Licensing *or*

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Abstract
The present paper addresses the so-called free choice effects of disjunction under existential quantification. The effect has received most attention in modal contexts, specifically as free choice permission. Consequently, a broad range of analyses trace the reason for free choice effects at its interaction with modality. I will argue that free choice effects arise with any kind of existential quantification, and that an analysis should hence not essentially rest on modality. I propose that a Boolean analysis of *or*, in concert with specific interpretation of existentials, is sufficient to derive the observed effects. It is moreover proposed that the reinterpretation of existential quantifiers is made necessary by a principle of *or*-licensing which is the second cornerstone of the analysis.

1. Introduction

Our logic classes taught us that the word *or* denotes Boolean disjunction ∨. However, looking at uses of *or* in everyday life, it seems that the word rarely ever exhibits its pure meaning. The problem seems to be that disjunctive statements *A or B* contain the simpler parts *A* and *B*. Why did the speaker fail to make one of the simpler statements and chose the longer, and less informative disjunction instead? A survey of the data leads to the following cases:
In downward monotone contexts, *A or B* statements are indeed more informative than simpler statements. In such sentences, *or* can unproblematically denote Boolean disjunction.
In certain other uses, the disjunctive statement may be longer than *A* alone, or *B* alone, and less informative than *A and B*, but gives rise to extra implicatures and hence leads to motivated utterances. We could label such uses as 'Boolean ∨ plus pragmatic inferences'.
In a last kind of cases, however, *or* occurs in a sense that is hard to explain as the result of Boolean *or* plus pragmatic inferences. These are the so-called free choice use of *or* in the scope of existential modals. The following example illustrates the case.

(1.1) *Judy may take coffee or juice.*
(1.2) *Judy may take coffee, and Judy may take juice.*

The puzzle is this. The sentences in (1.1) and (1.2) seem intuitively equivalent. However, a simple boolean analysis of *or*, together with a simple possible-world analysis of *may* as existential quantification over deontically accessible worlds ("worlds that show what Judy is allowed to do"), fails to predict this intuition. The failure rests on the wellknown fact that, in predicate logic, formula (1.3) does not imply (1.4). Kamp (1973) is the classical reference which brought the free choice puzzle on the agenda of formal semantics.

(1.3) $\exists x(A(x) \vee B(x))$
(1.4) $\exists x(A(x)) \wedge \exists x(B(x))$

In recent years, several strategies to solve this puzzle have been explored. As the effect arises predominantly in modal contexts, some authors attribute it to a revised interpretation of modal existentials (plus, possibly, further pragmatic effects). This line was followed, for example, by Schulz (2002), Aloni (2003a,b), or Simons (2005a,b). The more radical kind of rescue, however, consists in the claim that the word *or* did not denote Boolean disjunction in the first place. Zimmermann (2000) develops an analysis of *or* as conjoined epistemic alternatives and

derives free choice effects in modal contexts from this analysis. The more recent Geurts (2005), while deviating from Zimmermann's proposal in detail, can be seen as a conservative extension of this kind of approach. The authors leave it somewhat open whether they would allow for a reading of *or* as Boolean disjunction in addition to their analyses. However, Zimmermann seems to defend a maximal position in that the paper lists several examples where his denotation for *or* is problematic; a second use in a Boolean sense is never his proposed solution. I will therefore at some points refer to his approach as the most consequently non-Boolean analysis.

Apart from free choice examples, any analysis of *or* should be able to cope with the following range of cases.

(1.5) a. *Nobody was sick or on holiday.*
b. *Nobody was sick, and nobody was on holiday.*

Sentence (1.5) illustrates the use of *or* in a downward entailing context (here: the scope of negation). Whatever the exact delimitations of contexts may be, elementary predicate logic tells us that the disjunction (a) logically entails the conjunction in (b.). Semantic intuition suggests that Boolean ∨ is a fully adequate denotation of *or* in these examples.

(1.6) *Joe is drunk or sick.*
(1.7) (*As far as I can see,*) *Joe might be drunk, and Joe might be sick* (*and I don't know which*)

In positive contexts, epistemic uncertainty appears to be the standard reason to use *or*. If no other reason can be thought of, the hearer will assume that the speaker makes an unspecific assertion because he does not know any better.

(1.8) *Everybody ordered a beer or a pizza.*

This sentence shows *or* in an upwards monotone context. If *or* is taken to denote Boolean disjunction, then (1.8) is true if everyone ordered a beer (and no pizza), if everybody ordered a pizza (and no beer), or in mixed cases. In fact, our semantic competence tells us that (1.8) should only be used in mixed cases (unless the speaker has imperfect knowledge). For instance, it can felicitously be uttered by the waitress who has just taken a respective order. We can assume that she has perfect knowledge about the order; e.g. having noted it as a list. In such a situation, she does not seem to express a list of epistemic possibilities, neither globally ("*possibly everybody ordered a beer, and possibly everybody ordered a pizza, and I don't know which"*) nor locally ("*for each customer, it is possible that he ordered beer, and its possible that he ordered pizza*"). In these cases, however, a simple Gricean argument can account for this fact. If the speaker knew that everybody in fact ordered a beer, he could have said so and been briefer and more informative. Similarly for a homogeneous order for pizzas. Hence, the mixed cases are the only ones that warrant possible utterances. (Matters change, of course, as soon as *or* is justified by the speaker's imperfect knowledge.) Analogous examples arise in necessity statements (i.e. for modal universal quantification).

The cases listed so far (including free choice examples) are the common stock in the literature. The last two types of examples, to my knowledge, have not yet received extensive attention.

(1.9) *The whole school was posing in the yard to welcome the queen. Everybody was dressed in nice clothes for the great day.*

a. *Some children waved little flags or threw flowers.*
b. *Some children waved little flags. And some children threw flowers.*

The sentence in (1.9.a) seems to be uttered by the speaker with a certain group of children in mind. He might vaguely intend to talk about those children who took part in cheerful activities. No epistemic uncertainty is expressed, and we understand that the disjunction is used because among the active children, there were some who waved and some who threw flowers. The conjunction in (b.) follows. Note that (1.9) is the analogue of the classical free choice constellation in the domain of nominal quantification. Klinedinst (2005) is another source where such examples were discussed.[1] I sympathize with his findings which, however, need to be sharpened to do justice to the data. Finally, consider (1.10).

(1.10) *What new privileges does Judy gain when she's 18 years old?*
 # Judy may drive a car, or marry without her parents' consent or vote in elections.

The striking fact about (1.10) is that it does not offer an instance of the free choice pattern. Specifically, the disjunct does *not* imply the conjoined list of privileges of those over-age in (1.11).

(1.11) *Judy may drive a car, and Judy may marry without her parents' consent, and Judy may vote in elections.*

Free choice *or* essentially occurs in just those cases where the disjunction lists deontic alternatives with respect to one specific decision. (1.10) in a free choice interpretation sounds as if the three things depended on each other, somehow as if Judy's driving a car would exclude her voting in elections. I will come back to the *no list of privileges* example (1.10) at several places. Specifically, I will use it to explore the nature of deontic alternatives that are addressed by true free choice sentences (section 4). Note that Zimmermann (2000) predicts that it should be a natural free choice example and imply (1.11) (section 2).

The paper is organized as follows:[2] In section 2, I will recapitulate uses of Boolean and "illbehaved" *or* and offer a brief review of the most recent literature. It will be concluded that *or* requires licensing in most contexts, and that licensing *or* can require a non-standard use of other parts of the sentence (specifically existential quantifiers). In section 3, I will elaborate my analysis of examples like (1.9). I propose that these examples rest on quasi-specific existential quantification. The hearer will understand that the speaker has a certain group of individuals in mind, and in order to be truthful has to use disjunction. Section 4 shows how this analysis can be carried over to the modal case, i.e. free choice examples of the type in (1.1). Section 5 discusses some examples where various kinds of licensing *or* interact. It highlights the program underlying the present paper (as many others before): The word *or* can show unexpected effects in various ways. It is preferable to assume one uniform semantic contribution, namely Boolean disjunction, which interacts with other parts of the sentence in different ways which, in turn, lead to different side messages.

[1] The online version of his SuB 10 talk came to my attention while I was elaborating the core ideas of the paper.
[2] I want to thank an anonymous reviewer whose comments helped me to sharpen and clarify an earlier version of the paper.

2. Boolean and mis-behaved 'or'

Boolean disjunction is potentially problematic in terms of pragmatics. Disjunction offers us a means to denote a weaker property by using a more complex expression. This constellation, in many contexts, posits a contradiction to the combined M- and I-principle (Levinson 2000) or classically, Grice's maxims of manner and quantity. Such conflicts arise already in the simplest possible disjunctions, the disjunction of two positive atomic sentences. (2.1) offers an example.

(2.1) *Joe is drunk or sick.*

Instead of one of two possible, more specific statements ('*Joe is drunk*', '*Joe is sick*'), the speaker chooses to attribute the broader property of 'being drunk or sick' to Joe. Of course, it is not principally problematic to utter sentences with general properties. A sentence like '*Joe is German*' is pragmatically unproblematic, even though the speaker might know that Joe is in fact from Bavaria. The speaker did not mention Bavaria, and if the context does not render the German counties relevant, the sentence *Joe is German* does not implicate *Joe is not from Bavaria* or *The speaker does not know whether Joe is from Bavaria*. Disjunctions, however, are different. In using a disjunction, the speaker necessarily has to mention two properties which are usually more specific. These properties are presented as salient and relevant. The simpler sentences are salient alternative utterances in context. The hearer hence will look for a reason why the speaker choose a *more* complex expression in order to give *less* information. Going back to example (2.1), it is a textbook case in pragmatics to infer that (2.1) implicates that (2.2).

(2.2) *Speaker does not know* that *Joe is drunk, and speaker does not know* that *Joe is sick.*

Let me call a surrounding sentence in which a disjunction may be embedded a *sentence frame*. Then we can posit a general requirement on uses of *or*: A sentence frame Φ does not pragmatically license disjunction if the simpler sentence(s) entail the frame plus disjunction Φ.

(2.3) unlicensed disjunction: $\Phi(A) \rightarrow \Phi(A \vee B)$

The use of disjunction is pragmatically licensed if the simple sentence does not entail disjunction (2.4.a), and specifically if sentence frame with disjunction entails the simple sentence (2.4.b). Moreover, or is licensed if there are implicatures such that disjunction plus its implicatures are not entailed (2.4.c).

(2.4) a. licensed disjunction: $\Phi(A) \not\rightarrow \Phi(A \vee B)$
b. licensed disjunction: $\Phi(A \vee B) \rightarrow \Phi(A)$
c. licensed disjunction: $\Phi(A) \not\rightarrow \Phi(A \vee B) \wedge \Psi$ with implicature Ψ.

It can be seen easily that disjunctions in downward entailing contexts instantiate the (b.) case. Negation as well as the antecendent of a conditional, or the restrictor of universal quantifiers, are good pragmatic licensing contexts for Boolean disjunction.

(2.5) *If you get an A or a B in the exam, I will take you out for dinner.*
(Either condition will be sufficient)

(2.6) *Nobody was bored or annoyed.*
Gordon is the youngest man who ever climed the Chimborazzo or the K2.
Gordon eats neither meat nor fish.

Note that the last kind of use under negation must have been perceived so genuinely a useful *or* pattern in English that the original construction *not either ... or* together with negative concord *n-* was lexicalized as *neither ... nor*. I therefore take the *neither nor* construction as a particularly elucidating use of *or* under negation. A disjunction in the antecedent of a conditional is likewise useful because it allows the speaker to express two conditionals in one.

Let us now turn to some cases where a sentence plus a pragmatic inference can license the use of a disjunction. We already saw (1.8) above, but more cases show that the scope of universal quantifiers uniformely give rise to implicatures. Consider the sentence in (2.7).

(2.7) *(In order to get a Schein,) You have to write a paper or kill a rabbit.*

Simple Boolean disjunction under universal modal quantification will lead to a sentence meaning which holds true

- if in fact, I intend to hand out a Schein for a paper, and under no other circumstances
- if in fact, I intend to hand out a Schein for a dead rabbit, and under no other circumstances
- if in fact, I intend to hand out a Schein exactly if one or the other requirement is fulfilled.

Our everyday understanding of (2.7) suggests that it only should be true in the third case. Neither case should be mentioned spuriously (even though practical reasoning would strongly suggest the first scenario!). Like in (1.8), we can argue that the author of the announcement, having full control over matters, should have used a simpler and more informative sentence in the first and second scenario. Similar observations hold for *or* in the scope of proportional quantifiers with a strict ratio (e.g. "exactly half"). All these contexts allow the use of *or* plus implicatures. None of these cases needs to involve epistemic uncertainty. Once again, epistemic uncertainty *could* be the reason for the speaker to utter (2.7)—for instance for a student who can not remember the announcement very well. But the point is that epistemic uncertainty *need* not be understood.

A third class of sentences require one further step in order to allow for a motivated use of *or*. They are such that in their literal interpretation, the use of *or* would not be licensed (unless expressing epistemic uncertainty). However, such sentences can be improved by resorting to re-interpretations or secondary readings. (2.8) offers an example. Imagine the following report by the class teacher after class:

(2.8) (*Today's math class was just a desaster. I was not able to incense anyone for the beauty of the subject. The kids just did not react.*)
Some pupils were sleeping or daydreaming.

If all parts of (2.8) are understood in their normal, common way, we get an existential statement which is weaker than the simpler statements without disjunction. (2.9.a) is entailed by b. and c. (I use capital variables for plural objects. Predicates are assumed to apply to pluralities in a distributive manner. The details are given in the next section.)

(2.9) a. ∃X(PUPIL(X) ∧ [SLEEP(X) ∨ DAYDREAM(X)])
b. ∃X(PUPIL(X) ∧ [SLEEP(X)])
c. ∃X(PUPIL(X) ∧ [DAYDREAM(X)])

We'd hence expect that (2.8) is pragmatically marked. One way to remedy this markedness could consist in an implicature about epistemic uncertainty. In this reading, the speaker is not sure whether the pupils were asleep or awake, daydreaming.

However, under normal circumstances the sentence intuitively seems a shorter way to express (2.10).

(2.10) (*My class today was just a desaster.*)
Some pupils were sleeping, and some pupils were daydreaming.

This stronger statement seems to come about in two subsequent steps. Firstly, the indefinite 'some' is not interpreted as a mere existential quantification. The speaker appears to have a specific group of pupils X in mind that she wants to talk about. Using *'some pupils'* in a specific sense, she can refer to this group. Secondly, given that the referent is fixed, the speaker appears to have reason not to use one of the simpler sentences *'some pupils were sleeping'* or *'some pupils were daydreaming'*. The hearer will hence infer that *among the pupils that the speaker intends to talk about,* some were sleeping and not daydreaming, and some were daydreaming and not sleeping. Sentence (2.10) is entailed by the overall information conveyed by (2.8), but crucially, the groups of 'some pupils' in (2.10) are not the larger group that the speaker was talking about in (2.8). Note that the pattern corresponds to the free choice inference.

The free choice puzzle has received renewed attention in the last years, starting with the analysis by Zimmermann (2000), followed by Geurts (2005), Aloni (2003b), Schulz (2002), Simons (2005a,b) and Klinedinst (2005). A very detailed and insightful discussion of earlier treatments, including Kamp (1973) and (1979), is given in Schulz (2002). The majority of papers rest on a modified analysis for *or*.

Zimmermann 2000 (and Geurts, elaborating on Zimmermann 2000) claims that *or* does not contribute logical disjunction, but presents a series of epistemic alternatives which the speaker conjoinedly entertains. The paradigm case of this pattern is shown by sentences like (2.11) which comes down to the statement in (2.12):

(2.11) *Joe is drunk or sick.*
(2.12) (*As far as I can see,*) *Joe might be drunk, and Joe might be sick* (*and I don't know which*)

Zimmermann assumes that (a) all alternatives mentioned as a disjunct have non-empty intersection with the epistemic background of the speaker; that (b) there is no subset of epistemic alternatives of the speaker which supports none of the alternatives mentioned, and (c) there is an implicature about "independence" of the alternatives mentioned. Assumption (a) is designed to derive *genuineness*: no disjunct is uttered spuriously. Assumption (b) predicts *exhaustivity* under normal circumstances. No life option should remain unmentioned. Condition (c) is motivated by the observation that the hearer usually seems to understand that the alternatives are mutually exclusive in some sense. The examples discussed in the paper rest on logical independence, but the author states that more general (topological) notions of non-overlap are operant in the general case. Free choice effects for epistemic *might* follow straightforwardly from the analysis. In order to generalize the analysis to deontic modality, Zimmermann proposes the *authority principle*. If the speaker can be assumed to be an

authority in the issue in question, epistemic possibility (*'maybe'*) can be strengthened to epistemic certainty ('*in fact*').

In spite of its initial plausibility, Zimmermann (2000) has problems in those cases where *or* does not show modal flavour. Among the problematic cases are those without modal component (e.g. (2.8) and (2.6)), but problems arise also for deontic *must* as well as the *no-list-of-privileges* case. Consider once more the announcement in (2.7). If we interpret (2.7) as a list of epistemic possibilities, we get something like

(2.13) *Possibly, you have to write a paper, and possibly, you have to kill a rabbit.*
$\Diamond(\Box(\text{KILL-A-RABBIT})) \wedge \Diamond(\Box(\text{WRITE-A-PAPER}))$

Given that the author of the requirement has full knowledge about it, we can apply the authority principle in order to go beyond the 'ignorant student' reading of (2.7). The authority principle leads to

(2.14) $\Box(\text{KILL-A-RABBIT}) \wedge \Box(\text{WRITE-A-PAPER})$

This states that the requirement for a Schein consists of two parts: killing a rabbit *and* writing the paper. This does not match the natural understanding of (2.7).
Zimmermann's prediction for example (1.10), repeated here as (2.15), is likewise problematic. Remember that the sentence was *not* an acceptable way to state the conjunction in (2.16).

(2.15) (*What new privileges does Judy gain when she's 18 years old?*)
 # Judy may drive a car, or marry without her parents' consent or vote in elections.
(2.16) *Judy may drive a car, and Judy may marry without her parents' consent, and Judy may vote in elections.*

The sentence in (2.15) will be assigned the meaning in (2.17). Following Zimmermann, I use Δ for deontic possibility here.

(2.17) $\Diamond(\Delta(\text{DRIVE-JANE-CAR})) \wedge \Diamond(\Delta(\text{MARRY-JANE})) \wedge \Diamond(\Delta(\text{VOTE-JANE}))$

This list of epistemic possibilities is subject to Zimmermann's requirements to lists, (a)-(c). In particular, logical incompatibility (c) *could*, but *need not* necessarily, be required for $\Delta(\text{DRIVE-JANE-CAR})$, $\Delta(\text{MARRY-JANE})$ and $\Delta(\text{VOTE-JANE})$. In actual practice, however, no form of incompatibility (or non-overlap) is intended in deontic free choice examples. The paper proposes to apply the authority principle to (2.17). If the speaker has full knowledge about Jane's privileges, he will not only hold all three alternatives as possible, but as actual facts. Specifically, they can hence not be mutually exclusive.

(2.18) $\Delta(\text{DRIVE-JANE-CAR}) \wedge \Delta(\text{MARRY-JANE}) \wedge \Delta(\text{VOTE-JANE})$

(2.18) however expresses exactly the list of privileges that Jane (as well as any 18 year old person) will enjoy. The analysis, far from explaining that (2.15) is unacceptable, will predict that it is a perfect statement of lists of privileges.

Schulz (2003) argues in favour of a pragmatic basis for the modal approach in Zimmermann (2000). Going back to Gazdar's seminal work on implicature, Schulz assumes a systematic set of possible implicatures of disjunctions under modal operators which are

evaluated in context. The remaining implicatures are then fed into a high-developed modal logic framework and give rise to the desired entailments. Schulz' analysis moreover extends to obligation sentences and puts a wide range of data into a coherent common framework. While the present proposal shares Schulz' perspective of a modular semantic-pragmatic setup, Schulz once again offers an analysis which focusses on modal quantification and is inherently designed to cover free choice effects in those, and only those examples. Schulz' division of labour into pragmatics and semantics will avoid modal readings for those sentences where Boolean disjunction plus Gricean inferencing is sufficient (see (1.8) *Everybody ordered beer or pizza*) , but the setup is unsuited to capture free choice effects in nonmodal contexts. The following example replicates the effects shown in (2.8) and (1.9).

(2.19) (*Gordon is not as strict a vegetarian as he wants to make you believe. I have observed him for quite a while and …)*
Gordon sometimes DID eat meat or fish.
=> Gordon sometimes ate meat. And Gordon sometimes ate fish.

Two recent proposals by Simons (2005a,b) rest on a modified analysis for *or* but do not posit a modal component. The core idea of both proposals lies in the assumption that the disjuncts in the sentence should be collected in a set which is then available for further semantic computation. In Simons (2005b), the set of disjuncts is moreover exploited for a scoping mechanism in that, at an appropriate place, set *union* will be performed, reflecting the semantic contribution of *or*. Simons' proposal so far rests on a classical boolean view of *or* which can not explain the free choice puzzle. At this point, both accounts stipulate semantic requirements on the set of disjuncts which yield the desired entailments. Simons (2005a) discusses the requirement of being a *supercover*, while Simons (2005b) resorts to the weaker *symmetry condition.* Let me concentrate on this more recent proposal. The *symmetry condition* states that there should be some salient property P which is shared by all disjuncts. Simon illustrates the idea on basis of examples like (2.20).

(2.20) *Judy may take coffee or juice.*

The condition refers to the set of disjuncts {*Judy take coffee, Judy take juice*} and requires one salient common property for all these disjuncts. In absence of any common property which is entailed logically at this point, Simons stipulates that the requirement could be "that both propositions have nonempty intersection with the deontically accessible worlds". With this extra requirement, the free choice entailment follows. While the *symmetry condition* offers the correct results, it remains a convenient mystery that hearers always resort to the right kind of common property. Simons explicitely refrains from discussing the motivation underlying *symmetry*. The following kind of abuse can therefore not be excluded so far:

(2.20') *Judy may take coffee or juice.*
Salient common property: *Judy take coffee* and *Judy take juice* are both desirable options for Judy. (They have nonempty intersection with Judy's buletic alternatives.)
Fact: In fact, Judy is only allowed to take juice.

(2.20') is predicted to be acceptable by Simons' symmetry condition. In fact, it is not a good situation for the sentence to be true. I suspect that a pragmatic motivation of the symmetry condition would reveal it to summarize the pragmatic inferences that will be at the heart of the approach in the present paper.—One important aspect in Simons (2005b) consists in that she acknowledges the existence of pure Boolean disjunction in downward entailing contexts. She

quotes the observation that *or* with modals, if negated, is absolutely well-behaved. I will evaluate her solution in section five, where interacting licensing factors are discussed.

A recent proposal which is very close in spirit to the present paper was made by Klinedinst (2005). He is the only author, as far as I can see, who has ever pointed out free choice effects in nonmodal contexts. Consequently, any analysis of these effects should not rest on modality in a way which can not be transferred to ordinary existential quantification. It is this criticism that stands, in Klinedinst's as well as my opinion, against all approaches that were reviewed so far (as well as related ones), in spite of their sophistication and adequate predictions in the modal domain. While Klinedinst's examples, as well as (1.8), (1.9), are essential in the understanding of free choice effects, he does not explore explicit existential quantification in sufficient detail and therefore fails to understand free choice effects as the consequence of semantic re-interpretations plus pragmatic inferencing. He does not discuss specificity effects, and related effects in the modal domain which lead to the *no-list-of-privileges* facts.

The present approach to the free choice puzzle is very conservative in its analysis of *or* and modality. I propose that *or* is Boolean disjunction, and that existential statements are interpreted as specific under suitable circumstances. If a disjoint property is attributed to a specific set of objects, we can derive an implicature that all disjuncts must be exhibited by some elements of this set. The implicature arises by simple allusion to the Gricean maxims of manner ('be brief—comparing the salient alternative utterances') and quality ('do not say what you believe to be false'). The analysis will receive initial support from data with explicit existential quantification. They give us clear access to the discourse pragmatics of the effects under investigation. We can then proceed to the generalization to the modal case.

3. Explicit existential quantification and 'or'

In the present section, I will investigate free choice effects with explicit nominal or adverbial existential quantification in more detail. I will use the term "explicit existentials" for these quantifiers, because unlike modal existentials, they allow us to specify restrictions on the domain of quantification, and to investigate its status in discourse. Explicit existentials offer a test case for free choice effects where the interacting interpretive and pragmatic mechanisms are easier to access than in the modal case. After revisiting some phenomena, I will offer a semantic analysis for free choice effects for explicit existentials which will be applied to modal existentials in section four.

Let me start by illustrating the free choice effects for explicit existentials with some more examples. All examples are given with an appropriate context. The ties between free choice existentials and the discourse context will be discussed below.

(3.1) (*Our class visited the Zoo yesterday. After watching animals in the morning, we took a break near the kiosk at noon.*)
Some pupils had chips or ice cream. (*Others went to the playground.*)

(3.2) (Discussing whether our friend Gordon is a vegetarian or not: *No, I don't think that he is. We visited a summer school together, and I remember clearly that …*)
Gordon sometimes DID *eat meat or fish.*

The conjoined statements in (3.3) and (3.4) are intuitively entailed by the respective disjunctions.

(3.3) *Some pupils had chips, and some pupils had ice cream.*

(3.4) *Gordon sometimes ate meat, and Gordon sometimes ate fish.*

The examples hence exhibit an entailment pattern for existential quantification over individuals and times which is analogous to free choice effects. Some other, more subtle intuitions could be explicated as follows: The speaker wants to talk about some specific people, things or occasions. The specific persons, things or occasions that she wants to talk about exemplify a general property which is exemplified by the disjuncts. In the pupil-example, the speaker could announce her intentions as follows: "Among the ways that children can amuse themselves in a zoo, let me now name those which have to do with food." In the Gordon-example: "Among the occasions of Gordon eating, let me talk about those which violate his strict vows as a vegetarian."

Let me now try to delineate the pragmatics of free choice effects with explicit existentials. I characterized them as "specific" so far. Several observations suggest that, in fact, a partitive use of the existential seems crucial in order to elicit free choice effects. This is evidenced by several kinds of examples where the respective word order patterns do not support partitive readings very well, or where the context definitively excludes such a reading. In order to come to a richer spectrum of data, I will consider both English and German data in this section. The free choice effects for German explicit existentials exactly mirror the English effects, but due to greater freedom in word order, we can look at a broader spectrum of data. As a first example, let us passive sentences. Examples like (3.5) do not easily give rise to free choice effects. The resulting sentences have a very odd ring to them. It seems extremely hard to pinpoint the pragmatic side messages, and hence the intended overall information conveyed by (3.5). Here, as well as below, we see sentences with unlicensed and hard-to-license uses of disjunctions. There is as yet no technical term for the kind of interpretive puzzlement that befalls the hearer in view of sentences like (3.5), (3.7), or (3.8).

(3.5) a. Beer or pizza was ordered by some pupils.
b. *Bier oder Pizza wurde von manchen Schülern bestellt.*

Whatever (3.5) may mean, we do not understand a free choice effect easily. If we compare (3.5) with other, good partitive uses of existentials, we observe that the quantifier does not precede the property that is attributed to the NP referents. In common partitive uses of quantifiers, however, the stressed quantifier should precede the property in question (see e.g. Jäger, 1995, Eckardt 1998). We can hence conlude that free choice effects arise only when the explicit existential precedes the disjunctive property. More minimal pairs which illustrate word order effects are those in (3.6) which rest on verb pairs like *get* / *bring*, and (3.7) in German where changes in word order can turn an odd disjunction into a good disjunction.

(3.6) √*Some children get their presents from the Christkindl or Santa Claus.*
#*The Christkindl or Santa Claus bring the presents to some children.*

(3.7) √*Manche Kinder* *bekommen* *die Geschenke* *vom Christkind* *oder*
some kids get the presents from-the Christkind or
dem Nikolaus.
the Santa Claus
#*Vom Christkind oder dem Nikolaus* *bekommen* *manche Kinder* *die Geschenke.*
Of-the christkind or the Santa Claus get some children the presents

(3.8) √*Manchen Kindern* *bringt* *das Christkind* *oder* *der Nikolaus* *die Geschenke.*
to-some children brings the Christkind or the Santa Claus the presents

#Das Christkind	*oder*	*der Nikolaus*	*bringt*	*manchen Kindern*	*die Geschenke.*
The Christkind	or	the Santa Claus	brings	to-some children	the presents.

Note that "specific use" of an explicit existential does not exclude generic uses. The following example seems to be talking about kinds of guests rather than a specific group of persons present. The example could elaborate a remark like *"you know how hard it is to run a pizzeria which meets all customers' ideas of Italian food"*.

(3.9) *There are some guests who want pizza or beer.*
There are OTHER guests who want bruscetti or saltimbocca.

What seems to be crucial is that the disjuncts are understood as representative for a more overarching property, one which the speaker does not want to use explicitely ("underclass food" in contrast to "refined food"). In other cases, the property might not even have a good name, like in the Gordon-example in (3.2). "exhibiting non-vegetarian eating behaviour" seems an extremely clumsy paraphrase for the property of "eating meat or fish". The above example morevoer shows that resentational sentences with *there is* do not impede free choice effects. However, if we take (3.9) as an utterance in a different kind of situation (and with a different kind of message in the speaker's mind), we can test that the partitive use of *some* is necessary in order to derive free choice effects. In the scenario in (3.10) where a partitive use is definitively excluded, *or* will be understood as epistemically licensed: "and I don't know which":

(3.10) *The owner of the local pizza hut is shaken awake by his wife at 3 am:*
"Get up, man! There are some guests at the door who want pizza or beer!"
(undertone: *I didn't quite understand which.*)

In sum, a partitive use of the explicit existential seems crucial for free choice effects. Sentences with word orders which impede partitive use, as well as utterances in situations where partitive uses are blocked do not give rise to free choice effects.

Free choice effects for explicit existentials can be captured by the follwing, simple kind of analysis. Let me stress that the exact nature of *specificity* in (i) might require further investigation.

(i) partitive/specific use of an explicit existential
$[\![\textit{Some } N]\!] = \lambda P.\exists X([\![N]\!](X) \wedge P(X))$
Presupposition: The hearer understands that
the speaker has an intended instantiation A for the existential X in mind.
A is a true subset of a group B of known objects with property $[\![N]\!]$: $A \subset B$.
Notational comment: I assume that properties P are defined for atomic and pluralic objects. Predication over pluralic objects (for non-collective properties) is defined as in (ii).

(ii) pluralic predication: A property P holds for some given plurality X,
P(X) iff for all $x \leq X$: P(x)

(iii) Pragmatics of *or* in pluralic predication over group of objects A:
1. Speaker uses (P *or* Q)(A) and has sufficient knowledge of the situation.
2. Speaker did not use the simpler P(A), nor the simpler Q(A), and hence violated the maxim of manner: be brief.

3. He must have reason to do so. The reason could be the maxim of quality: The speaker seems to believe that neither P(A) nor Q(A) are true.
4. Hence, speaker knows that for some x_1, $x_2 \leq A$: $P(x_1) \wedge \neg Q(x_1)$, $\neg P(x_2) \wedge Q(x_2)$

The present analysis of free choice effects is essentially pragmatic. Before moving on to the modal case, I will briefly review some related data which offer evidence about the semantics-pragmatics interface. There is an ongoing debate about the interaction of pragmatic inferencing with semantic composition. Specifically, work like Chierchia (2004) or Sauerland (2004, i.pr.) raise the possibility that the pragmatic evaluation of subconstituents might precede the completion of semantic composition.
Explicit existentials with *or* show interesting effects in the antecedent of conditionals. Consider the sentence pattern in (3.11).

(3.11) *If any/some N do A or B, then S.*

It offers the opportunity to study the semantics-pragmatics interface. Specifically, if free choice effects arise in the antecedent of a conditional, the present account will require pragmatic inferencing before semantic composition has been completed. If, however, free choice effects do not arise in this constellation, this would lend support to the traditional sequential picture of semantic composition preceding pragmatic inferencing.

The actual data are intricate. In the bulk of examples, it seems impossible to understand free choice effects with nominal existential quantifiers plus disjunction in the *if*-clause. Consider the sentence in (3.12).

(3.12) *If any pupils take drugs or steal jewellery, then the teacher will be fired.*

The sentence intuitively seems equivalent to the conjunction in (3.13). This equivalence is predicted by classical logic.

(3.13) *If any pupils take drugs then the teacher will be fired, and*
if any pupils steal jewellery, then the teacher will be fired.

Note that *or* is in a downward-entailing context in (3.12). We would therefore expect that the sentence (3.12) has a reading which rests on Boolean disjunction, and shows no further implicatures. According to my intuition, this expectation is borne out. In the present example, it is very implausible to understand that only the conjoined vices will get the teacher sacked, while he may stay if only one *or* the other kind of criminal activity has been reported.

(3.14) *If some pupils take drugs,* and *some pupils steal jewellery, then (and only then) the teacher will be fired.*[3]

If we take sentence (3.12) as a typical exemplar of the scheme (3.11), we will conclude that antecedents of conditionals block free choice effects. This supports a pragmatic analysis of the effect, *plus* the traditional view of a strictly sequential modus operandi of semantics and pragmatics.

This observation is challenged by similar modal examples like in (3.15), discussed in Zimmermann (2000). He points out that free choice effects can arise in (3.15).[4]

[3] I am aware of the less-than arbitrary switch between *any* and *some*, but can not spot its exact relevance so far.
[4] For all those who are not acquianted with the original paper, it might help to know that the sentence relies on a situation where the interlocutors are engaged in the German board game *Scotland Yard* in which a single player,

(3.15) *If Mr. X might be in Chelsea or Hyde Park, then we can as well give up.*
understood*: Neither possibility alone would be reason to give up, but the joined possibilities set Mr.X in such a strong stragetic position as to be invincible.*

At this point, we could either conclude that the analysis of free choice effects with modals should be substantially different from the one for explicit existentials (contra the aim of my paper). Or we could resort to some unnamed difference between the pragmatics for modals in contrast to explicit existentials (not very attractive). Or we can look for more examples with explicit existentials in if-clauses. Indeed, it seems that with a suitable preceding context, we can reinforce free choice effects. The sentence in (3.16) plausibly is a free choice example, as wittnessed in (3.17) and (3.18).

(3.16) *If Gordon sometimes drinks beer or wine, we could offer him a good bottle of Bordeaux as a present.*
(3.17) *If Gordon sometimes drinks wine, then we could offer him a good bottle of Bordeaux.*
(3.18) Not implied:
If Gordon sometimes drinks beer, then we could offer him a good bottle of Bordeaux.

We seem to read "Gordon sometimes drinks beer or wine" as "Gordon appreciates mild alcohol abuse". The implication certainly does not distribute over the disjuncts in the antecedent. Beer drinking is not a good indication that someone will appreciate expensive Bordeaux wines. With a bit of goodwill, the same effect can even be achieved with nominal quantifiers.

(3.19) *If some visitors started talking or fell asleep during the concert, then the performance must have been awful.*

Again, it is plausible to understand the disjunction in (3.19) as an exemplaric list of the property of "not concentrating on the presentation". If this is in fact the speaker's point, he would deny that neither sleeping nor wispering audience alone is sufficient to indicate a poor concert. Yet, if several indicators coincide, certain conclusions about the quality of the concert are legitimate.

The data are puzzling so far. Free choice effects seem to arise in some, but not all embedded uses in *if*-clauses. Does this mean that pragmatic inferencing can sometimes, but not always, take place during semantic composition? A closer look at the examples in question might help to resolve the paradox. To my intuition, the conditionals above (including the Zimmermann examples) are not the law-like uses of conditionals like in *'if it rains, then the street gets wet'*. The conditionals in question seem to take up an asserted fact of previous utterances ('It seems that Mr. X. might be in Chelsea or Hyde Park'). In such a plain assertion, plain Boolean disjunction would not be licensed and pragmatic strengthening has to take place in order to motivate the use of *or*. If I am right in this intuition, then the antecedent takes up a fact that was estabished in discourse, and the consequent names the conclusion the speaker wants to draw. A case without disjunction is given in (3.20).

(3.20) *A: I do not feel well today.*
B: Too bad. If you don't feel well, you won't want to try my self-baked cream cake I guess.

Mr.X, making hidden moves in London has to be hunted by a team of cooperating detectives. From time to time, Mr X. gives clues about his movements which lead to hypotheses about his position.

This kind of conditionals can be used in discourse in order to present an assertion of the speaker as a natural consequence of previous assertions. What is important here is that the content of the *if*-clause is taken up anaphorically from the discourse. Let me therefore call these conditionals *anaphoric* conditionals.

Upon closer inspection, it turns out that free choice effects in the antecedent of a conditional can be systematically provoked in anaphoric conditionals. If that is true, the role of pragmatics is quite different than in an all-new utterance. While the details of a copying mechanism of literal content plus implicatures are still highly unexplored, we may expect that the free choice effects are *copied* effects from an antecedent root sentence rather than pragmatic inferencing dove-tailed with semantic composition. The analysis so far suggests that pragmatics indeed follows semantic evaluation. If no appropriate antecedent sentence (plus implicatures) is available, free choice effects in the antecedent of conditionals are very hard to understand. This holds true at least for free choice effects for explicit existentials. Let me now turn to the modal case.

4. Modal existentials

In this section, I will pursue the question whether the analysis for free choice effects for nominal and adverbial quantifiers can be generalized to the case of modal existential quantification. Let me briefly repeat the essential characteristics of the former:

- The existential quantifier was used partitively, refering to a subset of a set of objects that is salient in context.
- The existential quantifier was used in a specific sense: The hearer will understand that the speaker has a certain set of referents in mind.
- The disjoint property is loosely understood as the case-by-case exemplification of a more general property.[5]

Evidently, these characteristics can not be directly translated into characteristics of modal existentials. First, there is no clear notion of *partitive* modal quantification. It is unclear (to me) how one would present a set of worlds as salient, and which modal statements could convey meanings like: "In *some* of these worlds, Jane takes coffee, but there are others left." Likewise, it is very difficult to verify whether the speaker had some specific set of worlds in mind. We can not point at worlds and ask: did you mean this one? or that one? or yet another one? The last characteristic will turn out to be easiest to rediscover in the modal domain. In summary, it seems likely that a transfer of the analysis in section 3 will have to rely on slightly different versions of these characteristics of *free choice modal existentials*.

I will first discuss deontic modals (section 4.1) and then turn to epistemic possibility (in 4.2). Epistemic possibility will be closely compared to Zimmermann 2000 where this is taken to be the foundational case.

4.1 Deontic possibility

Deontic *may*, in the simplest case, provides an existential statement about the set of worlds which are deontic alternatives for some subject (as seen from the real world w*). Semantic modelling usually assumes that the existential statement states the existence of *one* world *at least*. A sentence like (4.1) states that there is a deontic alternative where Jane takes coffee.

(4.1) *Jane may take coffee.*

[5] This last observation is less easily explicable than the first two. However, the free choice effects arise most saliently when the preceding context leads the hearer to expect that this-or-that general property will be addressed next (e.g. non-vegetarian behaviour; amusing-by-buying-food and sweets; showing signs of boredom; etc.)

However, as Klinedinst (2005) points out, it would be more realistic to assume that such a statement asserts the existence of a plurality of worlds of a certain kind. He argues that every permission sentence leaves many things unmentioned that Jane may do or not do, as well as irrelevant side aspects. Hence, there is not only one but many deontic alternatives *w* (for Jane at *w**) which exemplify her taking coffee. The semantic analysis of modal existentials does not lose its strength if we allow quantification over pluralities of worlds: *there are some deontic alternatives for Jane where Jane takes coffee.*

Next, let me discuss which part of a person's deontic alternatives is described with a free choice disjunction. Two scenarios come to mind. In some cases, the preceding context makes it clear that the full space of deontic alternatives is covered. The subject has several options but *has* to chose one of them. (4.2) offers an example.

(4.2) a. *You must choose a password.*
b. *You may choose your old one, or a new one.*

Such examples are very close in meaning to imperatives like *you must choose your old one or a new one*. The fact that each disjunct denotes a genuine alternative is derived like in section 2 above, and the pertinent conjunction follows. We will come back to such cases below. Usually, however, permission sentences are true permissions in that the subject also has the option to do nothing.

(4.3) *Jane may take tea or coffee.*

This sentence, intuitively, has a threefold message. First, Jane has permission to take tea and she has permission to take coffee. Second, it is her choice which one to take. And third, *she may as well choose not to take either one*. In free choice permission sentences,

- the speaker decides to talk specifically about all and only those deontic alternatives which exemplify one among several possible actions that the subject may take *in one specific choice*
- the possible actions are losely understood as excluding each other (which is, however, not strictly necessary)
- logical independence is not sufficient for mutual exclusion; the possible actions must be tied together as being all possible outcomes of *one* decision of the subject.

The last observation is important. Remember that disjoint lists of mutually independent privileges do not give rise to free choice effects. I repeat the crucial example (1.10) for convenience.

(1.10) *What new privileges does Judy gain when she's 18 years old?*
 # Judy may drive a car, or marry without her parents' consent or vote in elections.

In sum, the speaker has indeed a specific subset of the set of all deontic alternatives (of the subject) in mind. The subset is the one which exemplifies all possible decisions that the subject is allowed to take in *one* given case. A sentence like (4.3) expresses: "The speaker wants to inform you about Jane's range of deontic alternatives as far as the choice of hot restaurative beverages is concerned". While we will turn to more complex examples below, I will take this paraphrase as the base line for the semantic analysis of modal existential quantification *if licensing for 'or' is required.* I have no conclusive views on other "neutral" cases. The following points generalise the analysis of section 2 to deontic modals.

(i.) *may* S refers to some specific intended subset W of all deontic alternatives W_{deont} for some subject a at world w*. It is the subset W which exemplifies all possible decisions that the subject is allowed to take in *one* given case.[6]

(ii) Pluralic predication over worlds: A property P holds for some given plurality W of worlds, P(W) iff for all $w \leq W$: P(w).[7]

(iii) Pragmatics of *or* in pluralic predication:
1. Speaker uses (A *or* B)(W) and has sufficient knowledge of the situation.
2. Speaker did not use the simpler A(W), nor the simpler B(W), and hence violated the maxim of manner: be brief.
3. He must have reason to do so. The reason could be the maxim of quality: The speaker seems to believe that neither A(W) nor B(W) are true.
4. Hence, speaker knows that for some w_1, $w_2 \in W$: $A(w_1) \wedge \neg B(w_1)$, $\neg A(w_2) \wedge B(w_2)$

If we apply this analysis to sentence (4.3), it yields the following.

(4.5) a. $\exists W$([TAKE(JANE, TEA) ∨ TAKE(JANE, COFFEE)](W)) where speaker has a certain set W of alternatives in mind.
b. …that is, for all $w \in W$: [TAKE(JANE, TEA) ∨ TAKE(JANE, COFFEE)](w)
c. As speaker uses (A *or* B)(W) instead of the simpler A(W), or B(W), he implicates that the simpler statements would not hold true for the set of worlds W he has in mind. Hence, there are w_1, $w_2 \in W$ such that TAKE(JANE, TEA)(w_1) $\wedge \neg$TAKE(JANE, COFFEE)(w_1) and $\neg$TAKE(JANE, TEA)(w_2) $\wedge$ TAKE(JANE, COFFEE) (w_2). In other words: *Jane may take tea*. And: *Jane may take coffee.*

This shows that the desired free choice effects follow from the analysis of this basic case.

Let us come back to those cases where *may A or B* is tantamount to *must A or B*. Geurts (2005) points out that the preceding discourse can specify the quantificational domain. I repeat the crucial example in (4.2).

(4.2) a. *You must choose a password.*
b. *You may choose your old one, or a new one.*

The first sentence characterizes the deontic alternatives in total. In this context, it is completely clear that the *may* quantification in b. refers to the range of deontic worlds described in a. In this case, an analysis as in (i)-(iii) is fully convincing, as the set of alternatives that the speaker must have in mind is the set of all those where the addressee adheres to the obligation in a. This totality of worlds W is characterised by the disjunctive property in (4.6), and as above the free choice conjunction in (4.7) is implicated.

(4.6) [CHOOSE(YOU, OLDPASSWORD) ∨ CHOOSE(YOU, NEWPASSWORD)](W)
(4.7) $\exists$w(CHOOSE(YOU, OLDPASSWORD) (w)) $\wedge$ $\exists$w(CHOOSE(YOU, NEWPASSWORD) (w))

[6] There may be more than one set of worlds that serves this purpose. This does not matter for the core of the analysis. It will be sufficient (see below) to assume that the speaker wants to talk about *any* one subset of deontic alternatives which is large enough to exemplify all options. The pragmatics of *or* would then implicate that *any* such subset can *only* be truthfully described by resorting to a disjoint property. Conjunctions of permissions will follow.

[7] We could assume here that we are talking about atomic parts of the plurality of worlds, i.e. single possible worlds. Hence, a simpler notation might be $w \in W$.

Note that the sentence *You must choose your old password, or a new password.* is logically equivalent to (4.2.b) in the given context. An explanation of the "friendlier" undertone of the *may* statement remains to be developed.

Even though the range of options that the speaker has in mind in modal existentials is more difficult to pinpoint than for explicit existentials, a closer look at the data can reveal some conventions. Let us turn back to example (4.3). There is some tacit suggestion that the disjunct in (4.3) exhausts the options of Jane *as far as hot beverages with restorive quality* are concerned. The speaker restricts attention to these cases and remains tacit about cold drinks, food, and any other activity. The speaker would not be uncooperative if it turned out that Jane has more unrelated options in addition: the choice between soft drinks, the choice between wine/beer, the choice between vegetarian and non-vegetarian lunch etc. The speaker has just that set of deontic alternatives in mind that exemplify the *hot beverages* choice.

To see this point more clearly, imagine an air flight where the stewardess approaches passengers and offers:

(4.8) *You may take coffee or ham sandwich.*

In this context (passenger and stewardess both informed about conventional refreshments) the utterance strongly suggests that the stewardess has run out of any other food or drink. She is cooperatively listing the remaining options and leaves for you to choose. If there were in fact more kinds of drink or food available, the passenger would be justly annoyed and have the feeling that the stewardess did not exhaust the full range of deontic alternatives that sentence (4.8) *suggests* she has in mind.

Further examples can serve to illustrate this intuition:

(4.9) *Samantha may take up her studies at Stanford or Harvard.*
possible intended deontic alternatives:
worlds that exemplify all possible universities S. may go to
worlds that exemplify all possible ivy league universities S. may go to

Hence, the utterer of (4.9) would not be uncooperative if it turned out that Samantha also has the possibility to go to Mayor Chesterton College at Sheperd's Hill, say. In that case, the speaker would just have the second set of deontic alternatives in mind. Matters are different in (4.10).

(4.10) *Frederick may take up his studies at Stanford or at Major Chesterton College at Sheperd's Hill.*
possible intended deontic alternatives:
worlds that exemplify all possible universities F. may go to

In (4.10) the two disjuncts that describe Frederick's options are disparate enough not to exemplify any sub-class of universities. Hence, we'll understand the list in (4.10) as exhaustive list of Frederick's options.

Let me finally briefly mention modal disjunctions like the following, as discussed in Geurts (2005):

(4.11) *You may do A, or you must do B.*
(4.12) *You must do A, or you must do B.*

I think that these require a more refined analysis of the deontic space. An example like the schematic (4.11) suggests that the first A option is more agreeable than the second, B option. Hence, (4.13) seems a natural instantiation for (4.11) while (4.14) is not (according to my own preferences):

(4.13) *You may do the shopping, or you must clean the toilet.*
(4.14) *You may clean the toilet, or you must do the shopping.*

The pattern in (4.12), in contrast, has been disputed as illogical (e.g. Schulz 2003 as reported in Geurts 2005). How can there be, logically thinking, an alternative of two equally binding obligations? (Note that (4.12) is not understood as an epistemic alternative here "…*and I don't remember which"*.) I think that the criticism is well taken, even though the examples are valid and existant. Yet, the contribution of *or* seems to be dynamic-temporal and beyond the range of phenomena that I want to address here. Consider a classical instantiation of (4.12):

(4.15) *Money, or Life!* (Geld oder Leben!)
(You must pass me your money, or you must die.)
Hands up, or I'll shoot you!
(*You must take your hands up, or you must die)*
(4.16) *You have to take away your car now. Or you'll have to pay a fine of 50 Euro.*

As before, the options are again ordered according to the degree of unpleasantness of the requirements. But secondly, there is a clear temporal dimension in the contribution of *or* in such examples. *You must do A. And if you have not done A in due time, B will follow.* Hence, the disjunction of obligations like in (4.12) does not present an alternative of obligations *now* but a *sequence* of *ever more unpleasant* obligations in the future. (This is the essence of all threats for punishment). I will not consider such uses of *or* in more detail here.

4.2 Epistemic possibility

Let us take a natural example of epistemic free choice as our starting point. We observe our friend John late at night, pale, leaning at a lamp post. We conclude:

(4.17) *John might be drunk or ill*.

In cases like this, there is one clear issue, evidence or fact and we present a list of possibilities that we hold compatible with this fact. At this point, it might be useful to recapitulate Zimmermann's acceptability conditions on lists. Relating the listed propositions p_1, … p_n to the epistemic alternatives of the speaker $H_{w,c}$ he assumes that

i. $p_i \cap H_{w,c} \neq \emptyset$ for $1 \leq i \leq n$ (*each disjunct is a genuine alternative*)
ii. there is no set M such that $M \cap H_{w,c} \neq \emptyset$ and $M \cap p_i = \emptyset$ for $1 \leq i \leq n$. (*the disjuncts together exhaust the epistemic space*)
iii. the disjunctions do not overlap, in the sense of a suitable topology. (*independence; a violable pragmatic requirement*)

Condition ii. amounts to the assumption that the speaker designes the list of alternatives with the intention to exhaust his epistemic space. In order to remain realistic, Zimmermann allows for a tacit *elsewhere* disjunct in order to account for open ended lists of irrelevant cases. This assumption could be rephrased as follows:

(A) The speaker intends to make a modal existential statement about his full epistemic space; or: that part of the epistemic space where the relevant, realistic options that he wants to list are exemplified.[8]

The intention in uses like (4.17) can be paraphrased as follows: "I want to talk about the set W of *all* reasonable epistemic alternatives—even though I use specific existential quantification to address them—and I attribute the property [DRUNK(JOHN) ∨ ILL(JOHN)](W) to this set of worlds." Epistemic alternatives which might be excluded from this statement are those remote possibilities the speaker has bad eyesight, it is in fact a lifesize doll of John that is leaning at the lamp post, etc. Note that the resulting constellation is parallel to the permission sentence in (4.5): "*You must choose a password. You may choose your old password or a new one"*. Like in that earlier case, (4.17) could be replaced by *John must be drunk or ill.* The quantification expressed, and the set of worlds refered to, therefore do not exhibit the standard neutral case of existential quantification. However, (4.5) and (4.17) can be captured as one limit case of specific existential quantification where *some are practically all*. Like in section 4.1, the genuineness of each disjunct follows by pragmatic inference. This, in turn, again entails the free choice conjunction.

(4.18) *John might be drunk. And: John might be ill.*

One very nice illustration of the tension between (a) the desire to exhaust all possibilities, (b) the fact that this might require an endless list, and (c) the systematic neglection of certain epistemic possibilities, is exhibited by the children's book "Schachtelmonster". A little boy finds a cardboard box and explores the possibility that there might be Schachtelmonster (cardboard box monsters) in that box. The hidden premiss of the reflections in (4.19) is "assume that there are monsters in that box" (i.e. let's devise this list of disjuncts with that set of epistemic alternatives in mind where there are actually monsters in the box).

(4.19) *Vielleicht sind sie gelb mit blauen Tupfen, oder blau mit gelben,*
perhaps are they yellow with blue spots or blue with yellow
oder vielleicht sind es Mumienmonster, oder ein paar
or perhaps are it mummy-monsters or a pair
Fledermausmonster, oder ganz viele ...
bat-monsters or a-whole many
'*Perhaps they are yellow with blue spots, or blue with yellow spots, or perhaps they are mummy monsters, or some bat monsters, or a terrible lot of them ...'*

The possibilities listed here do not cover the whole epistemic space of the little boy (because, luckily, there is still the possibility that there are no monsters in the box at all). The disjuncts listed do not seem to cover the full range of possible monsters either. Who can think of all possible monsters there could be? The epistemic alternatives rather seem to address the set of worlds which exemplify types of monsters the little boy can think of. Finally, further explorations will have to settle the extent to which *or* in epistemic statements can sometimes share the dynamic quality of the disjunctions at the end of section 4.1. It might be plausible to assume that intermittend *or* in an open list refers dynamically to sequences of epistemic states of the speaker: *Or, if the previous possibilities I could think of are not true, this new set of possibilities is another option.* I will leave such uses of contemplative *or* untreated here.

[8] As before, we can weaken this requirement to "some sufficiently large part of the epistemic space where all options are exemplified.

At the beginning of the section, I suggested that modal free choice examples arise easiest in contexts where the speaker addresses one clear issue, evidence or fact. He lists, so to speak, all resulting possibilities that are compatible with a certain kind of evidence, fact, observation etc. (It is perhaps not an accident that Zimmermann 2000 rests entirely on examples from a detective mystery game.) To what degree is such a context not just "natural" but even necessary? To check this, consider an example where the speaker in fact reports unrelated possibilities.

(4.20) *(On the ride to a wedding, the family discusses what the ceremony might be like.)*
The bride might wear a fancy white dress, or there might be children with flowers, or a band might be playing, or there might be a big cream cake.

A disjunction like this has an odd ring to it. If we understand it as disjoint possibilities—and a suitable prosodic pattern may enhance this—then the speculations seem to imply that under normal circumstances, only *one* of these possibilities is expected to hold. (The couple could have just enough money to buy *either* a dress, *or* flowers, *or* hire a band, *or* buy a cake.) Compare a list of possibilities as in (4.21).

(4.21) *The bride might wear a fancy white dress and*
there might be children with flowers and
a band might be playing and
there might be a big cream cake.

(4.21) is a good way to speculate about a wedding in its various, unconnected aspects. In this sense, it does *not* follow from (4.20). Zimmermann 2000 could, of course, capture this fact by appeal to condition (iii), the mutual non-overlap of alternatives. (4.20) illustrates that non-overlap is not a requirement about logical non-redundancy (as his examples could suggest) but about mutual exclusiveness.[9]

In sum, the analysis of epistemic free choice examples mirrors the previous cases in the following manner.

(i) *might* S expresses existential quantification over epistemic alternatives. The speaker has in mind a subset W of all epistemic alternatives W_{epist} (for speaker, in context c at world w*). It is the subset W which exemplifies all possible conclusions or options that the speaker can think of in view of a certain piece of evidence, facts, situations, or reflection.
(ii) Pluralic predication over worlds: A property P holds for some given plurality W of worlds, P(W) iff for all $w \leq W$: P(w).
(iii) Pragmatics of *or* in pluralic predication:
  1.) Speaker uses (A *or* B)(W) and has sufficient knowledge of the situation.
  2.) Speaker did not use the simpler A(W), nor the simpler B(W), and hence violated the maxim of manner: be brief.
  3.) He must have reason to do so. The reason could be the maxim of quality: The speaker seems to believe that neither A(W) nor B(W) are true.
  4.) Hence, speaker knows that for some $w_1, w_2 \in W$: $A(w_1) \wedge \neg B(w_1), \neg A(w_2) \wedge B(w_2)$

The only assumption that one could find problematic, (A), has been shown to mirror analogous assumptions that are inherent in earlier work, and in that sense, the present proposal is as good or as bad as these. However, the present analysis for epistemic free choice

[9] at least under normal circumstances. The offer "tea or coffee?" can always be exploited by the request "both, please!"

has been developed as an instantiation of a more general pattern that arguably also covers deontic free choice examples, and extensional free choice examples. Moreover, the analysis rests on the assumption that the word *or* denotes Boolean disjunction, and that all other effects are due to pragmatic inferencing, if necessary enhanced by reinterpretation of other parts of the sentence (here: existential quantification). This leaves the option to devise individual analyses for different kinds of implicatures for different kinds of disjunctive sentences. The final section will briefly but non-exhaustively highlight this issue.

5. Interactions between different licensers

The present approach presents a modular semantic-pragmatic analysis of free choice effects of *or*. The connective *or* uniformely denotes boolean disjunction. The word *or* (hence) offers a systematic means to convey a weaker property (A or B) instead of two stronger properties (A, B). This weakening requires pragmatic licensing: why say less, in more words? In many uses, we may have simple and perspicuous reasons to use weaker properties instead of stronger ones, e.g.:

> downward entailing contexts:
> antecedents of conditionals, restrictors of universal quantification, negation
> with certain implicatures:
> Scope of universal quantification (*every guest received a rose or a hat*)
> and necessity operators (epistemic, deontic, etc.)

Other uses would, in their literal meaning, trade a weaker statement for a stronger one. In such uses, speakers/hearers can use conventional reinterpretations *of other parts of the sentence* in order to come to a content where *or* is pragmatically meaningful. This option was elaborated for explicit and modal existential quantification. However, if no other explicit reason to use *or* is given in the sentence, epistemic *might* serves as a default licenser, as in (5.1). It was demonstrated in the previous section how we can derive the conjoined possibilities in (5.2).

(5.1) *John is a buddhist or a hindu* (*… and I don't remember which*)
(5.2) *John might be a buddhist. And John might be a hindu.*

I argued that epistemic uncertainty can not be the only way to license *or*. Many uses of *or* patently lack any flavour of epistemic uncertainty or insufficient knowledge. The modular analysis of *or* can explain why *or* has very different flavours in different contexts of use. Consider the following list of examples. None of these seems to indicate uncertainties on the side of the speaker. (Of course, all examples *can* be interpreted as involving epistemic alternatives, but this will not be the only, nor the most natural interpretation.)

(5.3) *All applicants are buddhists or hindus* (implicature: *and both possibilities occur*)
(5.4) *If you get an A or a B in the exam, I'll take you out for dinner*
(implies: *either precondition is sufficient*)
(5.5) *You must take a written exam or present three times in class.* (implicature: *which describes all your possible options; either one is a life option.*)
(5.6) *Nobody was bored or annoyed.*
Gordon never eats meat or fish.
Gordon eats neither meat nor fish.

All the examples in (5.3) to (5.6) have in common that a plain boolean analysis of *or*, together with a simple application of the maxims of manner and quality, are sufficient to describe the information content of the examples in question.

If the strategy pursued in the present paper is correct, then a simple boolean analysis of *or* is likewise sufficient in other cases, specifically those that give rise to free choice effects.[10] The observed logical strengthenings arise, I claimed, by a reinterpretation of existential quantification rather than by a nonstandard analysis of *or*. This will lead to the prediction that such reinterpretations will become superfluous if other licensers are present in the sentence. I will discuss two constellations, negation and conditionals as licensers.

Simons (2005b) points out that the negation of a disjoint permission behaves strangely. She states that "when we embed *or* under both a modal and negation, it stops misbehaving and starts acting like a well-behaved Boolean operator". The following example is discussed in detail:

(5.7) *Jane may not sing or dance.*

Simons diagnoses the following readings of (5.7):

(5.8) *Either Jane is not permitted to sing, or Jane is not permitted to dance.*
(5.9) *Jane isn't permitted to do either, sing or dance* ('*neither nor reading*')

Simons uses a modal re-interpretation of *or* (close to Zimmermann (2000)) to attribute the pertinent free-choice reading to the unnegated sentence (5.10).

(5.10) *Jane may sing or dance.*
$\Diamond$(jane sing) $\wedge$ $\Diamond$(jane dance)

Negation then leads to reading (5.8).

(5.11) $\neg(\Diamond$(jane sing) $\wedge$ $\Diamond$(jane dance))
$\equiv \neg\Box$(jane sing) $\vee$ $\neg\Box$(jane dance)

Yet, as argued in Simons (2005b), the more salient reading in (5.9) remains unanalysable in Zimmermann (2000). Simons herself can capture the second reading because her symmetry condition, posited on the disjuncts, is satisfied in negated uses. (The shared property of both disjuncts is to have empty intersection with jane's deontic space.) While this technically leads to the correct results, the basis for Simons' condition remains unanalysed, which turns it into an austere—and easily violable—stipulation.

Under the present account, we'd say that a specific interpretation of existential quantification (*may*) is essentially driven by the need to license the use of *or* as a longer way to say less. An analysis of (5.7) can proceed as follows: The material in the scope of the modal operator amounts to the disjunction[11]

(5.12) jane sing $\vee$ jane dance.

The modal applies, and we can assume that it does so under the standard existential analysis.

[10] excluding the dynamic *or* in section four.
[11] I follow Simons here in taking the scoping facts of negation relative to *must* and *may* for granted. Hence, *may not* is analysed as "negated permission", while *must not* denotes "obligation not to …"

(5.13) ◇(jane sing ∨ jane dance)

Finally, the result is combined with negation.

(5.14) ¬◇(jane sing ∨ jane dance)

The disjunction in (5.14) is in a downward entailing context, and hence the resulting statement is logically stronger than the competing simpler forms.

(5.15) ¬◇(jane sing), ¬◇(jane dance)

The use of disjunction is pragmatically licensed here because it leads to a stronger statement in a simpler way than by using two separate sentences (*Jane may not sing, and Jane may not dance*). In this case, the boolean interpretation of *or* does not need any further interpretative or pragmatic processes to make sense.

The epistemic reading (5.8) comes about in a different manner. In the present approach, the free choice effects for deontic *may ... or ...* are derived without any allusion to epistemic modality. In whatever way negation, modality and conjunction distribute out, this will not bring us from deontic to epistemic modality. However, I assume that epistemic possibility is *the* default licensing mechanism for *or*. The epistemic disjunction will be derived directly, by assigning wide scope to *or* and licensing it epistemically. (Note that wide scope *or* is not in a downward entailing context.)

(5.16) ***Possibly**, Jane may not sing **or** Jane may not dance.*
*"It is not allowed for Jane to sing, **or***
it is not allowed for Jane to dance,
***and I don't know which**."*

If we analyse epistemic "possibly" as shown in section 4, we can also derive the corresponding conjunction.

(5.17) ***Possibly**, Jane may not sing, **and possibly,** Jane may not dance.*

Going back to the preceding accounts, note that Simons (2005b) and Zimmermann (2000) (as in Simons 2005b) derive the disjunction in (5.11) by boolean distribution of negation over two conjuncts. The connective in (5.11) (as copied from Simons (2005b)) is simple Boolean *or* without any further modal force. Hence, (5.17) can not be derived from (5.11). Of course, both authors could resort to a Gricean argument here, but this would be at odds with the general program pursued in both papers, namely to derive free choice effects in the use of *or* as part of the literal content.

Note that there is a third scoping possibility for *or* in sentence (5.7), leading to the logical structure ¬(◇(jane sing) ∨ ◇(jane dance)). Under the present analysis all logical operators and quantifiers get their standard interpretation *unless more is required for pragmatic reasons*, which is not the case here. (Negation of two disjuncts is stronger than negation of either disjunct alone). Therefore this option is logically equivalent to (5.14).

It seems a natural assumption that the scope of *or* determines the pragmatic repair strategies and implicatures—if necessary—which warrant its use. Specifically, epistemic possibility appears to occur only with high scope *or*. Exceptions from this observations can arise in

contexts where a previous high scope epistemic modality gets copied into an embedded context from previous discourse.[12] This happens in the second kind of example that I will look into, *or* in the antecedent of conditional clauses. Antecedents of conditionals provide a good reason to use *or*. Consider the conditional in (5.18). It is intended as equivalent to the conjoined conditionals in (5.19). The two sentences are indeed logically equivalent under a Boolean analysis of *or*. The example is taken from Zimmermann (2000:275).

(5.18) *If Mr. X is in Regent's park or in Bloomsbury, he cannot take a boat.*
(5.19) *If Mr. X is in Regent's part, he cannot take a boat, and*
if Mr. X is in Bloomsbury, he cannot take a boat.

Consequenty, there is no further need to re-interpret any part of the sentence in order to come to a statement that warrants the use of disjunction. Specifically, note that an epistemic interpretation of *or*, while still possible, is at best marginal in such an example.

(5.20) *If Mr. X is in Regent's park or in Bloomsbury, he cannot take a boat.*
If Mr. X is in Regent's part, he cannot take a boat, ***or***
if Mr. X is in Bloomsbury, he cannot take a boat, ***and I don't remember which.***

This observation suggests that the different ways to make sense of *or* are not mutually exclusive. The presence of one does not lead to a principled unavailability of the other (even though "innocent" speakers of English tend to refute (5.20) on stylistic grounds). The epistemic use of *or* as paraphrased in (5.20) requires the following steps in the semantic evaluation: (i) Disjunction is interpreted with highest scope above the conditional, (ii) the resulting literal meaning contains a disjunction which lacks motivation, (iii) the hearer grants a modal *possibly* in the specific sense discussed in section three and (iv) derives the net information of literal content plus implicatures.

6. Summary

In the present paper, I proposed a modular semantic-pragmatic analysis of free choice effects for *or*. The account rests on the following assumptions:

- Uses of *or* are tendentially pragmatically unmotivated, specifically where the speaker would use more words to convey less information. The hearer will infer some reason why the speaker used *or*.
- Uses of *or* can be motivated by implicatures of the literal content of the sentence, by re-interpretation of the original sentence (plus implicatures), and by tacit epistemic modality.
- Existential quantification can be reinterpreted as specific existential quantification. This possibility is available in general. It is exploited in motivating uses of *or*.
- The semantics of specific existential quantification allows to derive the free choice effects which have been observed for *or*. Most importantly, it can explain free choice effects in all quantificational domains. Hence, the approach extends naturally to free

[12] I do not have any independent proposals to make about scoping of *or*. In particular, I appreciate Simons' scoping mechanism for *or* which allows scopetaking without any syntactic movement operations (dubious or not). My claim is that the scoping mechanism does not require further modifications of the semantics of *or* which are intended to yield free choice effects. The scoping mechanism in Simons is very strong, as it can potentially give any scope to *or*. The proposal that I defend here may lead to contentful restrictions to this scoping mechanism. It might turn out that a narrowly defined set of *or* licensers restricts the possible scopes of *or*. A systematic exploration remains to be conducted.

choice effects for explicit existentials, data which have not received much attention in the literature.[13]

I argued that core examples like those discussed in the paper can be captured maintaining a strict sequential order between semantic evaluation and pragmatic inferencing. It should be kept in mind, however, that more elaborate cases of embeddings could require a more refined picture. A sentence like (5.1) has no anaphoric quality, and yet free choice effects in the embedded context are possible.

(5.1) *The detective believes that Mr.X is in Regent's Park or in Bloomsbury.*

The proposed analysis hence delineates a new broad range of data which can help us to get a better understanding of the systematic interactions at the semantics-pragmatics interface.

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[13] Klinedinst (2005) poses a welcome exception to this claim. The present paper shares his perspective and the core analysis. However, the material which is accessible at present does not discuss specificity effects in the explicit domain, nor the interaction of several different ways to make pragmatic sense of *or*.