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Free choice is a form of dependence

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Abstract This paper refutes the widespread view that disjunctions of imperatives invariably grant free choice between the actions named by their disjuncts. Like other disjunctions they can also express a correlation with some factual distinction (fact-dependent reading), but as with modalized declaratives used for non-assertive speech acts this needs to be indicated explicitly. A compositional analysis of one such indicator, *depending on*, constitutes the point of departure for a uniform analysis of disjunctions across clause types. Disjunctions are analyzed as sets of propositional alternatives that correlate with a partition that the speaker may or may not be able to indicate explicitly. Free choice arises as the specific case where the partition is induced by the preferences of the addressee (understood as necessarily consistent effective preferences/'goals').

Keywords Disjunctions · Free choice · Imperatives · Strong permission · Alternatives

1 Introduction

Confronted with a disjunction like (1) I have good reasons to conclude that, at least as far as my interlocutor is concerned, I can choose between finishing my paper and going for a walk.

(1) Finish your paper or take a walk.

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Intuitively, a disjunction of two imperative clauses offers the addressee the choice between the two courses of action named in the two disjuncts. A similar effect has been observed with modal verbs, as illustrated in (2), and is generally dubbed the *free choice* inference.

(2) a. You may finish your paper, or you may take a walk.
b. You should finish your paper, or you should take a walk.

While sentences like (2a) and (2b) can easily give rise to other interpretations as well (prominently, that the speaker does not know which disjunct is true), (1) is mostly claimed to have only the free choice reading.[1]

In this paper, I focus on free choice in this intuitive sense that the choice between the two disjuncts is left to the relevant agent (in (2), the addressee), and I argue that most existing analyses fall short of actually capturing this. Moreover, I argue that contrary to common assumptions, disjunctions of imperatives need not grant free choice. I assume that sentential disjunctions denote sets of propositional alternatives that can interact directly with other operators in the course of the semantic computation. Contrary to common wisdom, I maintain that disjunctions of imperatives denote sets of propositional alternatives as well. Finally, I argue that in the absence of an overtly encoded operator that could combine with the propositional alternatives expressed by the individual disjuncts, independently of whether these are imperative or declarative in nature, all of them have to be integrated into the discourse as genuine epistemic alternatives: which one is true correlates with general facts that the speaker may or may not be able to specify or, in special cases, with the choices of the addressee. This take on unmodified disjunctions emerges naturally once a compositional analysis of *depending on* modifiers is in place. Building on the results for overtly modified disjunctions, I discuss how to derive the intended correlations for particular utterances of unmodified disjunctions in a neo-Gricean framework. In the process, I offer some insight into why imperatives and particular uses of modal verbs tend to convey dependence on the choices of the relevant agent.

2 Disjunctions and distribution

2.1 Imperatives and Ross's paradox

The free choice inference associated with sentences like (1) is often considered independent evidence for the non-propositional nature of imperative clauses (e.g., Segerberg 1990, Asher and Lascarides 2003, and Mastop 2005). Sentences belonging to this grammatical category cannot intuitively be associated with truth or falsity. In this, they differ sharply from declarative clauses, which are commonly deemed propositional. So it is hardly surprising if imperatives do not display the inference

[1] Throughout this paper I often use 'reading' or 'interpretation' to refer to specific aspects of how disjunctions are understood in a given context. This usage is pre-theoretical: a distinction between readings does not imply a commitment to genuine semantic ambiguity. In fact, I will eventually argue against the presence of semantic ambiguity in the cases at hand.

patterns observed with declaratives—patterns valid in classical logic with its Boolean interpretation of sentential connectives. In particular, declaratives validate disjunction introduction; that is, they allow one to conclude a disjunction from the truth of either of its disjuncts (cf. (3)). Inferences along these lines appear unwarranted for imperatives (cf. (4)).

(3) You slipped the letter into the letter-box.
$\Rightarrow$ You slipped the letter into the letter-box or you burnt it.

(4) Slip the letter into the letter-box!
$\not\Rightarrow$ Slip the letter into the letter-box or burn it!

This phenomenon (the flip side of the effect discussed for (1)) was first pointed out by Ross (1944) and is referred to as *Ross's paradox*. In the meantime, even the inference in (3) has come under scrutiny, and not everyone believes it to be valid (e.g., Zimmermann 2000 and Geurts 2005). But it still enjoys wide-reaching popularity, and its apparent failures are treated mostly as cases of pragmatic infelicity. Indeed, the inference seems unproblematic in a context where the speaker has reason to give less information than what she is known to have and what would be relevant for the addressee.

(5) [SCENARIO: The addressee is supposed to guess where a particular letter has been hidden.]
Okay, I'll give you a hint: I slipped it in between some of these books or I hid it under one of these pillows.

In contrast, (4) does not feel like a valid inference in any intuitive sense of drawing inferences from imperative clauses. Ross himself emphasizes that the very notion of 'inference' is undefined for imperatives. He points out that a logic of satisfaction conditions that associates an imperative with the set of indices at which it has been complied with straightforwardly inherits the inference patterns of declaratives. However, this is clearly not the only way of drawing inferences from imperatives, and it is, as Ross emphasizes, most likely not the most intuitive way: speaker intuitions about what follows from an imperative are better aligned with the possible ways of complying with it. On the latter understanding of imperative inferences, disjunction introduction has fatal consequences—potentially for the letter in Ross's example sentence, and surely for our reasoning with imperatives. Following these intuitions, the received wisdom on imperative disjunctions is that they always grant free choice between the two disjuncts as ways of satisfying the disjunctive imperative. Opinions differ merely on how imperatives are to be interpreted in general, and how the free choice effect is to be derived (e.g. Merin 1994, Mastop 2005, Aloni 2004, 2007, Veltman 2005, Portner 2010, Starr 2011, Charlow 2011, Barker 2012, and Aloni and Ciardelli 2013). Before this view is challenged in Sect. 2.4, it is helpful to obtain a better understanding of free choice disjunctions in general.

2.2 Modal disjunctions: how much room for choice?

In current linguistic work, Ross's paradox is mostly discussed in connection with the grammatical category of imperative mood. Ross himself entertained a strictly functional understanding of an 'imperative' as "a sentence the object of which is to express an immediate demand for action, but not to describe a fact" (Ross 1944, p. 31; similarly Hamblin 1987; for critical discussion, see Merin 1991 and Kaufmann 2012). Ross observes similar failures of disjunction introduction among modal verbs, which can also be used to "express an immediate demand for action" and, in these cases, fall under his conception of imperatives; cf. (6):

(6) You ought to slip the letter into the letter-box!
Intuitively: $\not\Rightarrow$ You ought to slip the letter into the letter-box or burn it.

Von Wright (1968) discusses Ross's paradox as a problem for his calculus of deontic logic, which has become standard in deontic logic (SDL). The intuition behind the free choice inference, which seems responsible for the invalidity of the pattern in (6), can be approximated by the SDL formula in (7a).[2] The intuitive validity of (7a) below is surprising in view of the fact that (7b) is a theorem of SDL: '$\Box$' is interpreted as universally quantifying over the accessible worlds in the relevant model; therefore, thanks to the classical interpretation of '$\vee$', if p is true at all accessible worlds, then $p \vee q$ is also true at them. But under the usual interpretation of '$\wedge$' and '$\rightarrow$', (7a) and (7b) together allow one to derive that everything is permissible (cf. Von Wright 1968).

(7) a. $\Box(p \vee q) \rightarrow (\Diamond p \wedge \Diamond q)$
b. $\Box p \rightarrow \Box(p \vee q)$

Von Wright (1968) observes a similar phenomenon with possibility modals—his *Puzzle of free choice permission*:

(8) You may slip the letter into the letter-box!
Intuitively: $\not\Rightarrow$ You may slip the letter into the letter-box or burn it.

Again, adopting the intuitively valid inference in (9a) as an axiom would lead to disasterous results in view of (9b), which is another theorem of SDL:

(9) a. $\Diamond(p \vee q) \rightarrow \Diamond p$
b. $\Diamond p \rightarrow \Diamond(p \vee q)$

In short, modalized disjunctions in natural language (here, exemplified for English)[3] behave quite differently from their putative SDL counterparts.

[2] I am calling it an approximation because it fails to capture aspects of the free choice inference that will be discussed toward the end of this section. None of these aspects are crucial to the basic point made here.

[3] To the best of my knowledge, extensive crosslinguistic research on the matter is still lacking. While related languages like German follow the English pattern, it would be interesting to compare with languages that lack the lexical distinction between conjunctions and disjunctions, such as, for instance, ASL (cf. Davidson 2013).

In the free choice reading, *or* seems to behave more like *and* in that (the permissibility of) the coordination entails (the permissibility of) both coordinands; cf. (10).

(10) a. You may slip the letter into the letter-box or burn it.
b. You may slip the letter into the letter-box, and also, you may burn it.

At the same time, and possibly in contrast to what would be suggested by *and*, most authors agree that an utterance of (10a) does not settle the matter as to whether the addressee is also granted the option to do both. This is often discussed under the heading of *resource sensitivity*. I, too, will assume that the option to carry out both is not granted by the sentence, even though it is not explicitly prohibited either (e.g. Simons 2005a and Barker 2010; for the opposite view, see Fox 2004). In Sect. 5.2.3, I will show that my analysis of the free choice reading holds some promise for understanding the somewhat elusive nature of the resource sensitivity associated with it. Finally, some authors assume that the free choice reading entails that the options given in the two disjuncts are the only ones. According to them, even with disjunctions involving possibility modals the addressee is under an obligation to either post the letter or burn it (cf. Aloni 2004 and Geurts 2005). Others deny this (e.g. Simons 2005a), and I will side with the latter.

Disjunctions with necessity modals, as in (11a), have received less attention than the examples with possibility modals. They invite a more complex inference, which can be paraphrased as in (11b):

(11) a. You ought to slip the letter into the letter-box or burn it.
b. You can slip the letter into the letter-box, and also you can burn it, but you ought to do one of the two.

In this case it is undisputedly necessary to carry out one of the two options; whether carrying out both is permissible as well is, again, less clear.[4]

In addition to the choice-offering readings, which are unexpected from the SDL point of view and which can be brought out easily by a follow-up like *…it's up to you*, there also exists the reading, expected from SDL that the two modalized disjuncts are not both false. A typical trigger for the latter reading is *…but I don't know which*. The result is sometimes called the 'wide scope reading' of the disjunction. It is rendered as in (12) and (13) for possibility and necessity modals, respectively.

(12) a. You may take an apple or a pear, but I don't know which.
b. $\Diamond$(you take an apple) $\vee$ $\Diamond$(you take a pear)

(13) a. You ought to take an apple or a pear, but I don't know which.
b. $\Box$(you take an apple) $\vee$ $\Box$(you take a pear)

The free choice reading is sometimes associated with a construal where the disjunction takes scope under the modal, and is then called the 'narrow-scope reading'. In the remainder of this paper, I will argue against a structural difference between these

[4] The free choice reading for possibility modals and for necessity modals collapses in the accounts of Aloni (2004) and Geurts (2005).

two readings. Therefore, I refer to them as the *ignorance reading* and the *free choice reading*, respectively.

The ignorance reading is of course the less problematic of the two for the standard assumption that natural language *or* expresses classical $\vee$. Still, it suggests the exclusive reading that exactly one of the two disjuncts is true, rather than the inclusive reading that at least one of them is true, an inference that, following Grice (1975), is standardly treated as a scalar implicature.

Attempts to derive the different readings from a mere scope difference are challenged by Von Wright's (1968) observation that both the free choice reading and the ignorance reading are observed not just in sentences with only one instance of the modal, but also when each disjunct contains its own instance of the modal verb.[5]

(14) a. You may take an apple or a pear.
b. You may take an apple or you may take a pear.

(15) a. You ought to take an apple or a pear.
b. You ought to take an apple or you ought to take a pear.

Analyses that rely on a difference in syntactic scope have to avail themselves of covert representations with only one modal to account for the free choice reading of disjunctions like (14b) and (15b) (Simons 2005a; Barker 2010). Alonso-Ovalle (2006) points out that this is problematic in view of examples like (16) (his (247)), which involve different modals:

(16) You may email us or you can reach the Business License office at 949 644-3141.

If the two modals in the two disjuncts were overt realizations of the trace of one and the same head that is raised across the board, they could not be pronounced differently in the two disjuncts. I consider this a strong argument against any account of free choice readings that relies crucially on a structure with a single modal in scopal interaction with the disjunction.

2.3 The influence of descriptive and performative modality

At first glance, the presence or absence of free choice seems to correlate with two ways of using deontic modal verbs (as suggested by Ross 1944). On the one hand, deontic modal verbs can be used to describe states of affairs (*descriptive modals*), that is, they can occur in assertions about what is commanded and what is permitted. On the other hand, deontic modal verbs can be used to change these states of affairs by actually giving permission or commanding (*performative* or *non-descriptive modals*). In the latter case, despite its apparent declarative form, the sentence resembles an imperative clause in its infelicity with a subsequent truth judgment:

[5] See also Zimmermann (2000) for particular emphasis on this point.

(17) A: You must leave now!
B: #That's (not) true.

The definition of descriptive and performative verbs is somewhat unclear, and so is the status of the distinction.[6] Some consider it an ambiguity (e.g. Kamp 1973, van Rooy 2000, Ninan 2005), others a matter of use (e.g. Kamp 1978, Schulz 2003, Kaufmann 2012).

On closer inspection, the pattern of logical 'misbehavior' does not correlate with any of the attempted specifications of descriptive vs. performative modality. The contrast is not between 'well-behaved' descriptive modals and 'ill-behaved' non-descriptive (or, performative) modals (occurring in commands, permissions, advice, etc.). Von Wright (1968) and many others observe free choice effects also with descriptive prioritizing modals, as in (18a) (from Paul Portner, p.c.),[7] and they note a closely related inference with epistemic modal verbs, as in (18b) (from Zimmermann 2000)—here, too, a disjunction of two possibilities is understood somewhat like a conjunction.[8]

(18) a. I checked the rules for paying your ticket. You can pay online or you can pay at the police station.
$\Rightarrow$ You can pay online; you can pay at the police station.
b. Mr. X might be in Victoria or in Brixton.

The occurrence of performative deontic modals in disjunctions that do not give rise to free choice is more controversial. Kamp (1973,1978) discusses the following examples:

(19) You may go to Shoal Creek, or you may go to Shingle Creek, but stay away from the dangerous one.

(20) You may pillage city X or city Y. But first take counsel with my secretary.

He argues that in both cases permission is given, but the addressee, rather than being able to act on it right away by choosing freely between the actions mentioned in the two disjuncts, is required to obtain further information first, to find out which of the two options is the course of events that is actually permissible. Stefan Kaufmann (p.c.) proposes calling this *contingent permission*.

In view of these findings, the availability of free choice readings cannot be considered an argument in favor of a semantic distinction between descriptive and

[6] Modal verbs in sentences that induce an actual change of what is permissible are mostly considered clear cases of performative modals. Yet, attempts to relate performativity to grammatical or lexical properties sometimes weaken the category to include modals in other non-assertoric speech acts (for instance, teleological modal verbs used in giving advice, or bouletic modal verbs used in expressive speech acts), and/or change it to include only modal verbs that cannot be used in assertions (Ninan 2005 and Portner 2009 suggest this for deontic English *must* in matrix clauses).

[7] Rather than extending the label 'deontic' to modalities involving desires and goals in addition to rules and regulations, I reserve it for the latter type. I adopt Portner's (2009) term *prioritizing* to cover the entire class of deontic (in the narrow sense), bouletic, and teleological modalities.

[8] This is often also called a free choice reading, but as indicated in the beginning, I reserve 'free choice' for the stronger sense of offering choice between two courses of events.

performative modals. Moreover, the appeal of treating free choice effects in terms of dynamic effects associated with non-assertoric speech acts is reduced significantly. Yet, given the inherently non-assertoric nature of imperative clauses, one might consider defending such a solution for the more limited domain of imperative disjunctions—if, as suggested by the received view, these are invariably choice-offering. I will therefore turn to imperatives again now for a closer examination. As turns out, my conclusion will be that the received view is mistaken.

2.4 Absence of free choice effects for imperative disjunctions

Claims that disjunctions of imperatives invariably give rise to free choice effects rest on intuitions about the inferences that can be drawn from imperative clauses (building on Ross's considerations regarding a logic for imperative clauses, cf. (4)), as well as intuitions about dialogues that display infelicitous attempts to cancel free choice inferences, such as (21) (from Aloni and Ciardelli 2013):

(21) MOTHER: Do your homework or help your father in the kitchen!
[Son goes to the kitchen.]
FATHER: Do your homework!
SON: But, mom told me that I could also help you in the kitchen!

It accords with speaker intuitions about (21) that the son, who objects to his father's command to do his homework, has a point: he can draw on his mother's earlier permission, which offered him a choice between doing his homework or helping in the kitchen. The father cannot 'undo' this by pointing out that the mother had intended an ignorance reading. In contrast, an argument along these lines is indeed possible for an utterance involving modalized declaratives, as in (22).

(22) MOTHER: You have to do your homework or you have to help your father in the kitchen.
[Son goes to the kitchen.]
FATHER: Do your homework!
SON: But, mom told me that I could also help you in the kitchen!
FATHER: She said that you had to do one of them. We'd discussed this earlier, and apparently she didn't remember which we'd agreed on.

But similarly to what has been observed with performative modal verbs, imperatives too do not always resist cancellation of free choice. It is, for example, perfectly natural for a speaker to use a disjunction of imperative clauses to give advice if she cannot fully resolve background facts needed to suggest a single best course of events; that is, if her knowledge is sufficient only to point out that in one type of situation, the first disjunct names the optimal course of events, while in another type of situation, the second does.

(23) A: How do I get to the station?
B: Take the bus or call a taxi. It depends on how much time you have.
B': Take the bus or the tram, I can't remember which.

Absence of free choice is not limited to imperatives used for advice. (24) constitutes a silent wish that lacks the sort of indiscriminacy familiar from Ross's paradox:

(24) Please be a Stanford or an MIT graduate—whichever it takes to get that job.

Even speech acts like orders, instructions, and commands, which are generally considered the canonical use of imperative clauses, can be placed in scenarios that allow for the free choice effect to be cancelled. Kaufmann (2012) discusses Ross's example in a context that blocks the free choice inference:

(25) [SCENARIO: A is looking for a letter that B wrote to a mutual friend to congratulate her on her new relationship.]
A: Just in case I find that letter of yours: What am I to do with it?
B: Post it or burn it, depending on whether they are still together.

In the presence of a follow-up like *depending on*, the free choice effect can easily be cancelled, and the resultant reading can be paraphrased as in (26):

(26) If they are still together, it's best to post the letter; if they are not together anymore, it's best to burn the letter.

Another example of a command or an order in which a disjunction of two imperatives fails to generate a free choice reading is modeled on a variant of Kolodny and MacFarlane's (2010) 'miners paradox' (cf. (27)):

(27) [SCENARIO: 10 miners are trapped in shaft A or B; blocking it with sandbags would save all 10.]
Find out what shaft the miners are in and then block shaft A or shaft B accordingly.

Here, the absence of free choice is indicated by *accordingly*.

Generally, it can be shown that the free choice effect with imperatives gets cancelled whenever the speaker lacks a piece of information needed to determine which disjunct should be carried out (or, for wishes like (24), should be true). But note that all our examples of felicitous cancellations carry an overt indication of imperfect information, and they become significantly worse in the absence of an overt marker. Even in the presence of strong contextual cues, as in (27), omitting *accordingly* suggests a—pragmatically infelicitous—free choice reading. At first glance this may seem to constitute a systematic difference between imperatives and modal verbs; after all, modals allow for the absence of free choice effects quite freely even without overt modifiers. But closer inspection shows that, in all such cases, the modals are used descriptively. Hence the parallel between imperatives and performative modals is confirmed: performative modals, too, appear to allow for the absence of free choice only if this is indicated explicitly. The difference between descriptive modals, on the one hand, and imperatives and performative modals, on the other, consists not in whether free choice effects can be cancelled in principle, but rather in how easily free choice

effects can be cancelled in the absence of overt cues.[9] I consider this evidence in favor of a pragmatic explanation as to why non-assertoric speech acts (nearly inevitably) give rise to free choice inferences unless prevented from doing so by overt linguistic material, and I will aim to shed some light on this effect in Sect. 5.3. For the moment, I would like to focus on how imperative disjunctions can interact with overt modifiers that keep them from offering free choice between two courses of action. Since, in this respect, imperatives behave just like (performative) modal verbs, the next section begins with a uniform analysis of modal verbs and imperatives.[10]

3 Inspecting the components of overtly modified disjunctions

3.1 A uniform analysis for modals and imperatives

Kaufmann (2012) takes the similarity between performative modals and imperatives as the starting point for a semantically uniform analysis of the two phenomena.[11] Modals are argued to be used performatively under specific contextual constellations, and imperatives are endowed with a set of presuppositions that confine their felicitous use to contexts of precisely this sort. Consequently, while modals can be used both descriptively and performatively, imperatives can only be used performatively—even though, semantically, they express propositions. While this may sound counterintuitive in view of the fact that imperatives cannot be said to be true or false, it implies merely that semantic values need not be directly accessible to naive speaker intuitions: judgments of truth and falsity are suitable reactions to an assertion of a proposition, but typically not if a proposition is used for some other speech act. In the following, I will briefly introduce Kaufmann's (2012) analysis, which will then serve as the backdrop for a uniform account of disjunctions in imperatives and in modalized declaratives.

Semantically, imperatives are assimilated to declaratives that contain a prioritizing necessity modal.[12] At the level of at-issue meaning, we obtain equivalences as in (28):

(28) Close the door! ≈ You should close the door!

[9] An anonymous reviewer objects to the claim that unmodified disjunctions of imperatives or performative modals invariably convey free choice. Yet other speakers' judgments confirm the claim, and I will continue to follow their intuitions in this paper. If my claim turns out to be too strong, the pragmatic mechanism sketched in Sect. 5.3 can easily be weakened to accommodate intuitions like the reviewer's. What is crucial, however, is that, either way, imperatives and performative modals behave alike.

[10] Thanks to its parallel treatment of imperatives and modals, the chosen analysis lends itself straightforwardly to the enterprise pursued in this paper. I leave it to future work to determine to what extent my proposal for disjunctions could be recast within other theories of imperatives, for instance Portner (2007), Starr (2011), or Charlow (2014).

[11] Kaufmann (2012) is a revised version of Schwager (2006), with which it agrees in all general aspects. Some of the details I draw on in the following are worked out in more detail in the book version, which is why I cite that version throughout.

[12] With Kaufmann (2012) I will ignore the distinction between weak and strong necessity modals (von Fintel and Iatridou 2008). Recent research suggests that, if imperatives are assimilated to necessity modals, they are similar to weak necessity modals like *should* and *ought* (Medeiros 2013; Schwager 2005a). For a slightly different take see Grosz (2009), who treats them as having variable quantificational force.

In what has become the standard approach to modality in linguistics (couched in possible worlds semantics), Kratzer (1977,…, 2012) proposes that modal verbs like *must, should, can,* and *may* express necessity and possibility with respect to two contextually given parameters. The choice of these parameters determines the different flavors observed with modal verbs (epistemic, deontic, bouletic, teleological, circumstantial/dynamic, and so on). One parameter, the *modal base*, describes inviolable background assumptions ('what is known', 'what the relevant facts are'). The other one, the *ordering source*, ranks courses of events or states of affairs compatible with the modal base according to how plausible, how desirable, etc. they are. Technically, both modal base and ordering source are modeled as functions from worlds to sets of propositions, so-called *conversational backgrounds*. Propositions are understood as sets of possible worlds. The set of propositions assigned to the world of evaluation by an ordering source g (representing what is required by a particular body of rules, preferences, or stereotypical assumptions, depending on the context of the conversation) is used to induce a preorder on the set of possible worlds, as in (29):

(29) $u \leq_{g(w)} v$ iff$_{def}$ $\{p \in g(w) \mid v \in p\} \subseteq \{p \in g(w) \mid u \in p\}$

If we set aside cases of infinite approximation to the ideal given by the ordering source, we can single out among the possible worlds compatible with the modal base the ones that are optimal according to the ordering source; cf. (30a).[13] From this, we can easily derive an accessibility relation as used in SDL (Kratzer 1991); cf. (30b).

(30) a. The set of optimal worlds at w given a modal base f and criteria g:
$O(f, g, w) := \{v \in \bigcap f(w) \mid \forall u \in \bigcap f(w)[u \leq_{g(w)} v \rightarrow v \leq_{g(w)} u]\}$
b. $\mathrm{R}^{f,g} := \{\langle w, w' \rangle \mid w' \in O(f, g, w)\}$

Throughout, I assume that the function $[\![\cdot]\!]^c$ assigns semantic content to disambiguated object language expressions at an utterance context c with respect to a set of possible worlds W. Temporality will largely be ignored; where needed, a set of temporal instants T is added ($T \times W$ framework; Thomason 1984). In the neo-Kaplanian tradition, I assume that each utterance context determines at least a speaker, an addressee, the time and world at which the utterance takes place, as well as a variable assignment representing reference and binding of pronominal expressions. Therefore, technically, c stands for a sequence of these and possibly further parameters (see below). Sentences containing necessity modals (represented as $\Box$) are interpreted as in (31), sentences containing possibility modals (represented as $\Diamond$) as in (32).[14] Modal operators are

[13] The assumption that from each world compatible with the modal base the ranking reaches a set of comparatively best worlds is called the *Limit Assumption* (cf. Lewis 1973). It holds for all finite ordering sources and some combinations of modal bases and infinite ordering sources. Kratzer's original proposal can deal with infinite approximation as well and could be adopted straightforwardly (see Kratzer 1991).

[14] For type-theoretic reasons, sentences that express propositions are interpreted as their characteristic functions.

annotated with superscripts for modal base and ordering source at the level of logical form: following von Fintel (2006), I assume that modal operators take as arguments covert representations of modal base and ordering source as well as the prejacent proposition.[15]

(31) $[\![\Box^{f,g}\, p]\!]^c(w) = 1$ iff $\forall w' \in O(f, g, w)[p(w')]$

(32) $[\![\Diamond^{f,g}\, p]\!]^c(w) = 1$ iff $\exists w' \in O(f, g, w)[p(w')]$

Kaufmann (2012) characterizes contexts in which modal verbs are used non-descriptively in terms of properties of the prejacent p, the modal base f, and the ordering source g that the modal operator combines with. Most importantly, in such a context, the modal flavor in question enjoys a special status in the ongoing conversation, and the speaker is assumed to enjoy an epistemically priviledged status with respect to this particular modal flavor.[16]

Following Stalnaker (1978), each utterance context c determines what information is mutually shared:

(33) The context set $\mathrm{CS_c}$ is the set of possible worlds W that are compatible with all the propositions (the common ground) that all participants take for granted for all purposes of the ongoing conversation.[17]

Context c is *practical* if for some salient agent α it renders salient a decision problem $\Delta_c(\alpha)$, modeled as a set of propositions that partitions $\mathrm{CS_c}$.[18] Each cell represents a course of events α could choose (see Cariani et al 2013 for discussion of choosability).

The contextual requirements for the performative use of a modal operator can be spelled out as follows:

First, the speaker counts as an epistemic authority on the modal flavor. Kaufmann (2012) implements this in terms of perfect knowledge along the lines of Groenendijk and Stokhof (1984) and Zimmermann (2000) regarding both f and g.[19] Here, I will resort to a weaker version of this requirement:

(34) The speaker is considered an *epistemic authority* on a modal flavor characterized by f and g iff at all worlds $w \in \mathrm{CS_c}$ for any proposition p: $\Box^{f,g}\, p$ at w iff $\Box^{f,g}\, p$ at all w' compatible with what the speaker believes at w.

[15] In the metalanguage, the same letters are used for the values assigned to the parameters by the contextually given variable assignment.

[16] Additionally, Kaufmann argues that it must be assumed that the speaker considers possible both the prejacent and its negation (Epistemic Uncertainty Condition). This is not crucial for the present discussion.

[17] Stalnaker (2002) derives $\mathrm{CS_c}$ from the transitive closure of the union of all the single participants' doxastic accessibility relations.

[18] I assume that the propositions describing the action alternatives are subsets of the context set. A set N $\subseteq \mathscr{P}(\mathrm{M})$ partitions M iff (i) for all $\mathrm{N_1}, \mathrm{N_2} \in \mathrm{N}$, $\mathrm{N_1} \cap \mathrm{N_2} = \varnothing$, if $\mathrm{N_1} \neq \mathrm{N_2}$, and (ii) $\bigcup \mathrm{N} = \mathrm{M}$.

[19] The speaker is considered an *epistemic authority* on a conversational background f iff at all worlds $w \in \mathrm{CS_c}$: $p \in f(w)$ iff $p \in f(w')$ at all w' compatible with what the speaker believes at w.

For the general purpose of Kaufmann's (2012) analysis, the weaker version in (34) works at least as well,[20] and in Sect. 5.3, I will show that it is superior to the original one when it comes to modification with *depending on*.

Second, the modality in question has to enjoy a special status in the ongoing conversation. If the context is or can be accommodated to be practical for the addressee and the imperative's prejacent offers an answer to the addressee's decision problem, then the modality has to be considered *decisive* for resolving it;[21] otherwise, the imperative expresses a wish of the speaker.

(35) *Ordering Source Restriction*

a. Either c is a practical context for the addressee s.t. p provides a complete or c-completable answer to $\Delta_c(\text{addr})$ in c, g is prioritizing, and CS_c entails that the modal flavor characterized by f and g is considered decisive for the resolution of $\Delta_c(\text{addr})$;

b. or, the utterance is a case of soliloquy (the addressee is merely imagined) or the prejacent is known to be settled (true at all historical alternatives)[22] or both; then, g is speaker-bouletic.

The relevant notion of providing an answer to a decision problem builds on Groenendijk and Stokhof's (1984) notion of complete and partial answers:

(36) A proposition p provides an answer to a decision problem $\Delta_c(\alpha)$ in c iff

a. p is a *complete answer*, that is, $|\{s \in \Delta_c(\alpha) \mid p \cap s \neq \emptyset\}| = 1$,

b. or it is a *partial answer*, that is, $\{s \in \Delta_c(\alpha) \mid p \cap s \neq \emptyset\} \subset \Delta_c(\alpha)$.

(37) A partial answer p is *c-completable* iff CS_c is compatible with $\Delta_c(\alpha)$ being fully resolved *in time* (as a first approximation: before any of the actions in $\Delta_c(\alpha)$ become impossible).

The additional restriction on partial answers is motivated by the observation that performative modals and imperative clauses are infelicitous if it is known that the hearer will not be able to further resolve the decision problem before action needs to be taken. This is illustrated in (38) (modeled after Kolodny and MacFarlane 2010):

[20] Even for Kaufmann's original purpose there is reason to think that the weaker version is more appropriate. Assume someone is uttering *Take the A-train* as a piece of advice. This strikes me as felicitous in a context where the speaker can only remember (and is known to be thus limited) that the A-train is the one going to the place the addressee wants to go to (be that Harlem or Hoboken, for example). Kaufmann's original formulation predicts the imperative to be infelicitous in this case because the speaker is not taken to have perfect knowledge on modal base and ordering source separately. The weakened requirement I am adopting here predicts that it is sufficient that the speaker is taken to know whatever follows from modal base and ordering source taken together. She does not have to know their specific contents separately.

[21] Kaufmann and Kaufmann (2012) specify a series of entailments of what it means for a modal flavor to be decisive.

[22] The *historical alternatives* of a world w at a given time t are all those worlds w' that are identical to w up to t but may differ at any time after t. See Thomason (1984) for the technical details.

(38) [SCENARIO: 10 miners are trapped in shaft A or B. Blocking the right shaft with all sandbags available would save all 10, and we all know there is no way you can find out in time where they are.] #Block the shaft they are in.

To derive the performative effect from an utterance of a sentence that denotes a proposition, Kaufmann assumes further that, in the absence of hedges or rising intonation, expressing a proposition p commits the speaker publicly to believing p.

Now, in contrast to modal verbs, which can be used felicitously in contexts that do not meet epistemic authority or the ordering source restriction (and which are then used descriptively), the felicitous use of imperatives is confined to contexts where the requirements are met. Kaufmann (2012) derives this via a special necessity modal operator in imperative clauses which triggers as pragmatic presuppositions the above characteristics of contexts in which modals are used performatively.

3.2 Previous views on free choice and how to derive it

For strings of the form '$\Diamond p$ OR $\Diamond q$' (or '$\Diamond\ p$ OR q'), most accounts aim to derive the propositions in (39a) and (39b) as representing the ignorance reading and the free choice reading, respectively (with f, g the parameters of the respective modal flavor).

(39) a. $\lambda w.\exists w'[w\mathrm{R}^{f,g}w' \wedge p(w')] \vee \exists w'[w\mathrm{R}^{f,g}w' \wedge q(w')]$
b. $\lambda w.\exists w'[w\mathrm{R}^{f,g}w' \wedge p(w')] \wedge \exists w'[w\mathrm{R}^{f,g}w' \wedge q(w')]$

For necessity modals, we obtain (40a) versus (40b):

(40) a. $\lambda w.\forall w'[w\mathrm{R}^{f,g}w' \rightarrow p(w')] \vee \forall w'[w\mathrm{R}^{f,g}w' \rightarrow q(w')]$
b. $\lambda w.\exists w'[w\mathrm{R}^{f,g}w' \wedge p(w')] \wedge \exists w'[w\mathrm{R}^{f,g}w' \wedge q(w')]$
$\wedge\ \forall w'[w\mathrm{R}^{f,g}w' \rightarrow (p(w') \vee q(w'))]$

Two facts are worth pointing out about (39) and (40). First, for possibility, but not for necessity modals, the truth conditions for the free choice reading (in b) entail the ones for the ignorance reading (in a). Second, unlike my initial characterization of free choice, the truth conditions in (39b) and (40b) are general enough to capture not only the free choice effects with deontic modals, but also the conjunction-like readings with epistemic modals (cf. (18b)). Confining his attention to deontic modals, Alonso-Ovalle (2006) speaks of (39a) and (40a) as representing 'epistemic distribution', in contrast to 'deontic distribution' as given in (39b) and (40b). In general, the difference aimed at with (39) and with (40) can be depicted as in Fig. 1. The ignorance reading is taken to express that the speaker is uncertain as to whether the actual world is like w_a or like w_b; the free choice reading is taken to mean that the set of accessible worlds contains both a p and a q world. As I will show in Sect. 3.3, this notion of free choice is crucially weaker than the one I am advocating in this paper, and which is suggested by the prose in much of the literature on free choice.[23]

[23] Consider for example what Simons (2005a) says about examples like *Jane may sing or dance*.

"[Such sentences] have two distinct readings, which are often referred to as the 'narrow scope' *or* (NS) and 'wide scope' *or* (WS) readings. The NS reading is generally the more salient, and is brought

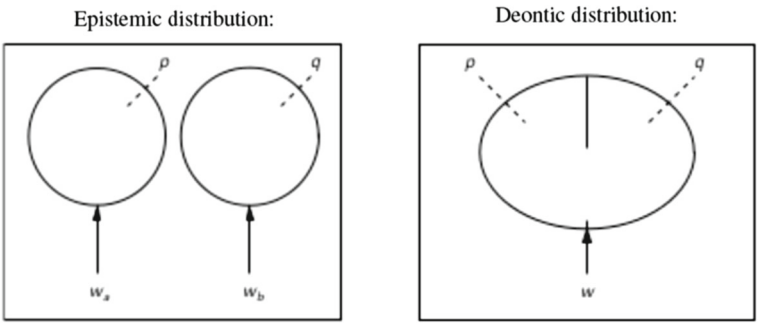

Fig. 1 Epistemic versus deontic distribution

Proposals to derive the two interpretations vary in how much of the difference is rooted in semantics, and how much is to be derived from pragmatic principles. In the following, I will highlight the main arguments adduced for more semantically or more pragmatically spirited approaches, respectively. In both camps we find accounts that interpret disjunctions as generating sets of propositional alternatives corresponding to the individual disjuncts (similarly to Hamblin's 1973 analysis of interrogatives, as well as analyses of nominal free choice items and NPIs). But the analyses differ in the extent to which the alternatives interact with other operators (c)overtly present in the syntactic structure. If, for instance, the alternatives are subject to existential closure at some point of the derivation, then the result is equivalent to a classical disjunction and can, as such, still serve as the input to pragmatic inference processes (possibly together with the underlying alternatives).

The strongest argument in favor of considering free choice effects pragmatic inferences (resulting from a reasoning process about the belief state of the speaker) consists in the observation that free choice inferences vanish under negation.[24] The interpretation of (41) is exactly what we would expect if negation takes scope over the deontic possibility that the classical disjunction is true.

(41) No one may eat the cake or the ice cream.
'No one may eat either cake or ice cream.'
Not: 'No one has a choice between cake and ice cream.'

Advocates of a semantically based account for free choice inferences stress the persistence of free choice inferences in certain other embedded contexts:

Footnote 23 continued
out by appending to any of the sentences the continuation "…whichever she prefers." On the NS interpretation, [such sentences] mean that Jane has permission to do either of the things mentioned—to sing or to dance—although not necessarily to do both." (Simons 2005a, p. 272)

Similarly, Aloni and Ciardelli (2013) state that *Post this letter or burn it* "is taken to grant the addressee the freedom to operate a certain choice" (p. 4). Other authors do not commit to this strong sense of 'free choice' and describe it as deontic distribution (cf. Alonso-Ovalle 2006; Klinedinst 2007).

[24] Advocates of this kind of approach include Kamp (1978), Kratzer and Shimoyama (2002), Schulz (2003), Klinedinst (2007), and Alonso-Ovalle (2006).

(42) If you may take an apple or a pear, you should be happy. (Barker 2010)

The various semantic proposals differ widely. For instance, Barker (2010) advocates a non-classical interpretation of natural language *or* in a resource-sensitive logic (linear logic). Zimmermann (2000), Geurts (2005), Simons (1998, 2005b), Aloni (2004, 2007), and Alonso-Ovalle (2009) develop semantically biased solutions that rely on the assumption that *or* makes accessible to the process of semantic composition a list of alternative propositions (expressed by the individual disjuncts).

While at first glance related to pragmatic accounts in terms of scalar implicatures or related reasoning processes, syntacticized accounts of scalar implicatures promise to be flexible enough to derive both the presence and the absence of free choice (and other) implicatures in embedded contexts (cf. Chierchia et al. 2011 for discussion). They avail themselves of covert exhaustification operators that can be inserted at various points of the derivation. The scalar implicatures they generate can then serve as input to the further derivation. The challenge becomes thus to constrain the insertion of covert operators and to establish the specific alternatives that are taken into account at any given stage.

In the following, I take a closer look at specific cues in the linguistic environment that trigger the presence or absence of free choice effects for disjunctions of modalized declaratives and of imperatives. I will conclude that specific triggers, namely *depend(ing on)* modifiers, constitute a forceful argument against a classical analysis of disjunctions and in favor of an analysis that renders the individual disjuncts accessible to the further process of semantic computation (see Alonso-Ovalle 2006 for arguments to the same effect).[25] The need to come up with a compositional semantics for particular instances of *depend(ing on)* will reveal the free choice reading in a new light. I will argue that these considerations extend to a more accurate treatment of the free choice effect in general, specifically when we compare it with a hitherto little-discussed reading of disjunctions that I will call the *fact-dependent reading*. Instances of it have already appeared in Sect. 2.4, and will now be investigated more systematically.

3.3 The fact-dependent reading

So far, we have been considering the ignorance reading (shared by disjunctions involving modals or imperatives with disjunctions of declarative sentences in general)[26] and the free choice reading (genuine to disjunctions involving modals or imperatives). Fact-dependent readings constitute a way of using disjunctions that does not readily fall into either category. In (43), I give an example with a single possibility modal, but an analogous effect can be obtained for imperatives or necessity modals, and also for examples with separate instances of modal verbs in each disjunct.

[25] His arguments rest on the interpretation of disjunctions under the scope of modals in general, on the interpretation of disjunctions in the antecedents of counterfactuals, as well as on the exclusive component of unembedded disjunctions.

[26] The case in which the speaker gives away less information than she has and would be relevant in the given context (the unwillingness reading, cf. (5)) is usually considered a variety of the ignorance reading.

(43) a. You can take the bus or the boat; it depends on the weather.
b. You can take the bus or the boat, depending on the weather.

The linguistic contexts in (43) trigger an interpretation that is clearly different from the free choice reading (under the strong notion advocated in this paper). But it is also different from the ignorance reading, as witnessed by the infelicity of (44).[27]

(44) #You can take the bus or the boat, but I don't know which. It depends on the weather.

(43) can easily be used to inform the addressee of what she can do in view of the speaker's rules; that is, the ordering source is constituted by the rules of the speaker.[28] For the sentence to be true at a world w, these rules could have the following content:

(45) { the weather is nice and you take the boat, the weather is bad and you take the bus }

Despite the intuitive difference from both ignorance and free choice readings, the interpretation of the disjunction in the linguistic contexts in (43) can easily be described by truth conditions that match either epistemic or deontic distribution. The choice correlates with the assumptions made about what conversational background constitutes the modal base. If we want to think of (43) as describing two alternative ways the world could be (epistemic distribution), we have to use a modal base that specifies all relevant (future) circumstances.

(46) Modal base f_z for epistemic distribution:
$\bigcap f_z(w) = \{w' \mid w'$ agrees with w on the weather and relevant facts about transportation$\}$

The resulting truth conditions can be paraphrased as follows: "The world is such that given what the weather turns out to be, the deontically best worlds are all boat worlds, or the world is such that given what the weather turns out to be, the deontically best worlds are all bus worlds." Equally plausible truth conditions can be devised to reflect deontic distribution. For this, the modal base has to contain all the relevant information

[27] Chris Barker (p.c.) points out that (ia) is significantly better than (44), and suggests considering this as evidence that we are dealing with an instance of epistemic distribution after all, the weirdness of (44) being due to possibly orthogonal issues with knowledge ascriptions. Cleo Condoravdi (p.c.) observes that it is also unproblematic to indicate epistemic uncertainty about which disjunct holds in the future; cf. (ib).

(i) a. You must take the bus or the boat. But I can't tell you which.
b. You will have to take the bus or the boat. But I don't know which one it'll be. It depends on what the weather is like.

I am not sure how to account for the difference between (44) and (ia). Ultimately, these observations square well with my unified proposal that treats ignorance reading, free choice reading, and fact-dependent reading as cases of epistemic distribution motivated by different considerations, giving rise to differences in what follow-ups are felicitous.

[28] In such cases, descriptive and performative use are hard to tell apart—is the speaker describing rules she has previously set up or is she setting them up by this very utterance? (Cf. Kamp 1978.) Fortunately nothing hinges on the difference for our current purposes.

about the system of transportation at each world, but must not settle the question of how the weather will turn out.

(47) Modal base $f_{z'}$ for deontic distribution:
$\bigcap f_{z'}(w) = \{w' \mid w' \text{ agrees with } w \text{ on the relevant facts about transportation}\}$

This derives that all epistemic alternatives agree that there are two types of deontically best worlds, correlated with the factual difference of whether the weather is good or bad. As long as the modal base does not rule out that bus and boat operate independently of what the weather is like, there will be at least one boat-world and one bus-world among the optimal worlds, and all optimal worlds are such that exactly one of boat or bus is taken. Crucially, the truth conditions derived from $f_{z'}$ are in perfect agreement with what is derived as the free choice reading by most of the accounts available on the market.[29]

At this point, I would like to highlight two findings:

1. Deontic distribution does not capture the free choice effect.
2. *Depend(ing)* has to somehow interact with the disjunction in the process of the semantic composition.

Obviously, the majority of existing accounts for the free choice reading derive that each disjunct constitutes a genuine alternative, but they do not rule out the possibility that the alternatives correlate with a factual distinction that impacts how the rules apply. Consequently, none of these accounts genuinely predicts that the addressee is given a choice—only, that for each disjunct there is at least one constellation of facts under which it is permissible to act out the action it describes.[30]

In fact, we can recast the same problem for deontic possibility modals in the absence of disjunction: the worry about $\Diamond(A \vee B)$ extends to the interpretation of simple *may* as $\Diamond$ w.r.t. what is deontically best in view of the relevant circumstances. In the philosophical literature, this is discussed as the problem of weak versus strong permission (Anderson 1966; Von Wright 1968; Hilpinen 1982; Hansen et al. 2007), and it is increasingly gaining attention in the recent, more linguistically oriented literature as well (Asher and Bonevac 2005; Barker 2010; Charlow 2011). *Weak permission* is to be understood as compatibility with what is required and is thus well represented by the standard interpretation of deontic possibility modals. In contrast, *strong permission* reflects that an action is explicitly allowed, and one way of thinking about this is that any (normal) way of carrying out that action is acceptable, or that no normal way of carrying it out will lead to sanctions.[31]

[29] E.g., Zimmermann (2000), Geurts (2005), Simons (2005a), Alonso-Ovalle (2006), Klinedinst (2007), Aloni (2007), and with conduct sets rather than truth conditions, Aloni and Ciardelli (2013).

[30] An anonymous reviewer asks if deontic distribution could be supplemented with a pragmatic theory similar to the one I draw on in Sect. 5.3. While perfectly conceivable, such an account would have to address two questions: (i) why one should want to derive deontic distribution in the first place if, just like the classical disjunction, it fails to represent free choice, and (ii) how to explain the interaction with modifiers like *depending on*.

[31] Asher and Bonevac (2005) argue that free choice permissions have to be treated as instances of strong permission. See Sect. 5.2 for a brief discussion of their proposal.

While it is relevant to ask which type of permission, strong or weak, is invoked in the interpretation of modalized declaratives containing possibility modals and their disjunctions, the answer does not in itself resolve the issues raised above. First, the problem with deontic distribution is not tied to deontic modality in the strict sense as it underlies permissions. The conflation between the truth conditions for the fact-dependent and the free choice reading arises equally for (43) when the sentence expresses a teleological flavor and is used to give advice or make an assertion about the addressee's options. Second, as I have shown above, even with deontic modality in the strict sense the problem arises also for disjunctions with necessity modals, which are used for commands, advice, etc. with some latitude for choice, rather than for permissions. Third, no matter what the correct analysis is for strong permission, in order to deal with sentences like (43a) and (43b) we have to make sense of *depend(ing) on*. I will therefore focus on the mechanics of the latter for the moment, and I will argue that the results can be extended to a unified account for the various types of readings we find with modalized disjunctions. Ultimately, even if I do not explore the connection further in this paper, these results may shed light on the semantics of strong permission.

4 An analysis for *depends on*

4.1 *Depend(ing) on* depends on accessible alternatives

In example (43a), fact dependence is indicated by a subsequent clause. In other cases, it can be specified by a modifier within the same clause, like the *depending on*-phrase in (43b) or (48):

(48) Once you are under way you may be undressed or topless, **depending on the captain's rules**. Most of our charters will state when you must be dressed or not.[32]

When *depend (on)* combines with sentential arguments in subject or object position, these have to be interrogatives; declaratives are ungrammatical in either position:

(49) a. Whether I will come to the party depends on whether he will be there.
b. *That I will come to the party depends on whether he will be there.
c. *Whether I will come to the party depends on that he will be there.

In some cases, a similar interpretation can be obtained from a nominal argument. For instance, in (48), the definite description *the captain's rules* can be understood as 'what the captain's rules are'; similarly for (50a).[33] Pronominal arguments can also stand in for an interrogative clause, as seen in (50b).

[32] www.travelbuff.net/faqs.html, emphasis mine.

[33] Noun phrases that are interpreted like embedded interrogatives are known as *concealed questions*; cf. Heim (1979). For a recent overview, see Frana (2010).

(50) a. Whether I will come to the party depends **on other people's choices.** (≈ 'what other people's choices are')
b. Will you come to the party? - **That/It** depends on who else will come.

Semantically, however this is derived compositionally, these noun phrases are interpreted like interrogatives, i.e. like sentential arguments.[34] In all these cases, *depend on* expresses that the answer to the question raised by the subject constituent is determined (at least to some extent) by the answer to the question raised by the object constituent. This contrasts with other readings of *depend on*, in which one or both arguments are replaced by an individual-denoting expression. For two individual arguments, it expresses simply that the well-being, fate, etc. of the subject depends on the argument of the preposition *on*; cf. (51).[35]

(51) Lord, I depend on you. (Old Testament, Psalm 71)

In the following, I will focus exclusively on cases where both arguments appear to be interpreted non-referentially.[36] Interestingly, even if declaratives are banned from either argument position of *depend on*, at least some declaratives can be modified by *depending on* phrases (cf. 32 above). This seems to be possible only for declaratives that introduce suitable alternatives for the modifier to combine with, for instance the individual coordinands of a disjunction:[37]

(52) a. #You will eat that apple, depending on what you had for lunch.
b. You will or will not eat that apple, depending on what you had for lunch.

The contrast in (52b) strikes me as a strong argument in favor of the assumption that a disjunction renders both disjuncts accessible to the process of computational interpretation. The most natural way to achieve this is a Hamblin-style approach to

[34] Some approaches to concealed questions advocate non-sentential interpretations for the interrogative-like noun phrases and assume polysemy of the embedding predicates. For them, the interrogative-like interpretation results from a specific lexical entry for *depend on*.

[35] There are also mixed cases; consider (i):

(i) Wide use of U.S. airport body scanners depends on Obama. (from http://www.reuters.com/article/2009/12/30/us-security-airline-scanners-idUSTRE5BT2QZ20091230)

The object position passes standard tests for extensional positions (e.g., *Obama* can be replaced *salva veritate* by the coreferential expressions *the person who's currently President of the U.S.* or *Michelle's husband*). In contrast, the bare noun phrase in subject position does not refer to any specific individual or event, but resembles the yes/no-equivalent of a concealed question 'whether or not there will be wide use of U.S.airport body scanners'.

[36] An anonymous reviewer points out the use of gerunds in the object position of *depend on*:

(i) Whether we will come to the party depends on it (# not) raining.

The native speakers I consulted consider examples along these lines slightly marked and point out that the interpretation differs from a corresponding polar interrogative, in that the proposition in the main clause is contingent on what is described by the gerund. While this is interesting, I will not consider it further in this paper.

[37] Further possibilities of rendering alternatives available for modification with *depending on* are discussed in Sect. 4.3. There, I also consider contexts that can, to some degree, render structures like (52a) acceptable.

disjunctions, on which they generate sets of propositional alternatives.[38] These observations regarding *depending on* align naturally with other arguments proposed in the literature. Simons (2005a) points out that *respectively* needs to interact with both disjuncts separately. Alonso-Ovalle (2006) argues that free choice readings for disjunctions under modals, disjunctions in the antecedents of conditionals, as well as the correct interpretation of the exclusive component of disjunctions require accessibility of the individual disjuncts.[39]

Technically, the generation of alternatives in the course of the derivation can be implemented in a full-fledged Hamblin semantics that replaces all ordinary semantic values with the singleton sets containing them and assigns non-singleton sets to expressions that introduce non-trivial alternatives. Alternatively, we can introduce sets of semantic values only when an expression gives rise to a non-trivial set of alternatives, as happens with *or* and with *wh*-words.[40] I adopt the second strategy, but nothing hinges on this—in either framework, the presence of non-trivial alternatives (satisfying specifically the requirements of *depending on*) can easily be detected, either because the semantic value is not a singleton set or because it is a set of objects of the expected logical type.

The interpretation of a disjunction is hence the set of values denoted by the individual disjuncts (cf. (53)). To the standard rules of interpretation (cf. Heim and Kratzer 1998, modified for the extensionalized system used here), the rules in (54) are added to allow for the pointwise combination of alternatives.

(53) $[\![\alpha \text{ or } \beta]\!]^c = \{[\![\alpha]\!]^c, [\![\beta]\!]^c\}$

(54) a. If α is a branching node with daughters β and γ s.t. $[\![\beta]\!]^c \in D_{\langle\sigma,\tau\rangle}$ and $[\![\gamma]\!]^c \subseteq D_\sigma$, then $[\![\alpha]\!]^c = \{[\![\beta]\!]^c(g) \mid g \in [\![\gamma]\!]^c\}$.

b. If α is a branching node with daughters β and γ s.t. $[\![\beta]\!]^c \subseteq D_{\langle\sigma,\tau\rangle}$ and $[\![\gamma]\!]^c \in D_\sigma$, then $[\![\alpha]\!]^c = \{b([\![\gamma]\!]^c) \mid b \in [\![\beta]\!]^c\}$.

c. If α is a branching node with daughters β and γ s.t. $[\![\beta]\!]^c \subseteq D_{\langle\sigma,\tau\rangle}$ and $[\![\gamma]\!]^c \subseteq D_\sigma$, then $[\![\alpha]\!]^c = \{b(g) \mid b \in [\![\beta]\!]^c \text{ and } g \in [\![\gamma]\!]^c\}$.

[38] Interrogatives cannot supply the alternatives required by the *depending on* modifier, suggesting that '*depending on p*' is attached lower than the interrogative marking that licenses the *wh*-phrase.

(i) #What will you eat, depending on what you had for lunch.
≁ 'What you will eat depends on what you had for lunch.'

Conversely, disjunctions cannot occupy either of the argument positions of *depend on*:

(ii) a. *That Peter or Mary will come depends on that the invitations are yellow or green.
b. *Whether I will come to the party depends on that Peter or Mary will come.

I consider this restriction a matter of syntactic subcategorization (Grimshaw 1979).

[39] While these arguments are problematic for standard neo-Gricean approaches to disjunctions, they lose their bite on syntactized accounts of scalar implicatures (cf. Alonso-Ovalle 2006). On Sauerland's (2004) assumption that *or* contrasts lexically not only with *and*, but also with the covert operators *Left* and *Right* that project the left and the right coordinand respectively, an approach in terms of classical disjunctions with covert exhaustification operators can make similar predictions.

[40] The first strategy is adopted by Kratzer and Shimoyama (2002) and Alonso-Ovalle (2006); Simons (2005a) adopts the second.

The interpretation of a simple disjunctive sentence proceeds as in (55):

(55) $[\![\text{John or Mary sleep}]\!]^c = [\![\text{sleep}]\!]^c([\![\text{John or Mary}]\!]^c) =$
$[\lambda x.\lambda w.\text{sleep}_w(x)](\{\text{john,mary}\}) = \{\lambda w.\text{sleep}_w(\text{john}),\lambda w.\text{sleep}_w(\text{mary})\}$

Projection of alternatives has been argued to be crucial to a variety of phenomena, including interrogatives (Hamblin 1973), alternative questions, strong NPIs (Krifka 1995), indefinites, and disjunctions. Any account of this kind has to specify how such a set of semantic values is to be dealt with, in particular if a non-trivial set of alternatives is generated in a position where a propositional value is expected—for instance, at the top level of a declarative sentence. In the following, I develop a semantics for *depending on* as an operator that turns sets of propositional alternatives into a single proposition.

4.2 A semantics for *depend on*

Karttunen (1977, fn. 6) suggests the interpretation in (57) for *depend on* as it occurs in (56); the embedded interrogative is interpreted as in (58) (q abbreviates the type of interrogative intensions $\langle s, \langle st, t\rangle\rangle$):

(56) Who wins the election depends on who is running.

(57) (preliminary) $[\![\text{depend (on)}]\!]^c = \lambda F_q.\lambda K_q.\lambda w.\exists g \forall w'[g(F(w')) = K(w')]$

(58) $[\![\text{who wins the election}]\!]^c =$
$\lambda w.\{p \subseteq W \mid \exists x[p = [\lambda w'.\text{win-the-election}_{w'}(x)] \wedge p(w)]\}$

Karttunen's semantics says that there is a function g (type $\langle\langle st, t\rangle, \langle st, t\rangle\rangle$) that at all possible worlds maps the exhaustive true answer to the object question to the exhaustive true answer to the subject question.[41] He remarks that this models only exclusive dependence, i.e. that the object question determines the answer to the subject question, and he suggests improving on this by adding a contextual variable C to '[represent] whatever other factors might influence the extension of K in addition to the membership of [the extension of] F' (Karttunen 1977, p. 10):

(59) $[\![\text{depend (on)}]\!]^c = \lambda F_q.\lambda K_q.\lambda w.\exists g \exists C_q \forall w'[g(F(w'), C(w')) = K(w')] \wedge$
$\neg\exists f(\forall w' \in W)[f(C(w')) = K(w')]$

Karttunen's semantics is non-contingent: it does not depend on the world of evaluation. This is suitable for the dependency between winning an election and running for it in the first place (after all, nobody can win an election without running for it, hence the dependency is guaranteed to hold throughout the logical space). But *depend on* can also be used to express contingent dependencies, as in (60) or (61):

(60) Who will come to your party **depends on what the invitations look like**.

[41] Strictly speaking, g operates on a Karttunen-style denotation, i.e. the set of all true answers at a given world, the conjunction of which is the exhaustive true answer.

(61) This seems to be an indicator which is more important to the established artist as they know that the prices they are able to charge and the type of collector who will come calling **depends in part on who has previously collected their work**.[42]

To capture speaker intuitions regarding non-contingent dependencies, I replace Karttunen's truth conditions with a sequence of conditionals, as exemplified in (62) for (60):

(62) 'If the invitations are formal, your conservative friends will come, and if the invitations are stylish, your broker friends will come, and if the invitations are artsy, your artist friends will come,…'

To implement this, I rely on Kratzer's (1991) analysis of conditionals. She proposes that the conditional antecedent updates the modal base of a modal operator in the consequent. In the absence of an overt operator, a covert epistemic modal is assumed to be present and to be modified in the aforementioned way. Nothing blocks the presence of such a covert epistemic necessity modal in cases where the consequent contains an overt modal. Therefore, such cases are systematically ambiguous as to whether a covert modal is present and is then the one restricted by the antecedent (*covert conditional operator construal*, CCO), or no covert modal is present and the antecedent restricts the overt modal (*overt conditional operator construal*, OCO).[43]

(63) $[\![\text{if } p, \text{(then) } \mathrm{M}^{f,g}\ q]\!]^c(w) = 1$ iff $[\![M^{f+p,g}\ q]\!]^c(w) = 1$, where
(i) M is an overt or covert modal (with prejacent q) present in the consequent and
(ii) $f + p = \lambda w.[f(w) \cup \{[\![p]\!]^c\}]$.

We can now analyse *depend on* as follows: 'Q_{subj} *depends on* Q_{obj}' is true iff each exhaustive possible answer to the object question Q_{obj} is the antecedent of a conditional which has an exhaustive answer to the subject question Q_{subj} as its consequent. Moreover, there has to be some variation as to which answer to the subject question is entailed by a particular answer to the object question. Since the subject question Q_{subj} need not contain a modal, I assume that *depend on* uniformly results in a CCO construal. The parameters of the covert epistemic modal represent the contextually relevant belief state which the conditionals are based on (modal base f), together with stereotypical assumptions about the most plausible courses of events (ordering source g).[44] Exhaustive answers (Groenendijk and Stokhof 1984), as needed to implement this idea, can be derived from Karttunen's interrogative semantics in terms of sets of true answers (Heim 1994).

[42] http://makingamark.blogspot.com/2010/10/which-numerical-performance-measure.html.

[43] Frank (1996) argues that deontic modals in the consequent of a conditional do not get modified directly but instead are always outscoped by a possibly covert epistemic modal.

[44] The choice of parameters for epistemic modality is notoriously problematic, but this is an independent issue. Whatever fits conditionals in general will fit here as well. For discussion, see Weatherson and Egan (2011).

(64) Retrieving exhaustive possible answers:
$F_{\text{exh,poss}} := \{\{w' \in W \mid \bigcap F(w') = \bigcap F(w)\} \mid w \in W\}$

The semantics of *depend on* is given in (65). I assume that it presupposes that the elements of its arguments are mutually incompatible in view of what are considered stereotypical courses of events (i.e., incompatible on $O(f, g, w)$) (abbreviated as exh_c) and that exhaustification can be triggered to ensure this. For simplicity, I assume that exhaustification has already occurred when *depend on* combines with its arguments.[45,46]

(65) $[\![\text{depend (on)}]\!]^c =$
$\lambda Q_{\text{obj}_q} : \text{exh}_c(Q_{\text{obj}}).\lambda Q_{\text{subj}_q} : \text{exh}_c(Q_{\text{subj}}).\lambda w.(\forall p \in Q_{\text{obj}})(\exists k \in Q_{\text{subj}})[\Box_w^{f+p,g} k] \wedge (\exists k \in Q_{\text{subj}})(\exists p_1, p_2 \in Q_{\text{obj}})[\Box_w^{f+p_1,g} k \wedge \neg\Box_w^{f+p_2,g} k]$

Additional complications arise if *depend on* combines with an anaphoric pronominal subject like *it* (cf. (43a)). In this case, it has to be ensured that the pronoun can access the alternatives expressed by the individual disjuncts, however they are treated in unmodified disjunctions (cf. Sect. 5.3).

Finally, I would like to point out that the semantics proposed in (65) is relatively weak. For instance, it does not entail that the dependence between the two questions follows the structure of alternative questions. Compare (66):

(66) Whether you have to go right or left depends on whether you are using the car or the tram.

The assumption that you have to go right when using the car, and left when using the tram, is not derived as part of the literal meaning of the sentence, which strikes me as correct. I will not explore this in any detail here, but I assume that it can be calculated as a manner implicature.

4.3 Finding alternatives

While *depending on* can easily access the alternatives generated by a disjunction at, or projected to, the sentential level, it is not constrained to operate at that level. Rather,

[45] In this case, the requirement for non-overlap will give rise to an exhaustive interpretation of the two disjuncts; see Sect. 5.2 below. Similar to the case of interrogatives, I assume that a suitable exhaustification operator can be inserted in the course of the compositional process (cf. Chierchia et al. 2011). For disjunctions, we need to ensure that 'A and B' survives as an alternative for 'A or B or both', but not for 'A or B' (cf. Sauerland 2004).

[46] In response to presentations of this material, Patrick Grosz and Robert Henderson pointed out that (65) appears to be too strong for non-exclusive dependence of the kind that can be conveyed explicitly by modification through *partly/to some extent*. Even in the absence of modifiers, an interpretation of partial dependence is acceptable for *depend on* as sentential predicate (see already Karttunen 1977), but as was pointed out to me by Pauline Jacobson and Scott Ander-Bois, less readily so for *depending on*. To capture the weaker readings, the conditional dependence in (65) could be weakened (e.g., to absolute or comparative likelihood instead of consequence). How to implement this, and when to allow for it in the absence of overt modifiers, has to be left for further research.

it can combine with a variety of expressions that express distribution over a plurality of intervals, individuals, and the like. Consider the following examples:

(67) Depending on which day, and how I am feeling on that day, I have a different favorite song on the album. One day it might be 'Karma', and other days it is 'Stay For A While'.

(68) Churches, depending on their policy, can do fantastic work with people in the community.

(69) My weight fluctuates depending on my mood and my current devotion to my fitness routine.

I leave it for future research to determine how exactly *depending on* interacts with the expressions introducing variation in these examples. For disjunctions, it is a straightforward assumption that they introduce a set of propositional alternatives at the sentential level which the modifier can combine with.

Interestingly, other expressions that are often taken to induce alternatives (scalar expressions like *some/all*, indefinites, or *any*) seem unfit to interact with *depend on* in the same way disjunctions do. (70) does not have a reading on which *depending on* would operate on its scalar alternatives, and the elements of the domain of (71) do not seem to be readily accessible for interaction either (the infelicity of examples like (71) was pointed out to me independently by Mats Rooth and Chris Barker, both p.c.).

(70) #Some students will come depending on who is sending out the invitations.
≁ 'Whether some students or all students come, depends on who is sending out the invitations.'

(71) #/?She will/can take a/any piece of fruit, depending on what she is not allergic to.
≁ 'She will/can take an apple, a pear, a grapefruit,…, or a pineapple, depending on what she is not allergic to.'

If the difference between disjunctions and bare (or, most likely, generically read) indefinites on the one hand and *some/any* on the other hand is real, it poses a challenge for accounts of free choice readings that build explicitly on the similarities between disjunctions and indefinites (specifically, Aloni 2007, Chierchia 2013).

But two anonymous reviewers adduce what appear to be counter-examples to the claim that *depending on* has to interact with semantically encoded alternatives, thereby questioning the special status of disjunctions as expressing sets of alternatives, which I argued for in Sect. 4.1. There, I drew on a perceived contrast in acceptability between (52a) and (52b) (repeated for convenience):

(52) a. #You will eat that apple, depending on what you had for lunch.
b. You will or will not eat that apple, depending on what you had for lunch.

Apparently, sentences like (52a) are not entirely unacceptable. In fact, a substantial number of instances can be found on the Internet.

(72) a. I will travel depending on the case type and exact location.[47]
b. As of writing this, I am still in my previous clan. I will leave depending on your decision to accept me.[48]

In (72b), not only the main clause, but also the nominal argument of *depend on* fails to express a set of alternatives (unlike *your decision*, the phrase *your decision to accept me* refers to a particular course of events). The reviewers also bring up the examples in (73), shedding doubt on the inability of further types of indefinites to introduce or highlight the alternatives required by *depending on*.

(73) a. The amount will be charged to (debited from) your account within a few days, depending on the account keeping bank.
b. I will bring some kind of dessert depending on what's on sale at the bakery.

Notably, the native speakers with whom I discussed such examples remarked that they differ in acceptability from the well-formed examples discussed in the rest of this paper. The sentences in (72) and (73) are generally perceived to be somehow elliptical and relatively marginal. If *depending on* at the sentential level requires the presence of salient propositional alternatives, one might argue that the difference between these examples and disjunctions stems from the fact that any (classical) disjunction makes salient such a set, whereas non-disjunctive declaratives require more contextual support. I remain sceptical of the notion that this is the sole cause of the difference. First, non-disjunctive matrix clauses with *depending on* remain marginal even if a suitable interrogative is given in the immediately preceding linguistic context:

(74) A: Will you leave?
B: #I will leave depending on the outcome of the vote.
B': I will leave or stay depending on the outcome of the vote.

Second, disjunctive and non-disjunctive examples often show slight differences in interpretation. While the disjunctive ones can be rendered faithfully as sequences of conditionals (as derived in Sect. 4.2), the non-disjunctive ones appear to express an epistemic bias for the matrix sentence—restricted by *depending on*, though; clearly, the speaker of (75) is not committed to an unconditional assertion that they will leave. The most faithful paraphrase seems to be the one in (75c).

(75) I will leave depending on the outcome.
a. $\overset{??}{\approx}$ 'If you vote that I should leave, I will leave, and if you vote that I should stay, I will stay.'
b. $\not\approx$ 'I will leave.'
c. $\approx$ 'If you vote that I should leave, I will leave.'

Third, the reviewers' examples all involve the auxiliary *will*, which has been argued to be anaphoric to subordinate states of affairs (Klecha 2015) or silent conditional antecedents (Copley 2009). While I do not attempt to offer an actual analysis for them

[47] http://www.busterdangerfield.com/contact-us/.
[48] http://quickybaby.com/forums/51/4165.

in this paper, I would like to suggest that examples like (75) should be treated in connection with the conditional interpretations of *will* in (76).

(76) a. Don't go near the bomb. It'll explode. (Klecha 2015)
b. (If you want,) we will exchange your oil in Madera. (*intended as an offer*) (Copley 2009)

In the absence of *will* (or possibly other modals), *depending on* is hard to make sense of in sentences that fail to compositionally encode alternatives:

(77) a. #John went to Singapore depending on the outcome of the selection.
b. John went to Singapore or to Auckland depending on the outcome of the selection.

I consider these findings evidence that my analysis is on the right track and that, normally, *depending on* operates compositionally on a set of alternatives expressed in the sentence. If the main clause or the complement of *depending on* fails to express a set of alternatives, sets of propositional alternatives can be accommodated (cf. (73b)) or generated by mapping the main clause and (a salient resolution for) the complement of *depending on* to the corresponding singleton sets (cf. (75)). The former strategy results in a familiar sequence of conditionals; the latter results in a single conditional and appears to rely on the presence of a modal (suggesting a type of modal subordination). While the technicalities remain to be worked out in detail, a treatment along these lines promises to capture the differences both in acceptability and in interpretation. If, instead, my distinction between disjunctive and non-disjunctive matrix sentences turns out to be mistaken, this would not in itself affect the semantics I propose for *depend on*. We would, however, lose the argument in favor of an alternative semantics for disjunctions and should re-evaluate the connection between indefinites and disjunctions.

5 Disjunctions in terms of different dependencies

In the following, I draw on the interpretation of *depending on* modifiers to derive a semantically uniform account for the various readings of disjunctions. I first focus on the fact-dependent reading that is shared by unmodalized and modalized disjunctions (Sect. 5.1), arguing then that the analysis proposed for it extends straightforwardly to overtly indicated free choice readings (Sect. 5.2). I suggest that these results inform our treatment of free choice readings for unmodified disjunctions: in Sect. 5.3, I propose a treatment of unmodified disjunctions and take the first steps to explain the affinity between free choice readings and performative modality (including imperatives).

5.1 Indicating fact dependence

For an unmodalized disjunction like (78a), the fact-dependent reading can be computed straightforwardly and in exact analogy to what would be obtained for an interrogative clause as the subject question, provided the possible answers are the propositions

expressed in the two disjuncts (compare (78b)). As above, I assume that the two arguments of *depend on* have been exhaustified.[49]

(78) a. Depending on what the weather was like, Mary took the bus or the boat.
b. What means of transportation Mary took depends on what the weather was like.

The crucial steps of the computation for the unmodalized disjunction in (78a) are given in (79). (I abstract away from the temporal interpretation and assume for simplicity that the weather is classified by the propositions 'that the weather is good' (= 'GOOD') and 'that the weather is bad' (= 'BAD'); 'BUS' stands for 'that Mary took the bus', 'BOAT' for 'that Mary took the boat'.)

(79) a. $[\![$[Mary took [the bus or the boat]]$]\!]^c$ = {BUS, BOAT}
b. $[\![$what the weather was like$]\!]^c$ = {GOOD, BAD}
c. $[\![$[[depending on [what the weather was like]] [Mary took the bus or the boat]] $]\!]^c$ =
$[\![$depending on$]\!]^c([\![$what the weather was like$]\!]^c)([\![$Mary took the bus or the boat$]\!]^c)$ =
$[\lambda Q_{\text{obj}_q} : \text{exh}_c(Q_{\text{obj}}).\lambda Q_{\text{subj}_q} : \text{exh}_c(Q_{\text{subj}}).$
$\lambda w.(\forall p \in Q_{\text{obj}})(\exists k \in Q_{\text{subj}})[\Box_w^{f+p,g} k] \wedge$
$(\exists k \in Q_{\text{subj}})(\exists p_1, p_2 \in Q_{\text{obj}})[\Box_w^{f+p_1,g} k \wedge \neg\Box_w^{f+p_2,g} k]]$
$(\{\text{GOOD, BAD}\})(\{\text{BUS,BOAT}\})$ =
$\lambda w.(\forall p \in \{\text{GOOD, BAD}\})(\exists k \in \{\text{BUS,BOAT}\})[\Box_w^{f+p,g} k] \wedge$
$(\exists k \in \{\text{BUS, BOAT}\})(\exists p_1, p_2 \in \{\text{GOOD, BAD}\})[\Box_w^{f+p_1,g} k \wedge \neg\Box_w^{f+p_2,g} k]$
where f describes the contextually relevant belief state and g the corresponding set of stereotypical assumptions.

Note that, since the two sets of propositions are construed as non-overlapping, each answer to the object question about the weather is compatible with exactly one answer to the subject question about Mary (namely, the one it entails), as far as the most plausible epistemic alternatives go. The analysis is compatible with there being worlds that are compatible with the modal base (but are not among the most stereotypical worlds) at which both disjuncts would be true.

The modalized example (43b) works similarly, with one additional intricacy. The set of subject question propositions is given in (80a), and the resulting truth conditions appear in (80b) (with 'BUS' and 'BOAT' standing for 'that you take the bus' and 'that you take the boat' now):

(80) a. $[\![$you can take the bus or the boat $]\!]^c$ = $\{\Diamond^{f_1,g_1}\text{BUS}, \Diamond^{f_1,g_1}\text{BOAT}\}$
b. $\lambda w.(\forall p \in \{\text{GOOD,BAD}\})(\exists k \in \{\Diamond^{f_1,g_1}\text{BUS}, \Diamond^{f_1,g_1}\text{BOAT}\})\ [\Box_w^{f+p,g} k] \wedge$
$(\exists k \in \{\Diamond^{f_1,g_1}\text{BUS}, \Diamond^{f_1,g_1}\text{BOAT}\})(\exists p_1, p_2 \in \{\text{GOOD, BAD}\})$
$[\Box_w^{f+p_1,g} k \wedge \neg\Box_w^{f+p_2,g} k]$,

[49] Christine Bartels (p.c.) points out a natural variant of (78b) with past tense on *depend on*. I take this to correspond to a separate non-epistemic reading of the conditionals which I will not aim to analyze in this paper.

where f describes the contextually relevant belief state, g the corresponding set of stereotypical assumptions, f_1 contextually relevant circumstances, and g_1 the rules under consideration.

Here, in each conditional, the answer to the object question constrains the epistemic modal introduced by *depend on*, not the overt modal in the matrix clause disjunction (which plays the role of the subject question). Just as in ordinary conditionals with modals in the consequent, this is sometimes unproblematic; compare (81) from von Fintel and Iatridou (2005):

(81) If jaywalking is illegal in this town, that guy over there has to be punished.

On the CCO-construal (ignoring for the moment the ordering source of the outer epistemic modal), this says that for each epistemically accessible world w' at which jaywalking is illegal, among the worlds at which similar circumstances obtain as in w', the law in w' ranks those as best at which that guy (a jaywalker) is punished. Note that this can be true independently of the rules in the worlds that are getting ranked according to the rules in a given w': it does not matter whether in those worlds, too, jaywalking is illegal. In other cases, though, the worlds ranked for the evaluation of the embedded deontic modal should also be such that the antecedent of the conditional is true:

(82) If John owns a car, he has to pay high taxes.

A natural scenario for (82) to be true is such that at all the epistemically accessible worlds w' at which John buys a car, the law itself does not specify whether John pays high taxes or not—this only comes up in conjunction with his having bought a car. So it is crucial that the worlds that are getting ranked also verify the antecedent. Intuitively, whether or not specific assumptions have to be made in order to ensure that the antecedent is passed on to the overt modal in the consequent depends on whether the antecedent explicitly encodes information about the content of the ordering source of that modal (as in (81)), or whether it contains information that affects the ranking by a possibly constant ordering source (as in (82)).

The scenario I have in mind for (43b) is similar to (82) in this respect: a given set of rules (constant across all worlds epistemically accessible to the speaker) singles out bus or boat as optimal with respect to specific weather constellations; there is no need for the rules to change in response to the weather such that, for example, at all bad-weather worlds the rules per se derive that taking the bus is mandatory (no matter what). Consequently, here too the information about the weather has to be passed down from the epistemic modal to the embedded deontic modal.

For ordinary conditionals, there are at least two ways to make the embedded modal sensitive to the restriction that the antecedent clause has imposed on the epistemic conditional operator. First, modal backgrounds can be conceived of as anaphoric (Frank 1996; Geurts 1999); that way, we can think of the antecedent as being copied into the modal base of the embedded modal. Second, we can assume that the modal base of the modal in the consequent is of a nature that will, at each antecedent world at which it gets evaluated, select a set of propositions that includes the antecedent itself; a natural

choice for this is a historical modal base, i.e. a function that at each world w and time t describes the set of possible worlds identical to w up to t (Thomason 1984).[50] A circumstantial modal base, in contrast, will not pick up all the properties of the world at which it is evaluated. Still, the proposition in the antecedent will typically be relevant for the evaluation of the consequent (for example, for (82), that John bought a car). But then, the modal base of the modal in the consequent contains the antecedent as naming one of the relevant circumstances. Consequently, a circumstantial modal base can be expected to behave similarly to a historical one in the crucial respect.[51] While both anaphoricity and suitable modal bases are viable options for analyzing ordinary conditionals, only the latter option extends straightforwardly to the analysis of *depend on* as developed above. The propositions that serve as the consequent of the conditionals are computed independently and form a set of alternatives that are then combined pointwise with the conditional construction. It is thus not entirely clear how the modal bases contained in each of the alternatives could be modified anaphorically. In contrast, a suitably sensitive modal base will pick up on the fact that the antecedent is true at each of the worlds that the modal base gets applied to. For descriptive modals, both historical modal bases and circumstantial ones could be used; for performative modals and imperatives, I will argue that we have to rely on a circumstantial modal base (*pace* Kaufmann and Schwager 2011).

5.2 Free choice as a particular kind of dependence

5.2.1 A puzzle about (in)dependence

In contrast to ignorance readings and fact-dependent readings, free choice readings occur only with modalized disjunctions. Surprisingly, a natural way of signaling that a free choice reading is intended involves *depend(ing) on*:

(83) a. You can take the bus or the boat, depending on your preferences.
b. You should take the bus or the boat, depending on your preferences.

Consider the following naturally occurring examples, in which, intuitively, the choice between the two options named in the disjunction is left to the addressee:

(84) Mark quotations with quotation marks or indentation. You may quote whole sentences, useful phrases, or striking terms, **depending on your purposes**

[50] For either strategy, an additional restriction to relatively normal courses of events has to be added. This could either be realized as a second ordering source on the embedded modal or, as argued for convincingly by Condoravdi and Lauer (2016), correspond to a general restriction on what worlds are taken into consideration in a given conversation. Roughly speaking, I would like to assume that the evaluation of sentences in the indicative is constrained to take into account not the entire logical space, but only a subset of it that is considered relatively normal. I will leave it to future research to determine the details and to investigate whether this renders redundant the normalcy restriction on the epistemic modal serving as the conditional operator.

[51] To the best of my knowledge, it is a familiar problem with circumstantial modal bases that the link between what counts as relevant and what feeds into the modal base has never been worked out explicitly, and I am not trying to take on this issue here.

and style. But whenever the language is not your own, you must mark it as a quotation.[52]

(85) You can make it healthier or meatier depending on your preference.[53]

(86) Remember: Like all patterns spit out by my generators, this is mostly shaping directions. The purpose of the generators is to let you be creative, while eliminating the need to do pesky calculations. Depending on the generator, you may get a lot of design information which you may ignore or figure out **depending on your personality**. You can always just imitate the poncho picture![54]

Given the structural similarity to the fact-dependent reading of (43b) discussed in Sect. 5.1, we would expect (83a) to be interpreted along the same lines—except that now the object question is 'what your preferences are', so for example, {you prefer to take the bus, you prefer to take the boat}. The resulting truth conditions for (83a) are paraphrased in (87).

(87) 'If you want to take the bus, you can take the bus, and if you want to take the boat, you can take the boat.'

Unfortunately, the predicted reading seems far too weak: intuitively, free choice is granted independently of the addressee's state of mind, and taking a vehicle against one's preference is, from the speaker's point of view, just as unobjectionable as acting in line with one's preferences.

While I consider this worry legitimate, I think that it can be overcome in favor of a compositional treatment. Before going into this, I would like to stress that the problem discussed above is not an artifact of my analysis of *depend on* as inducing a series of conditionals. Rather, the analysis is in good company: there are object language constructions that are standardly analyzed in a similar way. First, an object language instantiation of the series of conditionals generated as the truth conditions of a *depending on your preferences* sentence intuitively also comes with the free choice effect; compare Von Wright's (1968) *You may take an apple or a pear* (repeated from (14a)) with (88):

(88) If you want an apple, you may take an apple, and if you want a pear, you may take a pear.

Second, *may* and imperatives sometimes appear with reduced conditionals indicating dependence on the agent's preferences. Again, rather than limiting the permission to situations in which the addressee actually has the respective preference, or expressing that the imperative is to be carried out in case the respective preference holds, the elliptic antecedents in (89a) and (89b) appear to indicate that the decision is up to the addressee:[55]

[52] http://legacy.earlham.edu/~peters/courses/plag.htm.

[53] http://www.ninjakitchen.com/recipes/search/0/all/58/hearty-skillet-lasagna.

[54] http://www.thedietdiary.com/knittingfiend/poncho/PonchoManos.html.

[55] Schwager (2005b) draws on the elliptic antecedent to derive permission-like imperatives from her necessity semantics for imperatives.

(89) a. You may bring a friend if you like.
b. Bring a friend if you like.

Third, similar effects can be observed for manner modifiers as in (90):

(90) You can do it the/any way you like.

In short, *depending on* modifiers are not the only constructions that can formally express dependence on the agent's preferences while intuitively being interpreted as offering free choice to the agent. In view of these findings, I would like to argue that rather than stand in the way of a compositional analysis, *depending on* modifiers hold the key to a uniform and non-stipulative analysis of free choice readings.

In order to make sense of the apparent discrepancy between an overtly expressed dependence and the intuition of free choice, I will consider another class of examples which also express dependence on preferences, without this dependence having a straightforward place in the respective sentences' truth conditions.[56]

5.2.2 Effective preferences as actual choice

The apparent weakness of permissions as conditional on the attitudinal state of the agent is reminiscent of effects that Condoravdi and Lauer (2016) discuss for *anankastic* and what they call '*near-anankastic*' conditionals, examplified in (91a) and (91b), respectively. Such conditionals involve a modal verb in the consequent that seems to interact with the prejacent of the attitude predicate *want* in the antecedent.

(91) a. If you want to go to Harlem, you must take the A-train.
b. If you want to use the tax exemption now, you must/will have to pay more taxes next year.

For instance, in (91a) the intuitive restriction of the embedded modal is 'you go to Harlem', rather than the actual antecedent proposition 'you want to go to Harlem' (cf. Sæbø 2002). For such genuine anankastic conditionals, the consequent typically describes a/the means to reach the goal mentioned in the antecedent. But as (91b) (Condoravdi and Lauer's example) shows, a similarly problematic effect can be observed in clauses that do not state teleological necessities resulting from hypothetical goals: (91b) is easily understood as true in a scenario where only the actual taking of the tax exemption this year, and not a mere desire, wish, or even plan to do so, gives rise to an obligation to pay more. The problem with (near-)anankastic conditionals is best seen in comparison with examples like (92) (from Hare 1971). In accordance with what is expected from a compositional point of view, (92) asserts a dependence between the necessity expressed in the consequent and the attitudinal state described in the antecedent (i.e., that you want to have sugar in your soup):

(92) If you want sugar in your soup, you should get tested for diabetes.

[56] I am indebted to Stefan Kaufmann (p.c.) for alerting me to the potential relevance of these examples.

In sum, both anankastic and near-anankastic conditionals and the free choice constructions I discussed in Sect. 5.2.1 formally express a dependence on preferences, which, intuitively, is not what they convey. They differ in that (near-)anankastics seem to convey dependence on the prejacent of the preference predicate instead, whereas the free choice constructions seem to convey no dependence at all. Despite this difference, I will argue that Condoravdi and Lauer's (2016) solution for (near-)anankastics can be adopted for free choice constructions as well.

To account for the difference between (near-)anankastic conditionals and genuine preference dependence as in Hare's (92), Condoravdi and Lauer (2016) propose that *want* is context dependent (similarly to Kratzerian modals). It depends on a preference structure (a partially ordered set of propositions) associated with the subject that can represent (i) (possibly inconsistent) desires, or (ii) effective preferences (necessarily consistent) that translate into plans for action. In the straightforwardly compositional reading salient for (92) *want* relates to the former, whereas in anankastics and near-anankastics *want* relates to the latter. In either case, *want* signals that its prejacent is a maximal element in the associated preference structure.

(93) a. A *preference structure* relative to an information state W is a pair $\langle P, \leq \rangle$, where $P \subseteq \mathscr{P}(W)$ and $\leq$ is a partial order on P.
b. A rational agent A in w has a distinguished preference structure $\langle P_w(A), \leq_{P_w(A)} \rangle$ which he uses to guide action choice (**effective preference structure, EP**). EPs have to be consistent.
c. A preference structure $\langle P, \leq \rangle$ is **consistent** iff for any $X \subseteq P$, if $\bigcap X = \emptyset$, there are $p, q \in X$ such that $p \leq q$ but not $q \leq p$.

Together with a particular interpretation of conditional clauses in a Kratzerian framework, the interpretation in terms of effective preferences results in a reading that makes *want* seem vacuous even though it is in fact interpreted normally. To get the desired effect, Condoravdi and Lauer resort to the CCO-construal, in which a covert necessity modal with an epistemic modal base and a stereotypical ordering source functions as the conditional operator restricted by the antecedent (cf. Sect. 4.2).

The schematic LF for an anankastic conditional is given in (94a), and that for a near-anankastic one in (94b). $\Box^{f_{\text{epistemic}}, g_{\text{stereotyp}}}$ represents the covert necessity modal acting as the conditional operator.

(94) a. If want$^{\text{effective-pref}}$ p, $\Box^{f_{\text{epistemic}}, g_{\text{stereotyp}}} \Box^{f_{\text{hist}}, g_{\text{effective-pref}}}$ q.
b. If want$^{\text{effective-pref}}$ p, $\Box^{f_{\text{epistemic}}, g_{\text{stereotyp}}} \Box^{f_{\text{hist}}, g_{\text{deontic}}}$ q.

For the conditional to be true, the consequent has to be true at the most normal of the epistemically possible worlds at which the addressee has the relevant effective preference. For anankastic conditionals, the modal base of the overt modal in the consequent is constituted by the historical alternatives of the antecedent world, and its ordering source is constituted by the addressee's effective preferences. The best—in the relevant sense—among the historical alternatives are therefore such that all effective preferences are realized (including the hypothetical one introduced by the antecedent, since by definition all effective preferences are mututally compatible), entailing in particular whatever is necessary to achieve them. Near-anankastics are slightly more

complicated: they involve a prioritizing modal in the consequent with an ordering source other than the effective preferences of the relevant agent. In (91b), for instance, the ordering source is deontic, and its content is not described by the antecedent of the conditional, which again specifies an effective preference. Condoravdi and Lauer (2016) argue that the truth of the conditional relies on the fact that, if the agent has an effective preference for, e.g., taking the exemption, he will also realize this preference at all historical alternatives normal enough to be considered in the utterance context.[57]

I would like to suggest that free choice as dependent on preferences can be treated like near-anankastics, amounting to the paraphrase in (95):

(95) 'If you have an effective preference for taking an apple, you may take an apple, and if you have an effective preference for taking a pear, you may take a pear.'

Under the assumptions about the modal base and the ordering source of the conditional operator laid out above, having an effective preference for taking an apple amounts to actually taking one. So, literally, the sentence expresses that a situation where the addressee chooses to take an apple is a situation in which the addressee is allowed to take an apple (i.e., taking an apple is compatible with what is deontically best), and similarly for pears. The overall effect of an update with this proposition is a (strong) permission: if the expressed proposition becomes part of the common ground, both speaker and hearer are committed to the belief that taking an apple in itself will not lead to sanctions, and that taking a pear in itself will not lead to sanctions either. In this we are distinguishing between the pragmatic effect of giving permission (the speaker adopts the commitment that the addressee will not incur sanctions for taking an apple and similarly for taking a pear) and the interpretation of the sentence uttered to achieve this very effect.[58]

This strategy avoids the undesired conditionalization on the actual attitude of the addressee, but it runs into another problem: (95) can very well be uttered in a scenario where the speaker assumes that the hearer would never form an effective preference to do something that might take her out of the range of what is currently permissible. But if this is so, (95) should not be able to get the permission effect off the ground: since taking an apple (or a pear) is known not to be explicitly permitted, it is also known that the addressee does not have an effective preference to do it, so the conditional should be infelicitous due to a lack of 'iffiness' (in the sense of von Fintel 1997). We might consider avoiding this by somehow weakening the effective preference along the following lines: 'If you have a desire to take an apple that is outranked only by your desire to stay within the realm of what is permissible,…' But here is another possibility, one which strikes me as more promising. While the stative nature of the conditional's antecedent allows for a simultaneous interpretation ('if an effective preference holds at the utterance time'), this is not the only possible interpretation. The evaluation of the conditional antencedent can also be shifted to the future, resulting in

[57] See fn. 49 above for discussion of this additional constraint to relatively normal courses of events (i.e., in this case, to a subset of the historical alternatives available in the entire logical space).

[58] Similarly to the treatment of imperatives above, I do not consider this an indirect speech act: the speaker is not giving permission by way of a different speech act (say, an assertion), but is merely committing herself to the truth of the proposition. For more extensive discussion, see Kaufmann (2012) and Lauer (2013).

a *predictive conditional* (S. Kaufmann 2005). Consequently, we can interpret (95) as saying that, if the addressee forms an effective preference for taking an apple, then all normal courses of events are such that taking an apple is okay (i.e., compatible with what is deontically best), and similarly for taking a pear. Thus it is indeed this very utterance that constitutes the speech act of the permission, even in a context where the addressee is known not to form effective preferences for actions that have not been strongly permitted.

5.2.3 Side effects of free choice as dependence

This treatment of free choice disjunctions makes a couple of predictions that are worth exploring.

First, relying on the semantics developed above for *depend on* offers some insight into why, normally, (14a) does not amount to a permission to take both an apple and a pear. This aspect of *resource sensitivity* is stressed by Asher and Bonevac (2005) and Barker (2010); Geurts (2005) builds it into his modal account of disjunctions by requiring that the individual disjuncts do not overlap on the relevant modal background (e.g., the deontically permissible worlds). But in the absence of contrastive stress on *or*, the addressee of (14a) can felicitously react with (96). Hence, (14a) should not entail semantically that taking both an apple and a pear is forbidden.

(96) But could I also take one of each? — Oh, sure, if you're still that hungry.

Such an exchange strikes me as natural if, before the disjunction is uttered, it is not a salient possibility for the speaker that the addressee might form an effective preference to take both an apple and a pear. If such a possibility is salient, then not only (14a) without contrastive stress, but also the conditionals paraphrasing my analysis (cf. (95)) are infelicitous. The analysis of the free choice reading in terms of *depending on* requires that there is a genuine dependence between preferences and permissibility; hence, it is incompatible with both options being permissible no matter what—for example, one option might be forbidden because the addressee has already chosen to act on the other option.[59] But interrogative meanings are known to be context dependent (Ginzburg 1995a, b). A rather obvious way of dealing with (96) is thus to treat it as a contextual shift in what worlds are under consideration and what count as possible answers to 'what you want to take': from {'I want to take an apple (and don't care about pears)', 'I want to take a pear (and don't care about apples)'} we shift to {'I want to take an apple (and don't care about pears)', 'I want to take both an apple and a pear'}. The volatile nature of the effect is also derived by Asher and Bonevac (2005), who model strong permission in terms of inference rules of a non-monotonic logic that allow one to defeasibly conclude from an action α being carried out that things are okay: '$\alpha > \mathrm{OK}$'. To this, they can easily add a rule that states that α and β together are okay ('$\alpha \wedge \beta > OK$') to deal with a sequence as in (96). In contrast,

[59] Note that the analysis does not semantically encode that the permission aligns with the preference: semantically, it is conceivable that a preference for an apple entails that taking a pear is permissible, and the other way round. I think that this option is pragmatically blocked by a manner implicature; compare also non-modalized *depending on* statements (cf. Sect. 4.2).

Barker's (2010) solution in terms of linear logic runs into a problem thanks to being overly resource sensitive: if, to the (strong) permission that taking either one is okay (choice is up to the hearer), we add the permission that taking both an apple and a pear together is okay too, we can no longer conclude that things are okay if the addressee takes an apple (or, analogously, if the addressee takes a pear), and we cannot conclude that things are okay if the addressee takes both an apple or a pear, either—in all of these cases one of the two permission clauses has not been used up and the corresponding proofs fail.[60]

Second, restricting quantification to relatively normal courses of events also helps to curtail what is being permitted: nothing is said about effective preferences in non-standard settings. I take this to be a significant advantage over an approach like Asher and Bonevac's (2005), which, as pointed out by the authors themselves, fails to predict that things are not going to be okay if a permissible course of events (like, having soup), is combined with a non-permissible course of events (like, pouring the soup over the waiter). In their default logic framework, the permission to have soup is modeled as the defeasible conditional 'have-soup > OK' (i.e., 'If you have soup, things are normally okay'). If the default conditional 'pour-soup-over-waiter > ¬OK' is adopted as well, in a situation in which the relevant agent has soup and pours soup over the waiter, neither conditional can be applied.

(97) have-soup > OK, pour-soup-over-waiter > ¬OK $\nvdash$ ¬OK

Therefore, they fail to predict the intuition that things are clearly not okay in such a scenario. To predict that the bad action trumps the permissible one, a more specific default rule has to be adopted in addition, saying for instance that 'have-soup and pour-soup-over-waiter > ¬OK'. This rule overwrites the strong permission to have soup and gives rise to the prediction that things are not okay in the scenario as described. The need for specific rules to predict badness for each forbidden course of events when occurring in combination with something that is strongly permitted strikes me as problematic. Intuitively, doing something that is strongly permitted does not call into question sanctions for bad things one is doing in addition to the thing permitted. Our account for *depending on* fares better in these cases: compatibility with what is deontically okay is only predicted for "normal ways" of doing something (thanks to the stereotypical ordering source of the conditional operator and the overall restriction to relatively normal historical alternatives), which arguably do not include cases where the addressee pours soup over the waiter.

[60] Barker's (2010) logic proves overly resource sensitive in other respects as well (I am much indebted to Dave Ripley, p.c., for discussing the details of Barker's logic): for example, a permission to do a (represented as $a \multimap \delta$, read 'If a, things are okay') together with the clause that everything is okay (δ 'yay') does not allow us to infer that we can act on the permission (and, for instance, take an apple).

(i) a. $a \multimap \delta, a \vdash \delta$
b. $a \multimap \delta, a, \delta \nvdash \delta$

This prediction is hard to make sense of under any understanding of the clause δ as used to model strong permission in terms of deontic reduction.

5.3 Unmodified disjunctions

The previous sections have been concerned with an account of overtly modified disjunctions. At this point, I would like to relate the outcome to unmodified disjunctions. Three of the previous results strike me as particularly crucial for this. First, in order to account for their occurrences with *depending on* modifiers, disjunctions were treated as sets of propositional alternatives. Consequently, something needs to be said about their fate whenever they do not serve as input to an overtly encoded operator (such as depending on or, as discussed by Alonso-Ovalle 2006, a conditional operator). Second, unmodified disjunctions followed by *It depends on...* are informationally equivalent to disjunctions with the corresponding clause-mate *depending on* modifiers (e.g. (43)). The treatment of unmodified disjunctions should be suitable for contributing to an account for these sequences. Third, if free choice inferences are just a particular form of dependence (cf. Sect. 5.1), this suggests a uniform account for free choice and other readings of unmodified disjunctions.

Following Krifka (1995) (for *any*) and Condoravdi (2014) (for *wh-ever*), I propose that sentential alternatives at the top level of a sentence are subject to an operation of global discharge that has a pragmatic effect over and above existential closure. With Condoravdi (2014), I assume that the operation triggers the pragmatic presupposition that the update results in a context set that is compatible with each of the individual alternatives.

Krifka and Condoravdi both work with assertive updates specifically. Their operators are therefore incompatible with disjunctions of imperatives or sentences containing performative modals: even if, just like ordinary declaratives, they express propositions, such sentences are used for speech acts other than assertions.[61] In order to keep global discharge available for different types of speech acts, I assume a purely technical notion of update of the context set with a proposition, rather than relating it directly to the speech act of assertion. Throughout, the idea is that many speech acts other than assertions also involve the update of the context set with a proposition—for example, promises, advice, or threats, but also orders and commands. I therefore adopt the version of global discharge of alternatives in (98):

(98) *Global discharge* (GD): In any context c, a non-interrogative matrix sentence that denotes a set of propositions $P \subseteq \mathscr{P}(W)$ is interpreted as $\mathrm{GD}(P) := \bigcup P$ with the pragmatic presupposition that:
$(\forall p \in P)(\exists w' \in (\mathrm{CS_c} \cap \bigcup P))[p(w') \wedge (\forall p' \in P)[p \not\subseteq p' \rightarrow \neg p'(w')]]]$[62]

I assume that it is the default application of GD which turns a set of alternatives into a proposition that can be used to update the common ground, provided all disjuncts remain live possibilities in their own right. This predicts correctly that disjunctions can express either (i) that all individual disjuncts constitute genuine epistemic alternatives for the speaker, or (ii) the speaker's unwillingness to disclose the full information ('but

[61] Being used in a non-assertoric utterance is part of the definition of performative modals, and it is ensured by the presuppositions associated with imperatives.

[62] If disjunctions are exhaustified sets of alternatives, then the restriction to propositions that are not entailed can be dropped.

I'm not going to tell you more than that'), or (iii) the concession that the speakers can agree to limit the possibilities to these options, but disagree on which one of them holds ('at least that much we can agree on').[63,64]

Crucially, the first type covers all three readings of (modalized) disjunctions that I have been focusing on in this paper: the ignorance reading, the fact-dependent reading, and the free choice reading share the property that all disjuncts constitute genuine epistemic alternatives for the speaker. The difference resides in whether or not the speaker can relate the resulting partition of the context set to some other distinction, be it factual (fact-dependent reading) or the choice of the addressee (free choice reading). If the speaker cannot do so, we obtain the ignorance reading. Interestingly, even though all three cases are thus analyzed as instances of epistemic uncertainty on the part of the speaker, a follow-up with *I don't know which* always suggests the ignorance reading and blocks fact dependence and free choice. At the moment, I cannot offer an account for this phenomenon, which needs to be addressed in connection with the more general question of how a given disjunction gets interpreted. For the issues discussed in this paper, the status of the free choice reading is most interesting, and it raises at least the following two questions. First, under what circumstances can an addressee conclude that the choice which of two disjuncts comes true is solely up to her? Second, in the absence of overt material to block it, why is this free choice effect always present for imperative disjunctions and disjunctions involving performative modals?

A promising way of looking at the question of what reading was intended for a particular disjunction in a neo-Gricean framework involves a form of backtracking. Given what is known about the utterance situation, under what additional assumption does the disjunction present itself as the optimal choice among a set of alternative utterances which specifically include the individual disjuncts? Such a mechanism is described informally in Kratzer and Shimoyama (2002). Lauer (2013) develops an optimality-theoretic account that predicts an uncancellable implicature: a speaker using a disjunction has to have a specific reason for doing so. Together with whatever other preferences are assumed to be operating (e.g., speaking truthfully, informing about each of the individual disjuncts,…), different such reasons (and hence 'readings') are inferred. The crucial ingredient to derive the uncancellable implicature is an assumed *ceteris paribus* preference for shorter utterances (for some suitable notion of shortness) and the inevitable competition between a disjunction and its individual disjuncts.[65] Lauer (2013) does not investigate modalized disjunctions and their additional free choice readings specifically, hence it remains to be worked out in detail what assumptions about speaker preferences have to be built in to predict these interpretations. It seems that free choice readings arise in a context where the speaker has not only

[63] See Condoravdi (2014) for these three subtypes of what in the context of *wh-ever* is generally dubbed the 'ignorance reading' of *wh-ever*, in contrast to its 'indifference reading'. Here, the term 'ignorance reading' remains reserved for a subtype of (i) as described in the main text.

[64] To account for sequences in which a second sentence resolves the dependence (e.g. (43a)), I assume that *it* can be interpreted as anaphoric to a set of propositions, and that, after the utterance of a disjunction, its corresponding alternative set is salient. The equivalence between pairs as in (43) is then captured straightforwardly.

[65] In Lauer's (2013) account, the presupposition I am associating with Global Discharge is derived as one aspect of the general reasoning about why a disjunction was used.

a preference to inform about each of the disjuncts, but also to give the addressee the necessary information to resolve the question of what to do. The reasoning would then go as follows: if the speaker is considered knowledgeable with respect to what correlates with the partition kept alive by the disjunctive utterance, and if no corresponding factual distinction is salient or named explicitly, then the addressee can assume that things are up to her. Working out a solution along these lines is beyond the scope of this paper, but I would like to highlight two aspects of my adopted analysis of performative modality and imperatives that strike me as relevant.[66] For one thing, the performative use of a modal or the felicitous use of an imperative requires that the speaker be considered an epistemic authority on the respective modal flavor. In Sect. 3.1, I have slightly weakened Kaufmann's (2012) definition to what is repeated in (99):

(99) *Epistemic Authority (preliminary)*: The speaker is considered an *epistemic authority* on a modal flavor characterized by f and g iff at all worlds $w \in \mathrm{CS_c}$ for any proposition p: $\Box^{f,g} p$ at w iff $\Box^{f,g} p$ at all w' compatible with what the speaker believes at w.

Upon closer inspection, this is problematic for the disjunctions under investigation. Clearly, disjunctive imperatives are felicitous, yet the speaker does not have perfect knowledge as to what follows from the respective modal flavor.[67] Rather than give up on Epistemic Authority altogether, I would like to weaken this definition in a way that relates to the requirement that, with imperatives and performatives, free choice needs to be blocked explicitly. I suggest that the speaker has to be an epistemic authority in the above-mentioned sense *modulo* a specific partition she can indicate explicitly.

(100) *Epistemic Authority (final version):* In a context c, the speaker is considered an *epistemic authority* on a modal flavor characterized by f and g iff there is a partition Π of $\mathrm{CS_c}$ such that the speaker can name Π, and for all $\pi \in \Pi$, for all worlds $w \in \mathrm{CS_c}$ and propositions q: $\Box^{f+\pi,g} q$ at w iff the speaker believes at w that $\Box^{f+\pi,g} q$.

Apparently, whenever Π is something other than the addressee's choice, the speaker needs to indicate it explicitly. I suspect that this has to do with a second aspect of performative modality/imperatives, namely the need to provide the addressee with

[66] In the following, I ignore unwillingness readings, whose empirical status needs to be investigated in more detail before they can be integrated into this discussion.

[67] Let alone what is the content of modal base or ordering source separately, if we were to adhere to Kaufmann's original formulation. But note that even Kaufmann's original requirement is unproblematic as long as we confine our attention to conditionals and assume that the antecedent serves to update the modal base of the imperative/performative modal. If the speaker is considered an epistemic authority on f, this carries over to f updated with a conditional antecedent p, i.e. to $f + p$. The proof is given in (i), where $Bel_x(w)$ stands for the set of worlds compatible with what x believes in w.

(i) *Proof:* Since x counts as an epistemic authority on f in c, at all worlds w in $\mathrm{CS_c}$ it holds that $(\forall w' \in Bel_x(w))(\forall q)[q \in f(w') \leftrightarrow q \in f(w)]$. By definition, $f + p = \lambda w.f(w) \cup \{p\}$. Therefore, at all w in $\mathrm{CS_c}$ it holds that $(\forall w' \in Bel_x(w))(\forall q)[q \in f + p(w') \leftrightarrow q \in f + p(w)]$. So x in c counts as an epistemic authority on $f + p$.

a c-completable answer to her decision problem (cf. (36b), (37)) . Roughly, if the speaker knows that the disjunction depends on something other than the choice of the addressee, and the addressee needs to be able to find out which disjunct applies, then the speaker had better inform the addressee of the dependence. Consequently, free choice readings arise for unmodified disjunctions of performatively modalized propositions because (i) the context set is left partitioned, (ii) the speaker is taken to know what it correlates with (epistemic authority), and (iii) the speaker is expected to enable the addressee to act informedly (c-completable answer). (ii) and (iii) can only be reconciled if the speaker can safely rely on the addressee to figure out the correlation for herself, which apparently entitles the addressee to assume that things depend on her own preferences. Absent such contextual pressures, unmodified disjunctions of unmodalized or descriptively modalized disjunctions allow for many other resolutions as well (cf. Lauer 2013 for discussion).[68] Many details remain to be worked out, but the general idea strikes me as promising.

6 Conclusions

In many contexts, natural language disjunctions convey that at least one of the two disjuncts describes the world of evaluation truthfully—a use that is approximated well enough by the classical interpretation of disjunction. In contrast, the interaction of disjunctions with modal verbs or specifically imperative clauses is well known to pose a challenge to this picture, a salient interpretation being that the relevant agent is granted choice between the courses of action named by the individual disjuncts.

In this paper, I have revisited evidence against a treatment of this effect at the level of speech acts, and I have adduced new evidence against hard-wiring it into the semantics of imperative clauses. Instead, I have argued that we can derive a uniform account for various readings of disjunctions across speech acts and clause types by looking more closely at *depending on* modifiers that can overtly indicate specific readings. These constructions prove revealing in several respects. First, in addition to granting free choice or conveying the speaker's ignorance as to which of the disjuncts is true, disjunctions can also indicate the correlation with other factual distinctions (fact-dependent reading). Second, in order to develop a compositional interpretation for the respective sentences, the individual disjuncts need to be accessible in the course of the derivation. Third, in view of overt indicators of the free choice reading with *depending on*, we need to account for the apparent discrepancy between free choice (perceived as independence proper) and an explicitly indicated dependence on the preferences of the agent.

In this paper I have developed an account for *depend(ing) on* as expressing a series of conditionals that correlate the truth of the individual disjuncts with a partition on the context set corresponding to another question. To this end, disjunctions are interpreted as sets of propositional alternatives. Dependence on the preferences of an agent can

[68] The solution in (98) does not carry over to disjunctions with epistemic modals if these are considered part of the propositional alternatives expressed. On all plausible settings of the modal parameters (speaker knowledge, group knowledge), the individual disjuncts are true at all worlds in the context set. For alternatives, see Weatherson and Egan (2011).

give rise to apparent independence (i.e., free choice) if preferences are understood as plans for action (effective preferences; Condoravdi and Lauer 2016), indicating roughly that for any course of action chosen, that course of action is admissible. Thereby, the analysis also sheds some light on the resource sensitivity of the free choice effect: the fact that it does not grant the choice of both disjuncts together can be related to the nature of the underlying question, which contextually excludes the possibility of a preference for, and hence choice of, both disjuncts together.

The different readings of (matrix clause) disjunctions all involve explicitly indicated or implicitly present partitions of the context set, and each of the disjuncts enters into the context as a genuine epistemic alternative. This relies crucially on a treatment of non-assertoric speech acts as mediated via changes in public (epistemic) commitments. While at first glance surprising for permissions, commands, and the like, this view allows for a uniform theory of the presence and absence of free choice across assertoric and non-assertoric utterances, across imperatives and declaratives, as well as across explicitly modified and unmodified disjunctions. Finally, I have highlighted how the specific properties of inherently non-assertoric clauses (imperatives) and performative modality can be employed to derive a bias toward the free choice reading, to the extent that other readings may become entirely unavailable in the absence of overt indicators. While I have not said much about embedded occurrences of disjunctions, the readings available for them will to a large degree depend on the operators taking scope over them. If particular operators, for instance negation, trigger the occurrence of existential closure over propositional alternatives, the classical behavior of a disjunction embedded under such operators falls out automatically. Future research will have to show if and how the account can be extended to free choice readings in the antecedents of conditionals or distribution effects in the scope of nominal quantifiers.

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