You may like or dislike this paper, and we do care which. Sluicing and free choice[1]

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Abstract. In this paper we study how different FC inferences are derived in cases of sluiced sentences that differ just by the verb embedding the sluice, improving on Fusco (2019). We propose to add a new economy condition to Rudin (2019) that is able to derive - together with other existing constraints - the desired sluices from certain syntactico-semantic properties (temporal orientation, (Condoravdi, 2001)) of embedding verbs. We then present an analysis in which the attested FC inferences are derived from the different sluices through the interplay of scopal parallelism (Chung et al., 1995; Fusco, 2019) and uniqueness presupposition of singular *which* clauses (Dayal, 1996).

Keywords: Sluicing, Free Choice, Uniqueness Presupposition, Orientation.

1. Introduction

In this paper we discuss the mechanics of sentences involving both sluicing and free choice disjunction. In particular, we aim at providing an analysis for the different meanings generated by the following two sentences:

(1)   a.   You may have coffee or tea, I don't know which.
        b.   You may have coffee or tea, I don't care which.

Whereas the former seems to presuppose that only one alternative is possible (and the speaker cannot tell which one it is), the latter appears to entail that both alternatives are possible to the addressee (and the speaker does not care which one the addressee will actually choose). In technical terms, while (1b) licenses Free Choice inferences, (1a) blocks them. We follow Aloni's (2018) and Fusco's (2019) intuition that the different readings are tied to the presence of the modal in the interpretation of the sluice (the partially elided *wh*-question) in (1a), and to the absence of the modal in the interpretation of the sluice in (1b):

(2)   a.   You may have coffee or tea, I don't know which [you may have].
        b.   You may have coffee or tea, I don't care which [you have].

This work wishes to accomplish two tasks. The first one is understanding why (1a) and (1b) yield different interpretations of the elided material. The second one is explaining how from these different elided structures we get different inferences with regards to FC. To account for the first task, we claim that the possible interpretations of a sluice are governed by an economy constraint which predicts the ideal sluice to discard the modal, which is introduced again when maximal economy would give an infelicitous sentence. Our discussion will highlight the importance of the notion of temporal orientation: leaving out the modal in the sluice in (1a) would result in an infelicitous sentence ('#You may have coffee or tea, but I don't know which you have.'), because of a contrast between the future time of evaluation given to *have* by the modal *may* in the antecedent, and the present time of evaluation provided to the same event *have* by

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know in the consequent. Repeating the modal ensures a match between the two event times. On the contrary, *care* in the consequent of (1b) is able to provide future time of evaluation even if the event in its scope is expressed with a present. It is so because while *know* has present orientation, *care* has future orientation just like *may*. From this, to achieve our second goal, we derive the different FC readings by assuming a uniqueness presupposition triggered by singular *which* clauses. In (1a) this presupposition applies to the modal and generates a contrast with the FC reading of the antecedent according to which the possibility modal applies to multiple elements. Therefore, the Non-FC reading of the antecedent in (1a) is selected. On the other hand, in (1b) the uniqueness presupposition applies to the event itself and not to its possibility. Therefore, no contradiction is detected with the FC reading of the antecedent and FC inferences are thus permitted and directly derived via a narrow scope configuration.

In the next section we will present the previous account of the FC-in-sluicing puzzle by Fusco (2019), together with our reasons to improve her analysis. In section §3, we formulate an economy constraint that shows how we can derive two different sluices and we explain the role of temporal orientation in the selection of the optimal sluice. In section §4, we show how we get from different sluice to different FC inferences, through the uniqueness presupposition of singular *which* clauses and different scopal configurations. And finally, in section §5, we summarize our work, and we propose possible directions and puzzles for future researcg on the topic.

2. Fusco's sluicing on free choice

The main predecessor of our work is Fusco (2019). In her paper, Fusco aims at providing an account for FC in sluicing by means of a scope-based account. Fusco's account departs from the crucial intuition mentioned before. The intuition is that FC is blocked in sluicing constructions when the modal is 'at-least-semantically' present in the elided material (Fusco, 2019; Aloni, 2018).

(3) a. You may have coffee or tea, but I don't know which you **may have**.
     b. You may have coffee or tea, but I don't care which you **have**.

Starting from this observation, Fusco's theory develops on two main assumptions. The first assumption is that FC can only be generated when the disjunction takes narrow scope (NS) with respect to the modal. In other words, FC arises whenever we have a logical form of the kind $\Diamond(a \vee b)$ (narrow scope configuration), and does not arise whenever the logical form is $\Diamond a \vee \Diamond b$ (wide scope configuration). This will block FC when the modal is present in the sluice, because of scopal parallelism. We will use this notion too later, for now it suffices to say that whenever the modal is in the sluice, the disjunction in the antecedent will take wide scope configurations, and therefore will block FC. Conversely, the absence of the modal in the sluice, induces a NS interpretation of the antecedent, which gives rise to FC. Further evidence for this analysis comes from the fact that substituting FC disjunctions with FC indefinites even yields ungrammaticality for the *know* case:

(4) a. #John may sit in any chair, I don't know which one ~~he may sit in~~.
     b.   John may sit in any chair, I don't care which one ~~he sits in~~.

The ungrammaticality of (4a) is predicted under Fusco (2019) if we consider that *any* has an obligatory narrow scope configuration (Chierchia, 2006, 2013), and this cannot satisfy scopal

parallelism when its *wh*-correlate - *which one* - scopes above the modal. We will later show that there are also additional reasons that make (4a) infelicitous.

Fusco's second assumption concerns the motivations behind which such configuration would be triggered through the presence of the modal. A couple of remarks seem to tie the phenomenon to the notion of *ignorance*. It is the ignorance declaration of the speaker to give rise to Moorean tension with a FC (i.e. narrow scope, for Fusco) reading of the antecedent, revealing that the speaker is not in the position to grant a FC permission. To resolve the tension, the wide scope reinterpretation mentioned above would do the job. However, we believe this point should be further clarified. In the next subsections we bring some arguments that tackle these two assumptions. In particular:

1. we challenge the first assumption, providing evidence from existing literature on the existence of wide scope Free Choice, posing serious threats to Fusco's overall theory on the licensing of FC cancellation;

2. we will oppose the second assumption through a series of counterexamples, showing that ignorance cannot be taken to be the reason for the blocking of Free Choice.

2.1. Wide scope FC

Fusco's theory relies on the idea that the absence of the modal in the sluice would trigger the NS configuration of the sluice in (3b), giving rise to FC, while the presence of the modal in the sluice would trigger the WS configuration in (3a), blocking FC, or, more precisely, inducing a non-FC re-interpretation of the antecedent. However, dismissing the possibility of wide scope FC might be too hasty. Since Zimmermann's (2000) example (*Detectives may go by bus or they may go by boat.*), wide scope FC has been an open issue, and most recent FC theories aim at accounting for wide scope FC together with its narrow scope counterpart, as in Bar-Lev (2018), Goldstein (2019) and Aloni (2022). While in Aloni's state-based modal logic, wide scope configurations are just compatible with FC;[2] in Bar-Lev (2018) wide scope configurations generate FC when they are hiding a covert *else*. In fact, a crucial step in the debate is to properly isolate examples of wide scope FC. What we mean is that surface scope might just be apparent, and wide scope examples might reveal to result from operators or movements applied to a narrow scope LF. In order to find the desired examples, it is important to detect cases in which scope is fixed and overt. Bar-Lev (2018) reports the following example:

(5) Either Mary can have a pizza or else (=if she doesn't have a pizza) she can have a hamburger.

The claim is that *or else* fixes wide scope, while preserving FC. Crucially, Bar-Lev (2018) notices that every time a sentence with wide scope surface gives rise to FC inferences, it remains grammatical whenever we overtly introduce *or else* (Bar-Lev, 2018). As a consequence, building on the theory of Klinedinst and Rothschild (2012), Bar-Lev (2018) claims that every wide scope FC involves a covert *or else*. According to Klinedinst and Rothschild (2012), the use of *or* with the meaning of *or else* is a 'non truth tabular disjunction'. Namely, *or* has two different uses: one in which it behaves as the commonly acknowledged truth tabular disjunction, and

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[2]When pragmatically enriched, if we assume an indisputable accessibility relation (Aloni, 2022); see the original paper for references.

one in which it means *and if not*. In particular the idea is that in wide scope FC *and* scopes above the modal, while *if not* takes a non modal argument, introducing for the second disjunct a scenario in which the event in the scope of the first modal (but not the possibility itself) is not realized. If we have this conjunctive meaning in apparent wide scope FC disjunctions, then the derivation of FC comes straightforwardly. '*(possible a) and, if not a, (possible b)*' gives us the FC meaning $\Diamond a \wedge \Diamond b$. Either way, considering the "or else" argument or not, FC can arise in wide scope configurations. The same conclusion has also been achieved through experimental methods by Cremers et al. (2017). Fusco's assumptions become then problematic. Interpreting the antecedent as having wide scope configuration, would not guarantee FC blocking, since FC is either derivable anyway, as in Aloni (2022) (under the assumption of an indisputable accessibility relation), or it might hide a covert "else", as in Bar-Lev (2018). Fusco might still argue that there is a strong contrast between the FC permission in the antecedent (caused by the conjuntive reading of the two disjunct) and the *ignorance* declaration in the consequent. Nonetheless, in the next section we will show that *ignorance* cannot be the culprit of FC cancellation (and thus of the contrast in (3)). We believe these examples are too big of an obstacle for Fusco (2019) and it is not clear how a scope-only account of FC would be able to properly account for FC cancellation in cases like (3a).

2.2. Ignorance shouldn't be blamed

Building on a consideration by Aloni (2018), Fusco's (2019) theory on sluicing and FC is grounded on the belief that FC is blocked whenever an ignorance (self)ascription by the speaker in the consequent triggers Moorean tension with the possible FC configuration of the antecedent. As a result, only the so-called 'ignorance sluices' would be responsible for FC cancellation, while 'other types of sluices, such as the indifference sluice [...] and the encouragement sluice [...], do not appear to cancel FC.' We believe that this observation is at least partially misleading. In fact, while Moorean tension might play an additional role for the specific *know* cases we observed with FC disjunction, 'indifference sluices' and 'encouragement sluices' are the *only* sluice types that do not block FC. It can be shown, it is not the case that the blocking of FC is always connected to ignorance and Moorean tension. Consider the following counterexamples:

(6)   You may have coffee or tea
       a.   ...guess which!
       b.   ...and I'm surprised you don't even wonder which.

In examples like these the intuition is that we do not have FC. However, it can be noted that there is no ignorance ascription to the speaker, therefore there cannot be any Moorean tension between the antecedent and the consequence. After this observation, some might redefine the theory, objecting then that maybe Moorean tension ascribed to the speaker is not a necessary element, but a general connection with some kind ignorance is, nonetheless. In fact, avoiding *knowledge* verbs is not a guarantee that we are not facing ignorance ascriptions. The imperative *guess* in (6a) presupposes the ignorance of the addressee. Similarly, the verb *wonder* in (6b) might be connected to ignorance, although in a more vague way. However, any sort of indirect ignorance ascription is not necessary either, as can be seen in (7):

(7)   You may have coffee or tea

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    a.   ...and I'm sure you (already) know which.
    b.   ...and even Susie can tell which.

Not only are these examples missing direct or indirect ignorance ascription, but they are precisely attributing knowledge. Crucially, even in these knowledge ascription sluices the prominent reading is FC blocking. The counterexamples we presented show that different FC readings in sluicing are not linked to direct or indirect ignorance attributed to the speaker, to the addressee, or to a third person. It has to be nonetheless recognized that a line is drawn between relevance (and encouragement) verbs and all the other ones. We have therefore to research the origin of FC cancellation on some crucial grammatical (or pragmatic) feature that divides these two classes.

To sum up, if in 2.1 we have shown that any framework reducing FC effects to NS configurations is faulty in accounting for the FC-in-sluicing puzzle, in 2.2 we have presented cases that brought us to reconsider Aloni's (2018) and Fusco's (2019) idea that FC blocking is linked to ignorance. If it is true Fusco's theory can be criticized because of these two wrong assumptions, it is also true that it makes crucial remarks and observations that have inspired this work and our solution, as we will discuss at the end of §4.

In the next section we will sketch a theory on something that so far has been left unexplained: namely, why the modal is present in the sluice of the *know* case, but absent in the sluice of the *care* case. Partially building on previous literature on the constraints that rule interpretation on sluices, we want to determine the grammatical features that separate relevance verbs from other sorts of verbs.

3. Part I: economy and orientation

Recall the examples we started with to present the FC-in-Sluicing puzzle, with their overt sluice intepretations (i.e. 'presluices'):

(8)   a.   You may have coffee or tea, but I don't know which you **may have**.
    b.   You may have coffee or tea, but I don't care which you **have**.

We can therefore start from asking whether such presluices are predicted by current theories of sluicing. In particular, we can notice that (8b) involve a modal mismatch: the possibility modal *may* in the antecedent is not repeated in the sluice. This implies that we need a theory that is able to predict sluicing mismatches, such as Rudin (2019). As we will show soon, Rudin's theory encounters some problems in deriving (8b), but we believe it's possible to improve his theory with a reasonable economy constraint that acts on the size of the default presluice and generates a new hierarchy of optimal sluices that will derive the desired results. Let us start presenting Rudin (2019) and the problem that arises when (8a) and (8b) have to be derived.

3.1. Rudin (2019): eventive cores and the pragmatic principle

Rudin (2019), like Kroll et al. (2017), is interested in explaining the limits of sluicing mismatches, those cases in which the ellipsis site present less, more, or (apparently) different material than its antecedent. Some of the most striking examples discussed by Rudin (2019) are reported down here:

(9) a. [finiteness mismatch]
      The baseball player went public with his desire *to be traded*. He doesn't care where *he is traded*.
     b. [modality mismatch]
      Although Sally sees that she *must defeat her competitors*, she relies on Susie to tell her how *to defeat her competitors*.

Merchant (2001); Rudin (2019)

The generalization Rudin (2019) arrives to is that mismatches are possible whenever the mismatch involves material that originates outside the *eventive core*, where the *eventive core* is defined as 'the highest *v*P of a clause — the complete verbal complex, including the origin sites of verbs and their internal and external arguments' (Rudin, 2019). This reflects an intuition already presented in Langacker (1974), namely that 'sluicing privileges content that originates within the verbal domain (the verb and its arguments) over content that doesn't' (Kroll et al., 2017). The generalization can therefore be exemplified by the following tree (Rudin, 2019):
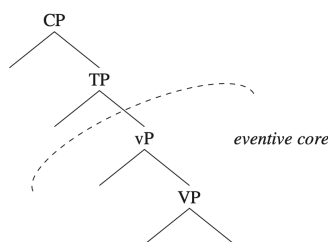
There is a cut-off at the level of *v*P: any head below it has to be identical between the antecedent and the ellipsis site, and any head above it is allowed to be different. Once this rule/generalization on possible mismatches has been established, a second principle, first proposed in Kroll et al. (2017), enters the picture in order to determine default sluicing interpretations:

(10) **Pragmatic principle to govern sluicing interpretations**
      If a perfectly antecedent-matching ellipsis site yields an interpretation that is plausible in context, that interpretation should be strongly preferred to interpretations generated via imperfectly antecedent-matching ellipsis sites.

According to this principle, every head contained in the antecedent should be copied by the interpreter into the ellipsis site by default, and only when this is contextually not possible some modifications (on layers above *v*P) happen in order to obtain the optimal sluice. Note that these two principles directly derive the attested sluice interpretation for our *know* case since it involves perfect match:

(11) **You may have** coffee or tea, I don't know which [**you may have**].

On the other hand, however, it seems that the prediction for the *care* case yields the unattested interpretation in which the modal is repeated in the sluice:

(12) **You may have** coffee or tea, I don't care which [**you may have**].

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To rule out (12) on the basis of Rudin's pragmatic principle, we should claim that its interpretation is somehow not plausible in context. However, it is not so clear why this interpretation should be implausible, and it is even possible to construct a scenario in which that is indeed a possible and plausible interpretation but it's still not the one recovered by speakers from the ellipsis site:

(13)   SCENARIO: John's brother is taking John's 10-year old son George to a baseball game at Fenway Park. John's brother is very responsible and knows that George just underwent some kidney surgery and there are only specific kinds of food he can have, and he asks John, a very irresponsible father, what the doctor said that George can eat. John replies:

(14)   George can eat cotton candy or hot dogs, I don't care which.

The intuition is that the elided material is interpreted by default as in (15a), rather than as in (15b):

(15)   a.   George can eat cotton candy or hot dogs, I don't care which (one) *he eats*.
        b.   George can eat cotton candy or hot dogs, I don't care which (one) *he can eat*.

Interestingly enough, however, (15b) is a perfectly grammatical sentence and conveys a plausible meaning. For these reasons, the perfect match interpretation in (15b) should be 'strongly preferred' to that in (15a), according to the pragmatic principle proposed by Rudin (2019) and stated in (10). It is therefore clear that refining the constraints that rule sluices interpretations is needed to account for both (8a) and (8b).

3.2. Economy, well-formedness, orientation

The failure of the pragmatic principle in the *care*-case, i.e. the fact that the perfect match is not the sluice's default interpretation even if it is a possible interpretation, could actually bring us to even more extreme consequences than those of Rudin (2019). In fact, the strategy we are going to propose could be seen as the reflection of taking the *eventive core* proposal seriously. If the identity domain is indeed the eventive core, i.e. if the identity we care about is the identity of vPs, there seem to be no reason why we would assume as default the structure that perfectly matches the antecedent, when this antecedent contains more material than the one we are interested in. In fact, we can stipulate that the eventive core alone is also the default interpretation, since we don't need anything more than that to ensure identity. This reasoning could be summarized with a simple notion of economy.

(16)   **Economy principle for sluicing**:
        Do not include in the interpretation of the sluice more than what is required for identity (namely, the eventive core).

In Rudin (2019), the pragmatic principle is introduced because Rudin's generalization alone - the idea that any material generated above vP can mismatch - suffers from over-generation. In fact, if it's indeed the case that any material above vP can mismatch between antecedents and ellipsis sites, we expect a plenitude of different options to be available as possible reconstructions. However, while expanding the antecedent might require pragmatic intervention to determine what new material has to be brought in the ellipsis site, it is not clear how the princi-

ple comes in the way when the attested interpretation is strictly smaller than the antecedent, or when there is competition between sluices bigger and smaller than the antecedent. Our economy principle can be introduced in a harmless way, and this also repairs an anti-economical contradiction lurking in Rudin's (2019) theory: namely the fact that identity is checked at the level of *v*P but additional material should still be interpreted by default in the ellipsis site if this material happens to be in the antecedent.

Let's see how our principle derives the attested sluice for the *care* case:

You may have coffee or tea, I don't care which	ID_{vP}	ECON
☞ a. you have		
b. you may have		*!

Both *you have* and *you may have* are perfectly grammatical presluices, which preserve identity with the *v*P of the antecedent (modulo the antecedent for the *wh*-word, i.e. *you have x*). However, *you may have* violates our economy principles, since it includes material generated above the *v*P, namely the modal *may*, the head of the the Deontic Modal Phrase. We correctly predict that the interpretation of the elided material in the *care*-case excludes the modal. Under our assumptions, it is now the inclusion of the modal in the *know*-case that needs some more explanation. If interpreting the *v*P alone, leaving out the modal, is generally preferred, why is (17a) preferred over (17b)?

(17)   a.   **You may have** coffee or tea, I don't know which [**you may have**].
           b.   **You may have** coffee or tea, I don't know which [**you have**].

The answer is rather simple and follows from a widely-acknowledged principle that governs acceptable sluices:

(18)   **Well-Formedness of sluices**
         If a pre-sluice is infelicitous, then the corresponding sluice will not be well-formed.
                                                  (Dayal and Schwarzschild, 2010)

Example (17b) is infelicitous and therefore it cannot be considered as possible interpretation for the sluice. The derivations for the optimal sluice in the *know* case goes as follows:

You may have coffee or tea, I don't know which	ID_{vP}	WELL-FORM	ECON
a. you have		*!	
☞ b. you may have			*

In other terms, our economy principle interacts with felicity, which operates on top, establishing a sluicing optimality hierarchy.

(19)   **Sluicing optimality hierarchy**:
         Eventive core > full antecedent > additional material

From this hierarchy, it is clear that when the eventive core and the full antecedent coincide, our predictions are the same as Rudin's (2019). However, when the eventive core is strictly smaller than the complete antecedent, we do predict the ellipsis site to 'shrink' (when this is possible),

in contrast with Rudin (2019). The puzzle is now understanding why (17b) is infelicitous, in contrast with its *care* counterpart. We claim that this is tied to syntactico-semantic properties of modal and embedding verbs, those connected to (temporal) *perspective* and *orientation* (Enç, 1996; Condoravdi, 2001). The term *perspective* refers to the time of evaluation of the modal. On the other hand, the term *orientation* concerns the state of affairs of the event under the scope of the modal, and its time of evaluation may be different than the time of evaluation of the modal.[3] Consider the following examples of epistemic modals from Condoravdi (2001):

(20)   a.   He may have been sick.
             MAY(PERF(he be sick))
       b.   He may be sick.
             MAY(PRES(he be sick))
             MAY(FUT(he be sick))

In both sentences the time of evaluation of the modal (*perspective*) is present. Yet, the time of evaluation of the prejacent (*orientation*) is past for (20a) and ambiguous between a present and a future in (20b). To see how this comes into play in our puzzle, consider that Enç (1996) points out that deontic *must* and *may* have future orientation, i.e. the time of the eventuality in the scope of the modal follows the time of evaluation of the modal. This means that the eventuality of having a drink in *You may have coffee or tea* is evaluated in the future.

(21)   a.   You may have coffee or tea.
             MAY(FUT(have coffee or tea))

Let us now turn to the extension of the notion of *orientation* to question embedding verbs. Laca (2012) attributes to *know* and other attitudes verb present orientation.

(22)   #You may have$_F$ coffee or tea, I don't know which you have$_P$.

As the previous example shows, there is a clash between the future time of evaluation given to have by *may* in the antecedent and the present time of evaluation provided to have by *know* in the presluice. This mismatch makes the sentence infelicitous. Introducing the modal in the presluice ensures that *have* is again evaluated in the future:

(23)   You may have$_F$ coffee or tea, I don't know which you may have$_F$.

Interestingly, Laca (2012) highlights 'a correlation between attitudes of preference (which assert an ordering among alternatives) and future temporal orientation'. We could then treat *care* equally to the attitudes of preference Laca (2012) refers to, like *want*.[4] *Care* indeed introduces a sort of preference order between alternatives. If *care* has future orientation:

(24)   You may have$_F$ coffee or tea, I don't care which you have$_F$.

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[3]In general, from a grammatical point of view, while perspective depends on the tense in which the modal auxiliary is expressed, orientation is generally determined by the *Aktionsart* of the verb under the modal's scope (Condoravdi, 2001).

[4]Consider the following constrast:

(i)   a. $^{??}$I know what you do tomorrow.
       b.   I care what you do tomorrow.

As (24) shows, *have* receives future time of evaluation both in the antecedent and in the presluice, and the sentence is felicitous. Note that this can be seen as a more radical notion of identity between *eventive cores*: two events are the same only if they are evaluated at the same time. As a prediction, we expect all *relevance verbs* ('care', 'it matters', 'it is important') to behave the same way with respect to FC permission in sluicing, since they have the same property of future orientation. This is indeed the case, as pointed out in Fusco (2019). Another felicitous prediction is that epistemic modals should never cancel FC (Aloni, 2022), since they don't have future orientation and the time of evaluation of their prejacent is purely given by the tense and aspectual markers on the prejacent.

(25)   a.   You might have voted for John or for Paul, I don't know which
                [you **have voted** for].
        b.   You might have voted for John or for Paul, I don't care which
                [you **have voted** for].

In this case, we indeed observe that *know* and *care* behave in the same way, and FC goes through. Let us now move to the second part of our solution, explaining how from different sluice interpretations we obtain different inferences concerning FC.

4. Part II: scope and uniqueness

In the previous section we provided motivations to ground Aloni's (2018) and Fusco's (2019) intuition according to which the contrast between *know* and *care* when it comes to FC inferences is tied to two different presluices:

(26)   a.   You may have coffee or tea, but I don't know which you **may have**.
        b.   You may have coffee or tea, but I don't care which you **have**.

While in (26a) the modal is present in the sluice, in (26b) it is absent. It is therefore natural that the two embedded questions have different meanings and it is crucial to understand how these two different meanings interact the antecedent, in particular with disjunction. To see what might play a role, it is particularly useful to take a step back from FC disjunction and look at another set of examples. Remember that is section §2 we showed how the ungrammaticality of the *know* sluice with FC indefinites is connected to their obligatory narrow scope. Considering now the following examples, in which the modality applies to multiple elements in the antecedent without using FC indefinites:

(27)   a.   There's (only) one chair you can sit in, I don't know which one it is.
        b.   There's (only) one chair you can sit in, I don't care which one it is.
        c.   # There're multiple chairs you can sit in, I don't know which one it is.
        d.   # There're multiple chairs you can sit in, I don't care which one it is.

We used the cleft *it is* to force the presence of the modal in the *care* sluice too. This is to show that it really is the presence of the modal in the embedded question that creates a problem, whenever there is a clash between possibility over multiple members in the antecedent, and singular *which* questions as sluices. Our claim is that the oddness of these sentences is caused by a uniqueness presupposition brought up by *which* that creates a contradiction-like contrast with the antecedent. While the antecedent states the possibility of sitting in multiple chairs in (27c) and (27d), the consequent claims through a presupposition that there is only one chair in

which sitting is possible. This constitutes an additional reason for which *know* sluices with FC *any* antecedents result in ungrammaticality. The claim that *any x* is possible, clashes with the singular *which* question that presupposes that only one *x* is possible. Clearly, this clash arises only when the uniqueness presupposition includes the modal in its scope. In the other cases, the uniqueness presupposition simply applies to the event itself - *there is only one chair you (will) sit in* - and this is perfectly compatible with a scenario in which possibility applies to multiple elements. We will now unfold this observation, connecting it to the existent literature on the uniqueness presupposition.

4.1. The uniqueness presupposition

Singular *which*-clauses are generally thought to bear a uniqueness presupposition. For instance, the question *Which cat purred?* presupposes that there exists a unique *x* such that *x* is a cat and *x* purred. The traditional analysis of the aforementioned presupposition is the one by Dayal (1996), that assumes uniqueness to be triggered by ANS, an answer operator applying at the highest level, above CP, to the whole question. ANS operates on question extensions, presupposing that there exists a maximally informative member in the Hamblin set of possible answers.[5] Clearly, if we are dealing with a singular question, possible answers are all disjoint and ANS presupposes that there is *exactly one* true answer (Hirsch and Schwarz, 2020). Following this reasoning, it is clear that whenever the uniqueness presupposition applies to possibilities, we have incompatibility with any scenario in which possibilities are distributed over multiple elements, like FC disjunctions and FC indefinites. However, there have been recent attempts to show, precisely in the case of answers featuring FC disjunction, that this uniqueness presupposition does not necessarily scopes above modals (Hirsch and Schwarz, 2020; Kobayashi and Rouillard, 2021). The most prominent counterexamples involve teleological constructions, like the following example from Hirsch and Schwarz (2020):

(28)   The skeleton of a word with a missing letter is *fo_m*.
    a.   Which letter could we add to make a word?
    b.   *A* or *r*.

For this reason, Hirsch and Schwarz (2020) develop a local approach that can generate uniqueness in two different positions, one of which being under the modal. They manage to do so by conjecturing that it is *which* itself the element that conveys the presupposition and not the answer operator ANS. On the one hand, there is the High Uniqueness (HU) reading, generated when *which* scopes high, above the modal, and, on the other hand, there is the Low Uniqueness (LU) reading, generated when *which* scopes low, below the modal. According to Hirsch and Schwarz (2020) the logical forms of the HU and the LU reading of (28a) are respectively:

(29)   a.   **HU**: which > may $...\exists!...\Diamond...$
        b.   **LU**: may > which $...\Diamond...\exists!...$

HU for (28a) says that there is a unique *x* such that *x* is a letter and it is possible to add *x* to make a word. On the contrary, LU in (28a) says something like 'it is possible to complete a word inserting a unique *x* such that *x* is a letter'. However, while we do believe that explaining what is going on in (28) is a real theoretical puzzle, we are skeptical about any local solution

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[5]i.e. 'a proposition that is true and entails any other proposition that is true' (Hirsch and Schwarz, 2020).

that assumes two different sites for uniqueness presuppositions to apply. In particular, we are worried that the question-answer pair in (28) might constitute a peculiar case of accommodation. Our reason to claim this comes from the fact that the best way to test presuppositions in questions is through embeddings, and the low uniqueness presupposition does not survive this test. In fact, FC disjunctions are not good answers to singular *which* questions when they are embedded, as in (30a), and to be good they rather request plural marking, as in (30b):

(30) a. *I know which letter we could add to make a word: *a* or *r*.
      b. I know which letters we could add to make a word: *a* or *r*.

We are therefore going to assume the datapoint in (30a) to affirm that there is no worry in ruling out the possibility of low uniqueness when discussing sluicing, since at the very least in embedded questions this possibility is not an option. We therefore assume that the two different sluices trigger each one a different presupposition: the sluice in (26a) triggers the presupposition that there exists a unique x s.t. it's possible for you to have x ($\exists!x\Diamond Hx$); while the sluice in (26b) triggers the presupposition that there exists a unique x s.t. you (will) have x ($\exists!xHx$). We will start now showing how the global uniqueness presupposition attested in embedded singular-*which* questions interacts with the sluice antecedents.

4.2. Sluices and antecedents

The gist of our proposal is that the interpretation of the antecedent of a sluice is affected by that sluice in a twofold way: (i) a sluice can help disambiguating a scopally ambiguous antecedent because of scopal parallelism, as already proposed in Fusco (2019); (ii) a sluice and its presupposition can restrict the meaning of antecedents that would be otherwise compatible with multiple scenarios. These two points will be now unpacked, starting from the possible meanings of antecedents involving FC disjunction. We adopt here the Bilateral State-based Modal Logic (BSML) defined in Aloni (2022), which allows us to capture both narrow scope and wide scope free choice.[6] Note that any semantics that is able to derive free choice in wide scope configurations would serve as a good tool for our solution. The motivations for this, however, are external to this work and are those mentioned in §2.1. In some sense, if we didn't consider the possibility of wide scope free choice, the following part of our solution would just be an extension to Fusco (2019), highlighting the existence of uniqueness presuppositions, which would however be redundant to solve the puzzle.

On a purely representational level, the sentence *You may have coffee or tea* might have two different meanings: the free choice one, $\Diamond Ha \wedge \Diamond Hb$; and the strengthened non-free choice one $\Diamond Ha \vee \Diamond Hb \wedge \neg(\Diamond Ha \wedge \Diamond Hb)$. The question is how these two different meanings are obtained from the disjunction in the sentence. In BSML, while the Non-FC meaning can only be compatible with a wide scope configuration, FC can be obtained through both narrow scope and wide scope configurations (Aloni, 2022), via pragmatic enrichment (+):

- $[\Diamond(\alpha \vee \beta)]^+ \vDash \Diamond\alpha \wedge \Diamond\beta$

- $[\Diamond\alpha \vee \Diamond\beta]^+ \vDash \Diamond\alpha \wedge \Diamond\beta$ (if the relation is indisputable)[7]

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[6]For a detailed description of the system please see Aloni (2022).

[7]In both Aloni (2018) and Aloni (2022), indisputability is linked to knowledge, and whenever there is an indisputable accessibility relation, together with pragmatic enrichment, FC is predicted to arise. There seems to be a

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Now consider that in *You may have coffee or tea, I don't know which [you may have]*, the *wh*-word in the sluice scopes above the modal, and by scopal parallelism (Chung et al., 1995; Tancredi, 1992; Fox, 1999) we need to assume that the disjunction scopes above the modal in the antecedent too:[8]

You may have coffee or tea...   **...which you may have**

$$\boxed{\Diamond Ha \vee \Diamond Hb}$$ $\boxed{\exists x \Diamond Hx}$ [9]

At this point of the argument, we only know that antecedent and sluice have the same wide scope configuration, but we still don't know if FC is licensed or not, since both FC and non-FC scenarios are compatible with a wide scope configuration. This is where the uniqueness presupposition kicks in. We know that the sluice for the *know*-case triggers the following presupposition $\exists!x \Diamond Hx$, namely $(\Diamond Ha \wedge \neg \Diamond Hb) \vee (\Diamond Hb \wedge \neg \Diamond Ha)$, which is compatible only with the Non-FC antecedent, since it is in blatant contradiction with the FC permission $\Diamond Ha \wedge \Diamond Hb$. Therefore, a wide scope non-FC interpretation of the antecedent is selected and FC is 'cancelled'. In the case of *care* sluice, the *wh*-word (the existential, in inquisitive terms) does not scope above any modal and by scopal parallelism it cannot scope above the modal in the antecedent too. This triggers a narrow scope configuration of the disjunction with respect to the modal for the antecedent.

You may have coffee or tea...   **...which you have**

$$\boxed{\Diamond (Ha \vee Hb)}$$ $\boxed{\exists x Hx}$ [10]

Narrow scope configurations are only compatible with FC, which is therefore derived. This time, the uniqueness presupposition of singular *which* clauses applies below the modal and thus it does not interfere with the FC permission arising from the antecedent. As we said in §2, our solution is profoundly inspired by Fusco's. In particular, like Fusco, for the *care* case we assume that narrow scope is only compatible with FC and for the *know* case we assume that whenever we have FC-cancellation we also have wide scope. On the other hand, unlike Fusco, in our solution it's not the wide scope *per se* that blocks FC, since it could be compatible with it, but rather the uniqueness presupposition of singular *which* clauses.

5. Conclusions

In this paper we have provided a new account for the different FC readings that arise from the following sluiced sentences:

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problem for those cases in which wide scope configurations appear to block FC even though knowledge is pervasive, like *You may have coffee or tea, and everybody knows which.* However, we can maintain the link between indisputability and knowledge, assuming that the uniqueness presupposition blocks FC cancelling the pragmatic enrichment, which is indeed optional (Aloni, 2022).

[8]Since we adopt a state-based semantics for FC, we also need to adopt a state-based semantics for questions. This could be inquisitive semantics (Ciardelli et al., 2018), and in particular we exploit its existential quantifier and flattening operator to calculate the semantics of the question and its presupposition.

[9]Where $\exists$ is the inquisitive existential quantifier. On a semantic level, we obtain the completely antecedent-parallel $\Diamond Ha \vee \Diamond Hb$, by flattening the two contextually restricted alternatives $\Diamond Ha$ and $\Diamond Hb$.

[10]After flattening the alternatives: $Ha \vee Hb$.

(31)   a.   You may have coffee or tea, I don't know which.
        b.   You may have coffee or tea, I don't care which.

After presenting our motivations to improve on Fusco (2019) in section §2, we have grounded the mismatch intuition by Aloni (2018) and Fusco (2019) that assumed the modal to be present in (31a), but absent in (31b). To do so, we have provided a new economy constraint that modifies the dynamics of the constraints proposed by Rudin (2019) to rule mismatches and identity. In particular, we have claimed that *eventive cores* alone are default reconstructions, which can be extended whenever they result in infelicitious presluices. That is the case of *know*, which needs the repetition of the modal to ensure its prejacent to have the same evaluation time of the same event in the antecedent. For this discussion, the notion of temporal orientation proved to be fundamental. In section §4 we argued for a new solution to the FC-in-sluicing puzzle based on previous literature on the uniqueness presupposition of singular *which* clauses. Once different sluices are generated, different presuppositions arise: in the case of *know* the presupposition applies above the modal, creating a contrast with a possible FC antecedent, while in the case of *care* it applies below the modal and FC inferences go through. These considerations developed from the idea of scopal parallelism, which was the core for Fusco (2019)'s analysis, and determines whether the antecedent has to be interpreted as having a wide scope or narrow scope configuration of the disjunction with respect to the modal. We hope our analysis solves the puzzle, while informing us on various interesting dynamics. In particular, from our work it emerges that sluices are selected via economy on the basis of some grammatical properties, and that, once they are selected, they can affect the interpretation of their antecedent. This effect is two fold: there are both scopal and strictly semantic considerations that come into play determining the meaning of an antecedent given a certain sluice. For the future, we would like to provide a fully compositional analysis of the FC-in-S puzzle, starting from our results. More broadly, we would also like to gather cross-linguistic data on the FC-in-S puzzle and check our predictions: in particular,if the contrast baseline is replicated in all languages, we could either establish the universality of future orientation of relevance verbs or we would need to find new pragmatic solutions to the puzzle. Finally, we would like to study a puzzle that arises from *or else* disjunctions and scopal parallelism. Consider the following sentence:

(32)   You may have coffee or else you may have tea, I don't care which ~~you have~~.

On the one hand, the theory suggests that the antecedent has wide scope, fixed by *or else*. On the other hand, the antecedent should have narrow scope because of scopal parallelism with its antecedent, in which *which* doesn't scope over the modal. Conversely, Patrick Elliott (p.c.) observed that the wide scope of *know* sluices seems to violate scopal parallelism in the following sentence, where discolated *either* should fix narrow scope for disjunction (Larson, 1985; Wu, 2018):

(33)   You may either have coffee or tea, I don't know which ~~you may have~~.

We currently have no theoretical stance on how this tension might be resolved. For the moment, we hope to have shed some light on sluicing, and the various dynamics that play a role in the derivation of free choice from elided structures.

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