We observe that in all of these cases the presuppositions triggered from the consequent, second disjunct, or the scope of *unless* appear to be filtered by a free choice inference associated with the rest of the sentence. The case of the conditional can be accommodated by scalar accounts of free choice, but the disjunction and *unless* cases cause a substantial problem for all these accounts. After discarding a natural but unsuccessful attempt at a solution, we consider two more promising strategies. The first holds on to an implicature account of free choice and exploits an algorithm of free insertion of redundant material. The second is based on a semantic account of free choice based on a notion of homogeneity. Each of these solutions comes with related problems. We conclude that the correct form of a theory of free choice remains open, though the data concerning the interaction between free choice and presupposition can significantly help sharpen our theoretical choices.

1 Introduction

Sentences involving disjunctions under a possibility modal give rise to so-called 'free choice' inferences, i.e. inferences to the effect that each disjunct is possible. For example, (1-a) suggests the inference in (1-b) (Kamp 1974).

(1)   a.   Maria can go study in Tokyo or Boston.
       b.   ↝ *Maria can go study in Tokyo and she can go study in Boston*

One successful family of theories of free choice treats it as a kind of scalar implica-

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ture, broadly construed.[1] The main argument for such theories is that free choice appears to be linked to polarity: free choice effects disappear in downward entailing contexts. Scalar accounts are very well placed to predict and explain this link.

This note raises a problem for all scalar accounts of free choice. We focus on the interaction between free choice phenomena and presupposition projection: in particular, we show that all scalar accounts have difficulties explaining patterns of presupposition projection and filtering in some complex sentences that involve free choice effects. For illustration, here is one of our sample sentences:

(2)   Either Maria can't go study in Tokyo or Boston, or she is the first in our family who can go study in Japan.

The sentence in (2) as a whole appears to carry no suggestion that Maria can go study in Japan, despite the fact that the second disjunct contains a presupposition trigger, associated with that presupposition (*S is the first in our family to* C presupposes that *S* C-ed or is C-ing). This means that, in standard terminology, the presupposition that Maria can go study in Japan must be filtered by some other parts of the sentence.[2] But, for filtering to occur, the clause *Maria can't go study in Tokyo or Boston* needs to trigger a free choice reading when computing the presuppositions of the sentence. That same clause needs to *not* trigger a free choice inference for its interpretation in the first disjunct. The problem is that this double behavior cannot be predicted by standard scalar accounts.

After describing the problem, we sketch a quick map of the solution space. First, we briefly consider and discard an unsuccessful attempt, based on the idea that implicatures can be calculated on presuppositions without also affecting the asserted content.[3] We then turn to two more promising strategies. The first is based on a recent account of presupposition projection and anaphora by Rothschild 2017, which exploits free insertion of redundant material at LF. The second is based on a semantic account of free choice (Goldstein 2018). Both these strategies can account for our data, but have problems. We conclude that the correct form of a theory of

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1 See Fox 2007, Alonso Ovalle 2005, Chemla 2010, Klinedinst 2007, Santorio & Romoli 2017, Franke 2011, Bar-Lev & Fox 2017 among others.

2 In principle, presuppositions can also not project by being 'locally accommodated' (cf. von Fintel 2008). This however would predict no difference between the sentence in (2) and (i): that is, the option of suspending the presupposition by local accommodation is equal in these sentences, yet intuitively from (i) we conclude much more that Mary can go study in Japan than from (2).

(i)   Either Maria's brother could go study in Tokyo, or Maria is the first in our family who can go study in Japan.

3 See Magri 2009, Spector & Sudo 2017, Gajewski & Sharvit 2012, Sudo & Romoli 2017, Marty 2017 among others.

free choice remains up for debate, but data about the interaction between free choice and presupposition can help sharpen our choices.

The rest of the paper is organized as follows. In §2, we provide some background about free choice and presupposition. We then illustrate the problem in §3. After sketching the unsuccessful strategy in §4, we discuss the two possible solutions, together with relevant problems, in §5. In §6, we discuss a further aspect of the truth-conditions of our main case predicted by both solutions.

2 Background

2.1 The implicature approach to free choice

One successful family of theories treats free choice as a kind of scalar implicature. We already mentioned one argument for this approach: free choice tends to disappear in downward entailing environments, exactly like scalar implicatures. For illustration: (3-a) doesn't have the reading in (3-b).

(3) a. It's not the case that Maria can go study in Tokyo or Boston
     b. $\not\approx$ *It's not the case that: Maria can go study in Tokyo and Maria can go study in Boston*

Other arguments for this approach come from the well-known observation that free choice inferences are cancelable (cf. Simons 2005, Fox 2007), and from free choice readings associated with universal quantifiers (Chemla 2009, Bar-Lev & Fox 2017) and nonmonotonic quantifiers (Bassi & Bar-Lev 2016, Gotzner et al. 2017). We refer the readers to the relevant sources for details.

All implicature theories of free choice build on semantic accounts of implicature, hence let us survey the latter. A number of authors (Fox 2007, Chierchia et al. 2012, Chierchia 2013 among others) argue that scalar implicatures are derived via a covert exhaustivity operators, which following tradition we represent as 'EXH'. EXH takes a sentence and a set of its alternatives as arguments and returns the conjunction of the basic sentence with the negation of the 'excludable' subset of its alternatives. Informally, an alternative counts as excludable if negating it doesn't contradict the literal meaning of the sentence asserted, and doesn't force us to accept any other alternative in the set.[4]

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4 Here are the lexical entries for EXH and the formal definition of excludability. (The notion below is not the final notion of excludability used by Fox; see Fox 2007 for the full story.)

(i) $[[\text{EXH } A]](w) = [[A]](w) \wedge \forall B \in \text{EXCL}(A, \text{ALT}(A))[\neg[[B]](w)]$

(ii) $\text{EXCL}(A, X) = \{B \in X : [[A]] \not\subseteq [[B]] \wedge \neg \exists C[C \in X \wedge ([[A]] \wedge \neg[[B]]) \subseteq [[C]]]\}$

Let us illustrate how this works for a simple example:

(4)   Maria went to study in Tokyo or Boston.
      ↝ *Maria didn't go study both in Tokyo and Boston*

Standard semantic accounts of implicature make two assumptions: (i) (4) is parsed as involving a covert exhaustivity operator, as in (5); (ii)the alternatives of (4) are those in (6).[5]

(5)   EXH[Maria went to study in Tokyo or Boston]

(6)
$$\left\{\begin{array}{ll} \text{Maria went to study in Tokyo or Boston} & \textbf{Tokyo} \vee \textbf{Boston} \\ \text{Maria went to study in Tokyo} & \textbf{Tokyo} \\ \text{Maria went to study in Boston} & \textbf{Boston} \\ \text{Maria went to study in Tokyo and Boston} & \textbf{Tokyo} \wedge \textbf{Boston} \end{array}\right\}$$

Given the alternatives in (6), only the conjunctive alternative ($\textbf{Tokyo} \wedge \textbf{Boston}$) is excludable. This gives the intuitively correct prediction: excluding the conjunctive alternative yields the implicature in (4).

Free choice effects cannot be derived as simple implicatures, at least not by using the classical meanings of disjunction and modals.[6] But they can be predicted on more sophisticated theories of implicature. One attempt, which goes back to Fox 2007 (see also Kratzer & Shimoyama 2002), derives the effect by postulating multiple occurrences of EXH in the relevant sentences. On this view, free choice is derived via a mechanism of recursive exhaustificaton. A more recent account exploits a different meaning for the exhaustivity operator that allows one to directly conjoin the assertion with some of the alternatives (Bar-Lev & Fox 2017).

For current purposes, it is not important exactly how free choice is derived, as long as the effect is based on one or more iterations of the exhaustivity operator. Both the problem we raise and the possible solutions are independent of the precise mechanism that derives free choice. Hence we simply use 'EXH*' as a placeholder for whatever operator, or combination of operators, works best for scalar accounts. For example, we assume that (7) is parsed as in (8).

(7)   Maria can go to study in Boston or Tokyo.

(8)   EXH*[Maria can go study in Boston or Tokyo]

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5 An important and controversial issue for all theories of implicatures is how the alternatives used to compute exhaustified meanings are determined. This question is orthogonal to our problem, so we set it aside. For relevant discussion see Breheny et al. 2017 and references therein.

6 Though see Klinedinst 2007 and Santorio & Romoli 2017 for attempts at deriving free choice via EXH, in combination with more sophisticated semantics for modals.

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2.2 Presupposition filtering and projection

A sentence like (9) gives rise to the inference that Maria went to study in Japan.

(9)   Maria is the first in our family who went to study in Japan.
        ↝ *Maria went to study in Japan*

This inference projects through embeddings in a way that is characteristic of pre-suppositions.[7] For instance, when we embed (9) under negation, in the antecedent of a conditional, under a possibility modal, or we make a question out of it (as in (10-a)-(10-d)), the suggestion that Mary went to study in Japan remains robust.

(10)   a.   Maria is not the first in our family who went to study in Japan.
        b.   If Maria is the first in our family who went to study in Japan, her older brother must have gone to study in the States.
        c.   Perhaps Maria is the first in our family who went to study in Japan.
        d.   Is Maria the first in our family who went to study in Japan?
              ↝ *Maria went to study in Japan*

In certain cases, however, presuppositions do not project through embeddings. For instance, when we embed (9) in (11)-(13), repeated from above, we do not conclude that Mary went to study in Japan.

(11)   If Maria went to study in Tokyo, she is the first in our family who went to study in Japan.
        ↝̸ *Maria went to study in Japan*

(12)   Either Maria didn't go to study in Tokyo, or she is the first in our family who went to study in Japan.
        ↝̸ *Maria went to study in Japan*

(13)   Unless Maria didn't go to study in Tokyo, she is the first in our family who went to study in Japan.
        ↝̸ *Maria went to study in Japan*

A theory of presupposition projection has to predict when and how presuppositions project. In informal terms, to explain the lack of projection in (11)–(13), different theories capitalize in different ways on the fact that the antecedent of the conditional, the negation of the first disjunct, and the negation of the restrictor of *unless* entails the presupposition of the consequent, second disjunct, and nuclear scope of *unless*, respectively.

The literature contains a large variety of approaches. For what is relevant here,

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7 Karttunen 1973, Heim 1982 and much subsequent work.

Sentence	Conditional ps	Unconditional ps	Filtering condition
If B, A$_C$	$\mathbf{B} \to \mathbf{C}$	$\mathbf{C}$	if $\mathbf{B}$ entails $\mathbf{C}$
B or A$_C$	$\neg\mathbf{B} \to \mathbf{C}$	$\mathbf{C}$	if $\neg\mathbf{B}$ entails $\mathbf{C}$
Unless B, A$_C$	$\neg\mathbf{B} \to \mathbf{C}$	$\mathbf{C}$	if $\neg\mathbf{B}$ entails $\mathbf{C}$

Table 1 Presuppositions and associated filtering conditions predicted by the main approaches in the literature for the cases in question

we can divide the different approaches in two main groups, on the basis of the two main predictions they make for the cases above. The first type of accounts predicts the conditional presuppositions summarised below (e.g. Heim 1982, Gazdar 1979, Beaver 2001, Chierchia 1995, van der Sandt 1992, Geurts 1999; for more recent approaches, see Schlenker 2008a, 2009, Chemla 2010, Fox 2008, Rothschild 2011, George 2008, Mandelkern 2016a; see also Schlenker 2008b for discussion). The second type of approaches (e.g., van der Sandt 1992, Geurts 1999, Mandelkern 2016a), on the other hand, predicts stronger presuppositions: i.e., they predict that the presupposition projects directly to the whole sentence.[8] What matters for us is that both type of accounts derive the same filtering conditions for (11)–(13): a presupposition triggered in the consequent of a conditional is filtered by the antecedent, if the latter entails it; a presupposition triggered in the second disjunct or scope of an *unless* sentence is filtered by the negation of the first disjunct/the negation of the restrictor of the *unless* sentence, if the latter entails it. The two main types of predictions are summarized schematically in Table 1.[9] We now show that neither is correct for our examples.

3 The problem: filtering free choice

Consider (14)-(16). None of these sentences suggest that Maria can go study in Japan (and that she can go study in the US). That is, the strong unconditional presupposition predicted by some of the approaches above is clearly wrong. We can still ask whether the weaker conditional presupposition predicted by the other approaches would be correct here. That is, we can ask whether the sentence suggests

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8 In addition, most of the account predicting the weaker presuppositions above are generally coupled with a theory of when these presuppositions can be strengthened to p to account for cases for which the weaker presuppositions appear inadequate. This falls under the name of the 'Proviso problem,' see Mandelkern 2016b and references therein for discussion.

9 We use sans serif capital letters, A, B, C . . ., as sentence variables, and boldfaced capital letters, $\mathbf{A}, \mathbf{B}, \mathbf{C}$, for the propositions they express. We move freely from talking about presuppositions as propositions and as sentences.

that Maria can go study in Japan, if she can go study in Boston.[10] But this also appears too strong: the sentence doesn't suggest anything about Maria being allowed to study in Japan, regardless of whether she can go study in Boston.[11]

(14)   If Maria can go study in Tokyo or Boston, she is the first in our family who can go study in Japan (and the second one who can go study in the US).
⊬ *Maria can go study in Japan(/the US)*

(15)   Either Maria can't go study in Tokyo or Boston, or she is the first in our family who can go study in Japan (and the second who can go study in the US).
⊬ *Maria can go study in Japan(/the US)*

(16)   Unless Maria can't go study in Boston or Tokyo, she is the first in our family who can go study in Japan (and the second who can go study in the US).
⊬ *Maria can go study in Japan(/the US)*

The problem can be reproduced with all sorts of presupposition triggers, as the examples below show.

(17)   a.   If Maria can go study in Tokyo or Boston, she will be **happy** that she can go study in Japan.
         b.   Either Maria can't go study in Tokyo or Boston, or her dad will be **happy** that she can go study in Japan.
         c.   Unless Maria can't go study in Tokyo or Boston, her dad will be **happy**

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10 The predicted conditional presupposition is actually *Maria can go study in Japan, if she can go study in Tokyo or Boston*, which we can simplify to *Maria can go study in Japan, if she can go study in Boston*.

11 An anonymous reviewer asks whether the intuition is just due to the fact that we are accommodating some contextual 'free choice-like' assumptions according to which if Maria has any study permission, she has them both for Tokyo and Boston. This may be plausible for some cases, but it cannot be the whole story. To see this, consider a context where this assumption is explicitly denied as in (i).

(i)   My students applied to programs in Japan and the US this year. These are selective programs, so it's not obvious that getting into one program entails getting into any of the others. I am not sure about the final results of the applications, but as for Maria:

       a.   If she can go study in Tokyo or Boston, she is the first in our school who can go study in Japan.
       b.   Either she can't go to Tokyo or Boston or she is the first in our school who can go study in Japan.
       c.   Unless she can't go to Tokyo or Boston, she is the first in our school who can go study in Japan.

In this context, there is still no presupposition that Maria can go study in Japan, if she can go study in Boston (let alone that she can go study in Japan, period).

that she can go study in Japan.
↛ Maria can go study in Japan

(18) a. If Maria can go study in Tokyo or Boston, her sister can go study in Japan **as well**

b. Either Maria can't go study in Tokyo or Boston, or her sister can go study in Japan **as well**

c. Unless Maria can't go study in Tokyo or Boston, her sister can go study in Japan **as well**
↛ Maria can go study in Japan

(19) a. If Maria can go study in Tokyo or Boston, **it's not only** in Japan that she can go study.

b. Either Maria can't go study in Tokyo or Boston, or **it's not only** in Japan that she can go study.

c. Unless Maria can't go study in Tokyo or Boston, **it's not only** in Japan that she can go study.
↛ Maria can go study in Japan

In summary: all these sentences seem to involve filtering of presuppositions. It is natural to assume that free choice is playing a role in this filtering.[12]

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12 To better see the key intuition, we can compare (14)–(16) to structurally similar examples. Notice that disjunctions in the scope of plural existential determiners (as in (i)) also give rise to free choice inferences, while the corresponding singular ones (as in (ii)) don't (Klinedinst 2007).

(i) Some of our students are in Boston or Tokyo.
⤳ Some of our students are in Boston and some of our students are in Tokyo

(ii) One of our students is in Boston or Tokyo.
↛ Some of our students is in Boston and some of our students is in Tokyo

Now consider what happens when we embed (i) and (ii) in a disjunction like (iii) and (iv):

(iii) Either it's not true that some of our students are in Boston or Tokyo, or this is the first year that some of our students are in Japan.

(iv) ??Either it's not true that some of our students is in Boston or Tokyo, or this is the first year that some of our students is in Japan.

(iii) is intuitively felicitous and presuppositionless while (iv) is not. On the contrary, it suggests that, if one of our students is in Boston, then one of our students is in Japan. (This is a somewhat bizarre presupposition, which might explain why the sentence is somewhat awkward.)

Another way to refine the intuition is by comparing the cases above to the corresponding ones with simple disjunctions. Consider a variant of our case in (v) as compared to its corresponding simple disjunction in (vi) (here using the conditional case, but the same can be replicated with the disjunction and *unless* cases).

To illustrate the point, consider schematic versions of our examples. (A^+ is a sentence asymmetrically entailing A; we ignore the second conjunct from now on for simplicity.)

(20)   If $\Diamond(A^+ \vee B)$, $C_{\Diamond A}$

(21)   Either $\neg\Diamond(A^+ \vee B) \vee C_{\Diamond A}$

(22)   Unless $\neg\Diamond(A^+ \vee B)$, $C_{\Diamond A}$

Consider the case of the conditional first: here the predicted projection is (23) (where '→' stands for material implication).

(23) $\Diamond(A^+ \vee B) \rightarrow \Diamond A$

What is important here is that the literal meaning of $\Diamond(A^+ \vee B)$ does not entail $\Diamond A$, therefore the presupposition is incorrectly predicted not to be filtered.[13]

This case can be accommodated once we have a theory that allows for embedded free choice. This is a routine prediction for semantic accounts of implicature, on which EXH* can be merged at global or local level. In particular, we could parse (20) as (24).

(24)   If EXH*$(\Diamond(A+ \vee B))$, $C_{\Diamond A}$

(v)   If Maria can go study Tokyo or Boston, she is happy she can study in Japan.

(vi)   ??If Maria went to study in Tokyo or Boston, she is happy she studied in Japan

While (v) is natural and carries no suggestion that Maria can study in Japan, (vi) sounds infelicitous. And, again, the infelicity of (vi) can be naturally connected to the odd presupposition it is predicted to carry (i.e., that Maria went to study in Japan, if she went to study in Boston; see discussion in section 3).

13 Let us observe that appealing to Simplification of Disjunctive antecedent is of no help here. It is often observed that a conditional with disjunctive antecedents seems to entail the two conditionals with the individual disjuncts as antecedents (see Fine 1975).

(i)   If Mary or Sue were at the party, the party would be fun.

    a.   ⤳ If Mary was at the party, the party would be fun.
    b.   ⤳ If Sue was at the party, the party would be fun.

There are a number of accounts of Simplification on the market, some pragmatic (Klinedinst 2007) and some semantic (Alonso-Ovalle 2004, Fine 2012, Santorio 2017, Ciardelli et al. 2018 among many). Here we want to notice that none of these accounts will help. Simplification is a global strengthening: a conditional entails two related conditionals. If anything this operation will add presuppositions to the sentence rather than taking them away (see Spector & Sudo 2017 and section §4 below). Conversely, the presuppositions of (14)–(16) seem to involve a strengthening that is local to the antecedent: i.e. they seem to presuppose $(\Diamond A^+ \wedge \Diamond B) \rightarrow \Diamond A$.

Given that $\text{EXH}^*(\Diamond(A^+ \vee B))$ entails $\Diamond A^+ \wedge \Diamond B$ and therefore $\Diamond A$, (20) is correctly predicted not to have any presuppositions (since it projects the tautological presupposition in (25)). Hence, as long as we allow for embedded free choice, we can account for the conditional case.[14]

(25) $(\Diamond A^+ \wedge \Diamond B) \rightarrow \Diamond A$

But things are not as simple for disjunctive sentences and *unless*-sentences. Intuitively, the problem is this: we want to use the enriched, free choice meaning of the possibility clause for the purposes of computing the presupposition, exactly as we have done for the conditional. At the same time, we need the basic, non-free-choice meaning of the same clause to compute the meaning of the first disjunct. The problem is that we cannot have both at the same time. For illustration, consider first the proposition that we predict to be presupposed *without* appealing to EXH^*.

(26) $\neg\neg\Diamond(A^+ \vee B) \rightarrow \Diamond A = \Diamond(A^+ \vee B) \rightarrow \Diamond A$

The problem is again that $\Diamond(A^+ \vee B)$ doesn't entail $\Diamond A$ and therefore filtering is not predicted. But here, unlike in the conditional case, there is no clear way to strengthen the first disjunct/restrictor of *unless* to get free choice effect while obtaining a plausible overall meaning for the sentence. This is because we want free choice to arise on the negation of the first disjunct/restrictor of *unless*, without changing the meaning of the latter. To illustrate, consider the two options we have in either case: we could first exhaustify above negation within the first disjunct/restrictor of *unless*. This however would not help, because exhaustifying above negation is vacuous. In other words, (27) is equivalent to $\neg\Diamond(A^+ \vee B)$ and so its negation, cannot, in the same way, filter $\Diamond A$ in the desired way.

(27) $\text{EXH}^*(\neg\Diamond(A^+ \vee B))$

Alternatively, we could try to insert EXH^* below negation, as in (28). Here its negation $\text{EXH}^*(\Diamond(A^+ \vee B))$ would entail $\Diamond A$ therefore correctly filtering the presupposition of the second disjunct/restrictor of *unless*.

(28) $\neg(\text{EXH}^*(\Diamond(A^+ \vee B))$.

But now the meaning of the first disjunct/restrictor of *unless* would be too weak: it

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14 One issue here is that we need to embed EXH^* in the antecedent of a conditional, which is generally a dispreffered option (cf. Chierchia et al. 2012). In an implicature account of free choice, however, we seem to need that anyway for cases like (i) (Kamp 1978, Barker 2010.)

(i)   If Mary can go study in Tokyo or Boston, she will choose Tokyo.

would be the negation of the free choice inference. Hence our examples (15) and (16) would have a reading that we could paraphrase as in (29) and (30) respectively.

(29)   Either it's not true that Maria can go study in Tokyo and can go study in Boston, or she is the first in our family who can go study in Japan.

(30)   Unless it's not true that Maria can go study in Tokyo and can go study in Boston, she is the first in our family who can go study in Japan.

These readings, if they exist at all, are certainly not the ones we are after.

In the next sections, we turn to discussing possible solutions. We first focus on an idea that, on close inspection, won't work. We then move on to two more promising suggestions.

4   A nonstarter: split exhaustification

Before laying out two potential solutions to the problem, let us dispatch a tempting but eventually fruitless response.[15] According to one recent line of theorizing, implicatures can be computed separately on the presuppositions and on the content of assertions.[16] The motivation for this line of thought comes from cases like (31).

(31)   Maria is unaware that some of the students passed the exam.

(31) has a reading (the most natural reading, in fact) that conveys that Maria doesn't believe that *any* of the students passed the exam, while at the same time presupposing that some *but not all* of the students passed the exam. To capture this reading, we seem to be forced to calculate implicatures on the presupposition, but not on the asserted content of the sentence. A number of theorists have proposed accounts that accomplish this. Here we sketch the simplest version of this idea, following the implementation in Sudo & Romoli 2017. The gist of the account is the assumption of an additional exhaustivity operators, which we will call EXH_2^*. This operator does the same of what EXH^* does, but at the presuppositional level. In other words, given a sentence A_p with presupposition p, we can now exhaustify in two different ways. First, we can use the regular EXH^* which is going to leave the presupposition untouched (it is going to let it project through; cf. Spector & Sudo 2017) and exhaustify the assertion part as in (32).[17]

(32) $[[\text{EXH}^*[A_p]]] = \lambda w : p(w).[[\text{EXH}^*[A_p]]](w)$

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15 Thanks to Clemens Mayr and Paul Marty for discussion on this point.

16 Magri 2009, Gajewski & Sharvit 2012, Spector & Sudo 2017, Sudo & Romoli 2017, Marty 2017.

17 We are using here the notation from Heim & Kratzer 1998, where a lambda expression $\lambda w : p(w).q(w)$ is a function from worlds into truth-values, which is only defined for worlds w when p is true at w and when defined is true if q is also true at that w.

Second, we can make use of the new exhaustivity operator and leave the assertion component intact while exhaustifying the presuppositional aspect of the meaning of the sentence as in (33).[18]

(33) $[[\text{EXH}_2^*[A_p]]] = \lambda w : [[\text{EXH}^*]](p)(w). \; [[A_p]](w)$

Now that we are equipped with this other exhaustivity operator, we can capture the relevant reading of (31) with the LF in (34).

(34) EXH_2^*[Maria is unaware that some of the students passed the exam]

This is because the assertion component in (34) is left untouched by EXH_2^*, therefore entailing that Maria doesn't believe that *any* of the students passed the exam, but the presupposition that some of the students passed the exam is now correctly strengthened to entail that *not all* of them did.

Now, our case might appear similar to (31) in all relevant ways. In particular, our problem involves a similar mismatch between the content and the presupposition of a sentence. Hence one might think that the novel exhaustivity operator above will also produce the right outcome in our case. This is a natural thought, but it is incorrect. There is a crucial difference between (34) and a case like (15), repeated below.

(15)   Either Maria can't go study in Tokyo or Boston, or she is the first in our family who can go study in Japan.

In the case of (31), if we don't compute implicatures in any way, we predict a presupposition that is *weaker* than what the data suggest. So we need an operator that allows us to strengthen the presupposition by computing the implicature, without strengthening the content of the assertion. This is exactly what EXH_2^* above does. Conversely, in the case of (15), if we don't compute free choice we predict a presupposition that is *stronger* than what we data suggest. As we pointed out, the problem is that the presuppositions triggered by the second disjunct appear to be filtered by some other element of the sentence, i.e. (15) is presuppositionless. The problem is that no exhaustivity operator at the global level can produce the result of *weakening* the presupposition of a disjunction like (15).

Let us elaborate. Suppose we try to exhaustify the presupposition of (34) globally. Using again standard assumptions about presupposition, and embedding that presupposition under an exhaustivity operator EXH^*, as in (35), we get the presupposition in (36). Now, no matter what alternatives EXH_2^* uses, it will either be

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vacuous or it will strengthen the presupposition of (34) by conjoining the negation of some of these alternatives to it. Either way, it cannot *weaken* the presupposition to a tautology, which is what we need for filtering.[19]

(37) $\textsc{exh}^*_2$[Either Maria can't go study in Tokyo or Boston, or she is the first in our family who can go study in Japan].

(38) $\textsc{exh}^*((\Diamond(A^+ \vee B)) \rightarrow \Diamond A))$

In sum, no matter what meaning we assume for $\textsc{exh}^*_2$ the alternatives it operates on, and where it is inserted, it cannot help with filtering. Exhaustivity operators are simply not in the business of weakening their prejacent, as we would need for filtering.

5   Two proposals

We now turn to two more promising avenues of research towards a solution. The first holds on to an implicature account of free choice, and exploits a mechanism of free insertion of redundant material, building on an account of presupposition projection and anaphora recently proposed by Rothschild (2017). The second is based on abandoning the implicature approach altogether for a semantic account (Goldstein 2018). Each of these options has problems, as we point out.

5.1   Free insertion of redundant material

5.1.1   Filtering free choice and free insertion

Rothschild (2017) proposes a trivalent approach to presupposition projection and anaphora. The crucial ingredient of his account for us is his mechanism of free insertion of redundant material, which builds on his previous proposal in Rothschild 2008 (see also Chierchia 2009, Kamp & Reyle 1993 and Geurts 1999). For illustration, consider a disjunction like (39).[21]

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19 Conversely, if we try to exhaustify within the first disjunct, above or below negation, this will make no difference. The reason is that no presupposition is present; the presupposition comes from the second disjunct.[20]

(35)   [Either $\textsc{exh}^*_2$[Maria can't go study in Tokyo or Boston], or she is the first in our family who can go study in Japan].

(36)   [Either not[$\textsc{exh}^*_2$[Maria can go study in Tokyo or Boston]], or she is the first in our family who can go study in Japan].

21 Examples like (39) go back to Barbara Partee; see Partee 2004.

(39)   There isn't a bathroom here, or it's under the stairs.

(39) has a coherent reading. This is hard to explain in the light of the fact that anaphora in natural language is highly constrained, and it's not clear how we can assign a suitable antecedent to the pronoun *it* in the second disjunct. In particular, notice that, in minimal variants of (39), anaphora is not felicitous.

(40)   There isn't a bathroom here. ??It's under the stairs.

Rothschild (2017)'s account starts from the observation that (40) is equivalent to (41). Assuming that (40) can be analyzed as (41) allows us to get the anaphoric facts right: the underlined inserted part provides a suitable antecedent for the pronoun.

(41)   There isn't a bathroom here, or <u>there is and</u> it's under the stairs.

In other words: we can say that sentences involve redundant conjunctions at the level of logical form. For instance, a sentence of the form $\ulcorner A \vee B \urcorner$ can be analyzed as having the logical form $\ulcorner A \vee (\neg A \wedge B) \urcorner$. The more formal definition of this insertion mechanism is in (42) (adapted from Rothschild 2017):[22]

(42)   **Adding Redundant Conjunctions (ARC)**: if a sentence A contains the clauses C and B, you may replace any instance of B with $C \wedge B$ if the resulting sentence is logically equivalent to **A**.

As Rothschild (2017) points out, this mechanism needs to be constrained not to overgenerate. The viability of his proposal ultimately depends on how principled these constraints are.

Let us show how free insertion can provide a solution to our problematic cases. Consider again the cases of disjunction and *unless*. Recall that there was no way to insert EXH* in the first disjunct/restrictor of *unless* that would give us the desired reading without also changing the meanings of the latter.

(43)   Either $\neg \Diamond (A^+ \vee B) \vee C_{\Diamond A}$

(44)   Unless $\neg \Diamond (A^+ \vee B), C_{\Diamond A}$

Notice, however, that (43) and (44) are classically equivalent to (45) and (46). We can, therefore, analyze (43) and (44) as having logical forms corresponding to (45) and (46), in accordance with (42).

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22 Where classical equivalence is defined as follows:

(i)   **Definition of classical equivalence**: A and B are classically equivalent if for every interpretation $[[ ]]$ and world $w \in W$, $[[A]]^w = 1$ iff $[[B]]^w = 1$.

(45)   Either $\neg\Diamond(A^+\vee B)\vee(\underline{\Diamond(A^+\vee B)}\wedge C_{\Diamond A})$

(46)   Unless $\neg\Diamond(A^+\vee B),(\underline{\Diamond(A^+\vee B)}\wedge C_{\Diamond A})$

In this way, we have a site where we can add EXH*. This allows us to obtain free choice, which in turn yields filtering of the presupposition. Hence we can exhaustify the inserted redundant material in the second disjunct/scope of *unless* as in (47) and (48).

(47)   Either $\neg\Diamond(A^+\vee B)\vee(\text{EXH}^*(\Diamond(A^+\vee B))\wedge C_{\Diamond A}=$
        Either $\neg\Diamond(A^+\vee B)\vee(\Diamond A^+\wedge\Diamond B)\wedge C_{\Diamond A}$

(48)   Unless $\neg\Diamond(A^+\vee B),(\text{EXH}^*(\Diamond(A^+\vee B))\wedge C_{\Diamond A}=$
        Unless $\neg\Diamond(A^+\vee B),(\Diamond A^+\wedge\Diamond B)\wedge C_{\Diamond A}$

With these ingredients in place, we predict the desired readings for (15) and (16). The reason is that the presupposition is filtered by the inserted material, once we strengthen the latter in a suitable way.[23] At the same time, since we have two distinct syntactic objects, we can apply our free choice operator EXH* to one, but not to the other. Hence we can still take $\Diamond(A^+\vee B)$ to contribute its basic meaning to truth conditions. This solves our problem, at least for the basic cases above.[24]

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23 The predicted projection in a conjunction like $A\wedge B_C$ is $A\to C$. Therefore in our cases the projection predicted in the second disjunction/scope of *unless* is (i), which is true in every context and therefore predicts correctly that *A* will not project.

(i)   EXH$^*(\Diamond(A^+\vee B))\to\Diamond A$

24 An analogous argument involving anaphora and implicature approaches to the multiplicity inference of plural nouns, according to which the more than one suggestion of plural arises as an effect of exhaustification (Spector 2007 among others), comes from cases like (i):

(i)   There are no students around or they are hiding.

In particular, for the plural pronoun to have a suitable plural antecedent, we could analyse (i) as (ii):

(ii)   There are no students around or (there are students around and they are hiding)

And we can then add EXH* in the second disjunct as in (iii) and have the meaning which we could paraphrase as in (iv), which allows the pronoun to have a plural antecedent.

(iii)   There are no students around or EXH*(there are students around) and they are hiding.

(iv)   There are no students around or there are at least two students around and they are hiding.

5.1.2 Problems for the free insertion account

In this subsection, we show that Rothschild's theory runs into trouble with cases that are very similar to those we have used so far. To get the right predictions, the theory needs to be modified in a number of ways.

Can we exhaustify freely inserted material? The first worry is that, even on the more liberal understanding of **ARC**, the account runs into trouble with exhaustification. In particular, we need to exhaustify freely inserted material whose antecedent is not exhaustified. There is some evidence that this kind of exhaustification might not be available.

Consider the case in (49).

(49) Either Maria didn't visit Madrid or Barcelona [at all], or she regrets having visited only one of the two main cities in Spain.

(49) parallels our core example in (15). It is a disjunction with a presupposition that Maria only visited one of Madrid or Barcelona triggered in the second disjunct. This presupposition is not entailed by the literal meaning of the negation of the first disjunct, *Maria visited Madrid or Barcelona*. Now, our judgment about (49) is that it is not presuppositionless. On the contrary, it seems to suggest that, if Maria visited Madrid or Barcelona, she visited only one of the two.

On the other hand, the free insertion account we are considering does predict that the presupposition can be filtered by the first disjunct. In particular, the presupposition is filtered if we use the following LF for (49):

(50) Either $\neg(A \vee B) \vee \underline{(\text{EXH}^*(A \vee B)} \wedge C_{(A \wedge \neg B) \vee (B \wedge \neg A)})$

Perhaps the proponent of free insertion can explain why (50) is not an available LF. At the moment, though, we cannot see a principled story that accomplishes this.

Trouble from the converse case. Another problem is generated by something like the converse case of our running example.[25] Consider (51). The first disjunct contains a positive sentence with a modal and disjunction, which we want to read with free choice. At the same time, despite the presence of a presupposition trigger in the second disjunct, the sentence doesn't presuppose that Maria cannot go study in Tokyo, i.e. the presupposition of the second disjunct appears to be again filtered by the first disjunct. This cannot be explained if we use the enriched, free-choice meaning of the first disjnct in the algorithm for presupposition projection.

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25 Thanks to Shane Steinert-Threlkeld for suggesting this case to us.

(51) Either Maria can go study in Japan or the US or she is the first in our school who can't go study in Tokyo.
↛ *Maria can't go study in Tokyo*

To appreciate the problem consider the schematic version of (51) in (52):

(52) Either $\diamond(A \vee B) \vee C_{\neg \diamond A^+}$

As a start, we know we want to read the first disjunct with free choice, so we have to eventually insert an EXH* in the first disjunct to derive that as in (53).

(53) Either EXH* $\diamond (A \vee B) \vee C_{\neg \diamond A^+} =$
Either$(\diamond A \wedge \diamond B) \vee C_{\neg \diamond A^+}$

Once we do that, though, the predicted conditional presupposition for (53) is (54): Maria can't go study in Tokyo if she cannot go study in the States. This again appears too strong.

(54) $\neg(\diamond A \wedge \diamond B) \rightarrow \neg \diamond A^+ =$
$\neg \diamond B \rightarrow \neg \diamond A^+$

So far this is similar to our basic examples. What is interesting about this case, however, is that there is no obvious way to insert any clause from the sentence that would help generate the right prediction. That is, there is nothing in the first disjunct that could be inserted redundantly and would help filter the presupposition of the second one.

There is a natural move here, but it comes with a cost in terms of complicating **ARC** further.[26]

(55) **Adding Redundant Conjunctions** (**ARC**): if a sentence A contains the clauses C and B, you may replace any instance of B with $C \wedge B$ or with $\neg C \wedge B$ if the resulting sentence is logically equivalent to **A**.

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26 This move, however, might be independently needed. Josh Dever pointed out to us the following example:

(i) Either there's an absence of a bathroom in this house, or it's under the stairs.

Accounting for the felicity of (ii) in Rothschild's account *might* require copying the negation of the first disjunct, as suggested in (55). At the same time, the standard version of **ARC** may be able to handle it depending on how one spells out the notion of "containing a clause". In particular, we might say that *there's an absence of a bathroom in this house* still contains in the relevant sense *there is a bathroom in this house*. (This is actually a prediction we would get if we allowed "containment" to be spelled out via deletion and/or replacement of constituents by subconstituents, following e.g. the way that Katzir (2007) defines alternatives.) If we are allowed to say this, we can account for (i) in the basic Rothschild framework.

To see how (55) helps, consider again our case in (51): using (55) we can now take the first disjunct and insert its negation in the second one as in (56). The inserted material entails the presupposition of the second conjunct in the second disjunct and thus filters it, as desired.

(56)   Either $\Diamond(A \vee B) \vee \neg \Diamond(A \vee B) \wedge C_{\neg \Diamond A^+}$

We can then insert EXH* as in (57) and obtain the correct reading with no presupposition: either Maria can choose between Japan and the States or she is the first in our school who cannot go to Tokyo.

(57)   Either EXH*$(\Diamond(A \vee B)) \vee \neg \Diamond(A \vee B) \wedge C_{\neg \Diamond A^+}$

In sum, a case like (51) is a challenge for the original version of the **ARC**. We can tweak the definition as in (55) and allow it to insert the negation of redundant parts of the sentence. This helps, but the move seems to have no independent motivation.

Contextual salience and contextual equivalence.   Finally, consider the following sentence, adapted from Rothschild 2017.

(58)   Either Maria didn't pass her last exam, or she is allowed to go study in Tokyo or Boston. And if she passed her last exam, she is the first person in our family who can go study in Japan.

Similarly to our standard examples, (58) carries no presupposition and hence gives rise to filtering. But this cannot be explained by the **ARC** as defined so far for two reasons. First, any plausible candidate for the material to be copied and inserted in (58) is outside sentence boundaries. This may be fixed by allowing ourselves to copy material from the clause that precedes the disjunction. For example, we might plausibly insert the following (and then exhaustify the underlined inserted part):

(59)   Either Maria didn't pass her last exam, or she can go study in Tokyo or Boston. And if she passed her last exam, she is allowed to study in Boston or Tokyo and she is the first person in our family who can go study in Japan.

(59) is equivalent to (58): if Maria passed her last exam, then it's not true that she is not allowed to study in Boston or Tokyo. That is, she is allowed to study in Boston or Tokyo. There is, however, also a second problem. The disjunctive sentence in (59) is not *logically* equivalent to the disjunctive sentence in (58), but only contextually equivalent to it. Hence the constraint on the material to be freely inserted should be relaxed. Freely inserted material needs to be not logically redundant, but only redundant given contextual information.

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This discussion suggests replacing ARC in (42) with:[27]

(60) **Adding redundant conjunctions (ARC)**: if a sentence A contains the clause B you may replace any instance of B with $C \wedge B$ or $\neg C \wedge B$, where C is a *contextually salient* clause, if the resulting sentence is *contextually equivalent* to **A**.

Of course, it needs to be checked whether the new principle is too liberal, and causes overprediction elsewhere. This task goes beyond the goals of our note.

5.2 Semantic accounts of free choice

5.2.1 Filtering free choice and semantic accounts

Semantic accounts hardwire free choice in the meaning of possibility modals and/or disjunctions, rather than deriving it as a scalar inference. Classical accounts in this vein (see, among others, Simons 2005 and Zimmerman 2000) have been plagued by the problem of explaining the disappearance of free choice under negation and other downward entailing operators. More recent semantic accounts are designed explicitly to deal with this problem (Aloni 2016, Starr 2016, Willer 2017, Goldstein 2018). Here we want to point out that semantic accounts of the new breed yield the correct predictions for our data, in particular focusing on the homogeneity-based account by Goldstein (2018).

For concreteness, we present informally a simplified version of the first system in Goldstein 2018, referring the reader to Goldstein's paper for a full discussion. Goldstein's main idea is that free choice is the product of a kind of homogeneity (cf. Križ 2015). To accommodate homogeneity, he uses a trivalent semantics, on which all clauses are mapped to one of three truth values: true, false, and indeterminate (represented as '#'). The semantics derives free choice via two main assumptions. First, as on traditional alternative semantics, disjunctive clauses introduce sets of alternatives: hence e.g. $A \vee B$ denotes a set containing the two propositions [[A]] and [[B]]. Second, the lexical meaning of possibility modals involves a requirement (which, for our purposes, we can model as a presupposition) to the effect that the alternatives denoted by the prejacent should be both evaluated in the same way.

These are Goldstein's lexical entries. Notice that '⬦' is the object language possibility modal, which is defined by appealing to a metalanguage modal '◇'.

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27 Where contextual equivalence is defined as follows:

(i) **Definition of contextual equivalence**: A and B are contextually equivalent in a context C if for every interpretation [[ ]] and world $w \in C$, $[[A]]^w = 1$ iff $[[B]]^w = 1$.

$$[[\mathsf{p}]] = \{\lambda w. \; p(w) = 1\}$$

$$[[\neg A]] = W - \bigcup [[A]]$$

$$[[A \vee B]] = [[A]] \cup [[B]]$$

$$[[\Diamond\!\!\!\!\Diamond A]] = \{\lambda w. \; \exists v \in \{0, 1\} \; \forall \mathbf{A} \in [\![A]\!], \Diamond\mathbf{A}(w) = v. \; \forall \mathbf{A} \in [\![A]\!], \Diamond\mathbf{A}(w) = 1\}$$

Here is, schematically, how this system derives free choice. Take $\Diamond\!\!\!\!\Diamond (A \vee B)$. $A \vee B$ denotes a set of two propositions, i.e. $\{\mathbf{A}, \mathbf{B}\}$. Given the lexical meaning of $\Diamond\!\!\!\!\Diamond$, $\Diamond\!\!\!\!\Diamond (A \vee B)$ presupposes that $\Diamond\mathbf{A}$ and $\Diamond\mathbf{B}$ have the same truth value, and asserts that they are both true. Once we place the whole clause under negation, via the homogeneity presupposition we get that, whenever the sentence is defined and true, both $\Diamond\mathbf{A}$ and $\Diamond\mathbf{B}$ are false. This is because the presupposition requires that they are either both true or both false and the sentence asserts that it's false that they are both true. As a result, the semantics correctly predicts the free choice reading of (61) and the sometimes called 'dual prohibition' reading of (62).

(61)   a.   Maria can go to Tokyo or Boston
          b.   ⤳ *Maria can go to Tokyo and she can go to Boston*

(62)   a.   Maria can't go to Tokyo or Boston
          b.   ⤳ *Maria cannot go to Tokyo and she cannot go to Boston*

The system also captures our problematic data. Consider again (63), schematised as in (64), and remember that the goal is to obtain a dual prohibition interpretation of the first disjunct, while a free choice interpretation of its negation for filtering purposes.

(63)   Either Maria can't go study in Tokyo or Boston, or she is the first in our family who can go to study in Japan.

(64)   Either $\neg \Diamond\!\!\!\!\Diamond (A^+ \vee B) \vee C_{\Diamond A}$

On a system like Goldstein's, we can obtain both of those in the following way: First, the negation of the first disjunct, $\Diamond\!\!\!\!\Diamond (A^+ \vee B)$, directly gives rise to the free choice interpretation that $\Diamond A^+ \wedge \Diamond B$. The presupposition of the whole sentence in (63) is, therefore, predicted to be equivalent to $(\Diamond A^+ \wedge \Diamond B) \rightarrow \Diamond A$, hence correctly predicting filtering. Second, while the first disjunct in itself is weak - it is just the negation of the free choice interpretation i.e. $\neg(\Diamond A^+ \wedge \Diamond B)$ - it also introduces a homogeneity presupposition which projects through the whole disjunction. The combination of the homogeneity presupposition and the meaning of the first disjunct entails the expected dual prohibition reading that $\neg \Diamond A^+ \wedge \neg \Diamond B$. Similarly Goldstein's system can also account for the converse of our main examples, which we repeat from below in (65) and schematically in (66).

(65) Either Maria can go study in Japan or the US, or she is the first in our family who can't go study in Tokyo.

(66) Either $\diamondsuit(A \lor B) \lor C_{\neg\diamondsuit A^+}$

This is because the first disjunct has directly the free choice interpretation that $\diamondsuit A \land \diamondsuit B$. The negation of the first disjunct is now weak, only amounting to the negation of free choice. However when this combines with the homogeneity presupposition, $\diamondsuit A \leftrightarrow \diamondsuit B$, which projects to the whole disjunction, it gives rise to the dual prohibition interpretation $\neg \diamondsuit A \land \neg \diamondsuit B$, thereby correctly capturing the filtering of the presupposition of the second disjunct.

In sum, a semantic account like Goldstein's (2018) can capture our problematic case. But it is still not immune to problems.

5.2.2 Open issues for the semantic approach

The account by Goldstein (2018) captures our main examples by relying on the claim that the homogeneity presupposition (i.e., the presupposition that Maria can go study in Tokyo if and only if she can go study in Boston) projects from the first disjunct to the whole clause. This is a plausible assumption about the projection of run-of-the-mill presuppositions. But it is an open issue whether homogeneity does behave like run-of-the-mill presuppositions in this respect (see Križ 2015 for extended discussion). Here we present a couple of examples which seems to challenge this key assumption.

First, consider the following discourse:

(67) If Maria is allowed to go study only in Tokyo, she will go to Japan. If she is allowed to go study in Tokyo or Boston, she will go to the US.

(67) shows that there are cases where the homogeneity presupposition triggered in the antecedent of a conditional does not project globally. The antecedent of the first conditional raises the epistemic possibility that Maria is allowed to study in Tokyo and not in Japan, which explicitly contradicts the homogeneity presupposition of the second conditional. So this presupposition cannot project globally if the sentence is felicitous.

Second, we can force homogeneity not to project globally in cases like ours. Consider the following discourse:

(68) John applied for graduate school in Tokyo and Boston. We don't know yet what will happen, but any positive outcome will make him happy. If he's accepted to only one of the programs, he will be happy because he can go to grad school. If he's accepted to both, he will be thrilled because he will

have a choice. Moreover, unless he cannot go to Tokyo or Boston, he's going to be the first person in our family who's allowed to study in Japan and also the first who's allowed to study in the US. This will make him very proud.

The *unless* sentence in (68) is uttered in a context where it is abundantly clear that the homogeneity presupposition is not part of the common ground (i.e., it is possible that John is admitted to exactly one of the programs). But we still think that the sentence is felicitous and it doesn't presuppose that John is allowed to go study in Japan (or that he is allowed to study in the States). The homogeneity account also suffers from an undergeneration problem and the same issue can be reproduced, *mutatis mutandis*, with (65).[28]

Moving on beyond disjunction, we also note that that semantic accounts do not predict free-choice-type effects in sentences involving conjunction.[29] (69) also gives rise to a free choice inference:[30]

(69)   Maria is not required to go to Tokyo and Boston.
        ⇝ *Maria is allowed to not go to Tokyo and she's allowed to not go to Boston*

Also, a counterpart of (69) gives rise to a filtering phenomenon that is analogous to the one that we have discussed:

(70)   Either Maria is required to go to Japan and the US, or she's the first in her family who is not required to go to Tokyo.

(71)   Either $\Box(A \wedge B) \vee C_{\neg\Box A^+}$

Goldstein's account won't predict either the basic free choice effect triggered by (69) and the filtering in (70). The reason is that in Goldstein's system conjunctions don't introduce alternatives (and it is not clear how to do it in a way that doesn't create problems elsewhere). Hence the basic algorithm for deriving free choice doesn't even get started. Of course, one could argue that the inference in (69) are due to different mechanism from free choice inferences triggered by disjunction. Perhaps this is true. But the semantic theorist still owes an explanation of how this inference is generated, if they want to give an account of all free-choice-type phenomena in

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28 Note that accommodating the presupposition in the first disjunct will not do either, as this would make the first disjunct equivalent to: Maria can go study in Boston if and only if she can go study in Tokyo and it's not true that she can go study in Boston and can go study in Tokyo. In turn, its negation would be too weak filtering purposes: it amounts to the negation of the homogeneity assumption and cannot therefore filter the presupposition of the second disjunct anymore.

29 Thanks to Simon Goldstein for extensive and very helpful discussion about these points.

30 Ciardelli et al. (2018) cast doubts on whether the inference (69) is a possible inference of the sentence; see however Fox 2007 for discussion and Chemla (2009) for experimental evidence for this inference.

natural language.[31]

6   A note on the predicted truth conditions

Before closing, we want to go back to our main case repeated in (72) and briefly discuss the predictions of all the accounts discussed above, with respect to its truth-conditions.[32]

(72)   Either Maria can't go study in Tokyo or Boston, or she is the first one who can go study in Japan.

On both the solutions we considered, we can paraphrase the predicted truth conditions as follows:

(73)   Either Maria can't go study in Tokyo and she can't go study in Boston or she has free choice between the two and is the first one who can go study in Japan.

In other words, the sentence is predicted to be not true if Maria can only go to Tokyo, even if she is indeed the first one who can go study in Japan. (More precisely, it is predicted to be false under the implicature account supplemented with the ARC, while it is predicted to be undefined in the homogeneity approach.)

It's unclear that this prediction is right. Suppose that someone utters (72). And suppose that, after checking, we find out that Maria can only go study in Tokyo (and that she is indeed the first one who can go study in Japan). It seems to us that one can say that this person was right.

This said, we have to be careful that this way of judging an utterance as being true after learning more information might lead to more 'tolerant' intuitions than in the standard case. We cannot exclude that we might be more inclined to say that the speaker said something true *a posteriori*, after learning more information, than in the case in which we are judging whether she said something true against the information we already have at the time of utterance. Nonetheless, this is an important prediction

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31 Note that the implicature approach, supplemented with the ARC, can account for the case in (70). This is because this approach can analyse it as in (i), in which the negation of the first disjunct is copied and subsequently exhaustified. The exhaustified inserted part gives rise to the inference above in (69) and therefore can correctly account for the filtering effect in (70).

(i)   Either Maria is required to go to Japan and the US, or EXH[she is not required to go to Japan and the US] and she's the first in her family who is not required to go to Tokyo.

32 Thanks to an anonymous reviewer, Benjamin Spector, Paul Marty, Shane Steinert-Threlkeld and Simon Goldstein for discussion on this point.

of both of the strategies sketched above and it should be investigated further.

7   Conclusion

We have investigated the interaction between free choice and presuppositions. We have focused on sentences embedding both a disjunction in the scope of a possibility modal and a presupposition trigger, and we have looked at how the free choice effect triggered by the former can filter the presupposition of the latter. We considered three cases: conditionals, disjunctions and *unless* sentences. We observed that in all of these cases the presuppositions triggered by the consequent, second disjunct, or the scope of *unless* appear to be filtered by a free choice inference associated with the rest of the sentence. The case of the conditional can be accommodated by scalar accounts of free choice, but the disjunction and *unless* cases cause a substantial problem for these accounts. We sketched two promising possible accounts. The first holds on to an implicature account and uses an algorithm that allows free insertion of redundant material. The second exploits a semantic semantic account of free choice. Our discussion is not conclusive, but our data shows that the interaction of free choice and presupposition is important for evaluating theories of free choice.

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