

## Modals and conditionals

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### 17.1 Introduction

Modals ('It might rain'; 'You must eat a cookie'; 'I can fly') and conditionals ('If it rains, the picnic will be canceled'; 'If you want a cookie, let me know'; 'If I had wings, I would have been able to fly') play a starring role in philosophical and linguistic research. The ability to think modally distal thoughts is central to the human capacity to plan and choose; and the ability to express such thoughts is central to the human capacity for collective action.

Modals and conditionals have yielded a rich bounty of puzzles about logic, semantics, and pragmatics. In light of the obvious futility of giving an overview of these puzzles, I will organise this chapter around just three topics, focusing further in each case on just a few questions that particularly fascinate me. The result is partly autobiographical; but that seems inevitable for the task set out for this volume, and I hope to thus give a taste of some of the many interesting issues raised, together with pointers to further resources.

The first topic I explore is epistemic modals: words like 'might' and 'must', on a broadly epistemic reading. I survey a handful of puzzles about epistemic modals, puzzles which also touch on questions about attitude predicates, propositions, anaphora, and presupposition (for more on which, see Angelika Kratzer's, Yael Sharvit and Matt Moss's, Elizabeth Coppock's, and Márta Abrusán's contributions to this volume).

The second topic is conditionals. One reason the conditional has played

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a central role in logic, semantics, and pragmatics is because it does not seem amenable to a bivalent truth-functional analysis. For this reason, the conditional constitutes a major challenge for the Gricean research program which aims to treat the logical connectives and operators of natural language—‘and’, ‘or’, ‘not’, ‘if...then...’—as the truth-functions of classical logic, and explain their communicative complexity via the interaction of simple truth-conditions with complex pragmatic reasoning (see Emma Borg’s chapter). If conditionals are not truth-functions, what are they? A prominent view in philosophy says that ‘If  $p$ , then  $q$ ’ is true just in case the closest  $p$ -world(s) are  $q$ -world(s).<sup>1</sup> A prominent view in linguistics says that ‘If  $p$ , then  $q$ ’ is a restricted epistemic modal claim, which says that  $q$  must be true, on the assumption that  $p$  is true. In my discussion I will focus on points of convergence and divergence between these approaches.

The final topic I will explore is practical modality: modal claims about what one should do (deontic modals: ‘You should give me a cookie’), and about what one can or cannot do (agentive modals: ‘You can pass this test’). This topic has obvious ramifications for philosophical questions about morality, ability, and their connections. I will focus on recent work which suggests that these modals build on a representation of a set of available actions, and explore a puzzle about how we represent that set of actions when we give orders.

## 17.2 Epistemic modals

Epistemic modals are words like ‘might’ and ‘must’ on a broadly epistemic interpretation, as in (1):

- (1) a. Susie might bring her new girlfriend to the party.  
 b. Latif must be furious.

The standard analysis of modals in natural language, growing out of work in modal logic (Kripke, 1963; Kratzer, 1977, 1981; Lewis, 1979), treats them as quantifiers over accessible worlds. The idea is that modals are evaluated relative to a binary accessibility relation between worlds. An existential modal sentence (‘Might  $p$ ’, ‘May  $p$ ’, etc.) is true at a world  $w$  just in case some world accessible from  $w$  makes  $p$  true; a

<sup>1</sup> I will use lower-case Roman letters for sentences and italics for corresponding propositions, often ignoring relativization to context for readability.

universal modal sentence (‘Must  $p$ ’, ‘Have to  $p$ ’, etc.) is true at  $w$  just in case every world accessible from  $w$  makes  $p$  true. Different kinds of modality are associated with different kinds of accessibility relations. Epistemic modals are associated with a broadly epistemic one, on which a world  $w$  can access a world  $w'$  just in case  $w'$  is compatible with the relevant evidence or knowledge in  $w$ .

### 17.2.1 Embedding

On the standard approach, ‘Might  $p$ ’ thus means roughly the same thing as ‘For all we know,  $p$ ’. There is some flexibility here, given the context sensitivity of the accessibility relation for ‘might’, but not too much.

On the face it, this seems reasonable enough. But introspection about meanings is a limited technology. To evaluate a proposed synonymy claim, we must, among other things, explore whether the expressions in question embed in similar ways. Wittgenstein (1953, II.x.109) called attention to sentences with the form ‘Might  $p$  and not  $p$ ’, as in (2):

(2) #It might be raining, but it isn’t.

Sentences like this, and in the reverse order,<sup>2</sup> have formed the basis for much recent work on the semantics of epistemic modals.<sup>3</sup> Specifically, it has been revealing to compare the behavior of Wittgenstein sentences like (2) to Moorean sentences (Moore, 1942) like (3):

(3) #For all we know, it’s raining, but it’s not raining.

If the standard theory is right, (2) and (3) should mean roughly the same thing. Again, on the face of it, this looks like a reasonable prediction. But a little investigation shows that it is wrong: (2) and (3) embed in very different ways. Yalcin (2007) made this point by embedding sentences like these under ‘Suppose’, as in the pair in (4):

- (4) a. #Suppose it might be raining but it isn’t raining.  
 b. Suppose for all we know it’s raining, but it isn’t raining.

Yalcin observed that there is a striking difference between (4-a) and

<sup>2</sup> I.e. with the form ‘ $p$  and might not  $p$ ’, which Yalcin (2007) calls *epistemic contradictions*.

<sup>3</sup> See Boylan 2020b for discussion of a different kind of divergence between ‘might’ and ‘for all we know’, having to do with tense.

(4-b): the modal variant in (4-a) is infelicitous, while the non-modal variant in (4-b) is felicitous. But if the embedded sentences meant the same thing, then (4-a) and (4-b) should mean the same thing, too.

One response would be to posit something special about the meaning of ‘Suppose’, or perhaps about attitude operators in general, to account for these data. But this is too narrow, because the divergence in (4) reappears in many different environments. For instance, similar phenomena arise when sentences like this are embedded in conditionals (Yalcin, 2007), under quantifiers (Groenendijk et al., 1996; Aloni, 2000; Yalcin, 2015; Ninan, 2018; Mandelkern, 2019a), epistemic modals (Gillies, 2018; Mandelkern, 2019a), and disjunctions (Mandelkern, 2019a). The latter provides a particularly simple, and thus revealing, case:

- (5) a. #Either it’s raining but it might not be, or it’s snowing but it might not be.  
 b. Either it’s raining but we don’t know it, or it’s snowing but we don’t know it.

(5-b) is a coherent, if periphrastic, way of saying that it’s either raining or snowing, but I don’t know which; (5-a), by contrast, sounds incoherent. These are, however, just disjunctions of Wittgenstein and Moore sentences, respectively.<sup>4</sup>

The most obvious response to minimal pairs like these is to hold that, while Moore sentences are consistent (i.e., true at some points of evaluation), Wittgenstein sentences are not. But this is a hard line to maintain. Suppose ‘Might p and not p’ were a contradiction. If ‘and’ and ‘not’ have classical Boolean semantics (something we might deny, on which more presently), then for any sentences p and q, if ‘p and q’ is a contradiction, then p entails ‘Not q’. So ‘Might p’ would entail p if ‘Might p and not p’ were a contradiction. But clearly it doesn’t (‘It might rain and it might not’ does not entail ‘It will rain and it won’t’). How, then, can we account for the robust infelicity of Wittgenstein sentences across embedding environments, without predicting that ‘Might p’ entails p?

<sup>4</sup> I’ll use ‘but’ and ‘and’ interchangeably here, on the assumption that the differences between them don’t matter for present purposes. Readers suspicious of this can simply substitute ‘and’ throughout, which will not affect the basic observations.

### 17.2.2 Some possible solutions

I will give a brief, and opinionated, overview of four solutions that have been posed to this puzzle.

The *informational* response comes from Yalcin 2007, and says that, while Wittgenstein sentences are logically consistent, they are inconsistent in a different, *informational* sense.<sup>5</sup> On the informational conception of logic, roughly speaking,  $p$  entails  $q$  just in case, whenever you rationally accept  $p$ , you rationally must also accept  $q$ . Yalcin gives a theory of epistemic modals on which  $\ulcorner$ Might not  $p$  and  $p\urcorner$  and  $\ulcorner$  $p$  and might not  $p\urcorner$  are informationally inconsistent—that is, they can never be rationally accepted.<sup>6</sup> Such sentences remain classically consistent, however, and so Yalcin avoids the unacceptable conclusion that  $\ulcorner$ Might  $p\urcorner$  entails  $p$  (I’ll henceforth just call this *the bad conclusion*).

This approach has sparked much interesting research and debate, for instance on the nature of informational logic and the relation between informational and classical logics (e.g. Bledin 2015, 2020; Santorio 2021; Mandelkern 2020a). And this approach nicely accounts for the infelicity of Wittgenstein sentences when embedded under operators like ‘Suppose’ and ‘If’. The basic idea is that both of these can naturally be given semantics characterized in terms of acceptance: for instance,  $\ulcorner$ A supposes  $p\urcorner$  is true iff the set of worlds representing A’s suppositions accepts  $p$ .

The problem with this approach is that operators like quantifiers and disjunction are not naturally characterized in terms of acceptance, and so this approach does not naturally account for the infelicity of Wittgenstein sentences embedded in these environments. This suggests that this approach may be too limited to account for the range of the phenomenon.

A different approach is given by *dynamic semantics*. The dynamic approach is much more revisionary. In dynamic semantics, particularly in the framework growing out of Heim 1982, 1983, sentence meanings are not sets of points of evaluation, but are rather functions which take one context (a set of variable-assignment/world-pairs) to another. Connectives are treated non-classically: in particular, conjunction is treated as successive application of the functions denoted, first, by the left conjunct, then by the right conjunct. Finally,  $\ulcorner$ Might  $p\urcorner$  is a “test” function which checks its input context (its argument) for compatibility with  $p$

<sup>5</sup> This, in turn, draws on earlier work from the dynamic tradition (Heim 1982; Veltman 1996; Groenendijk et al. 1996).

<sup>6</sup> Yalcin presents his view in a *domain semantic* framework (see also MacFarlane 2011), but Ninan 2016 shows that the basic idea can also be spelled out in a standard relational framework.

(Veltman, 1996; Groenendijk et al., 1996; Beaver, 2001; Aloni, 2000, 2001; Gillies, 2004; Yalcin, 2015; Gillies, 2018; Goldstein, 2019; Ninan, 2019). The dynamic framework was developed to capture patterns involving anaphora and presupposition (in Karttunen 1973, 1974, 1976; Stalnaker 1974; Kamp 1981; Heim 1982, 1983), suggesting the intriguing possibility of a connection between the three phenomena of anaphora, presupposition, and modality.

Since conjunction is successive update, in a sentence like ‘p and might not p’, the input context for ‘Might not p’ will entail p; and ‘Might not p’ tests this context for compatibility with ‘Not p’. But this test will never be passed (at least, provided that p itself does not contain modals).<sup>7</sup> Thus ‘p and might not p’ will (for non-modal p) be a contradiction. Finally, the bad conclusion is avoided thanks to the non-classicality of the dynamic conjunction.

This approach is obviously well-suited to make sense of a wide range of the embedding data above, and it has been deeply influential. But it has an obvious problem with order. This approach predicts that, while ‘p and might not p’ is a contradiction (when p is non-modal), sentences with the reverse order, ‘Might not p and p’, are not. On this approach, the input context for a left conjunct is just the global context; so this approach predicts that ‘Might not p and p’ should pattern much like the corresponding Moore sentence.<sup>8</sup> But this is wrong: both orders are much worse than the corresponding Moore sentences. For instance, (6-b) is substantially worse than (6-a), and seems as bad as its right-modal variant in (6-c).

- (6) a. Either for all we know it is raining, but it isn’t; or, for all we know, it is snowing, but it isn’t.  
 b. #Either it might be raining but it isn’t, or it might be snowing but it isn’t.  
 c. #Either it’s raining but it might not be, or it’s snowing but it might not be.

<sup>7</sup> When p is modal (or, in some systems, when p contains (in)definites), ‘p and might not p’ can in fact be consistent; this is related to a perhaps more serious problem, namely that ‘p and not p’ is also consistent in standard dynamic systems (van Benthem, 1996; Mandelkern, 2020b).

<sup>8</sup> ‘Much like’ because there is still a difference: in the technical jargon of dynamic semantics, Wittgenstein sentences are consistent but not *acceptable*, meaning that no single non-empty context remains unchanged when updated with a Wittgenstein sentence in either order. But this difference will generally wash out in some embeddings—for instance, on standard dynamic approaches, Wittgenstein sentences under an epistemic modal or existential quantifier yield sentences which are both consistent and acceptable.

A variety of proposals have been made to essentially bleach the order sensitivity out of dynamic systems (Klinedinst and Rothschild, 2014; Yalcin, 2015; Rothschild and Klinedinst, 2015). These are interesting and deserve detailed consideration beyond our scope, though one might worry that there is something circuitous about building a system on top of an asymmetric conjunction and then finding ways to eliminate that order dependence.

A third, *salience-based* approach, due to Dorr and Hawthorne 2013, says that the standard *semantics* for modals is correct; the infelicity of Wittgenstein sentences has to do instead with broad considerations about salience.<sup>9</sup> The idea is that these considerations lead us to generally interpret modals in such a way that we take into account locally salient information in determining what accessibility relation is salient. The result is in some ways like a pragmatic version of dynamic semantics: in  $\lceil p$  and might not  $p \rceil$ ,  $p$  is salient and thus will generally be incorporated into the accessibility relation associated with ‘might’, rendering such sentences inconsistent on most interpretations (but not logically contradictory, thus, once more, avoiding the bad conclusion).

Can a broadly pragmatic approach account for the systematic infelicity of Wittgenstein sentences? This raises general questions about how to think about pragmatic defaults, as well as about just how systematic this infelicity is. But however this question is answered, this approach faces the same obstacle as dynamic approaches, namely order. These approaches, like dynamic approaches, are fundamentally asymmetric, since salience is very much an order-sensitive matter. To see this point, compare the following:

- (7) a. John is here, but he isn’t.  
 b. He isn’t here, but John is.

(7-a) sounds a bit weird out of the blue, intuitively because there is some pressure to interpret ‘he’ as referring to John, leading to incoherence (of course (7-a) can be rescued if we make salient a different referent for ‘he’). By contrast, there seems to be no pressure whatsoever in (7-b) to interpret ‘he’ as referring to John. In general, it seems that any salience-based approach will predict—simply because of the temporal asymmetries inherent in processing sentences—that Wittgenstein sentences display marked order contrasts. In particular, in a sentence

<sup>9</sup> Broadly similar ideas, though with important differences in detail and motivation, can be found in Dowell 2011, 2017; Silk 2017; Stojnić 2017.

with the form ‘It might not be raining and it is’, the proposition that it is raining is not yet salient when we process the modal, and so on the most prominent reading of such sentences, they should be interpreted just like Moore sentences—and thus should be felicitous in embeddings like (6-b). But, again, this does not seem to be the case. While there certainly *are* asymmetries in the interpretation of modals (for instance, in phenomena like modal subordination (Roberts, 1989)), the data under discussion here do not seem to be clearly asymmetric in the way predicted by the dynamic or pragmatic accounts.

A fourth approach—the one I am inclined towards—is the bounded theory which I develop in Mandelkern 2019a. That theory builds on the dynamic approach by tying the interpretation of epistemic modals to their local informational environment. In particular, the *bounded theory* builds on the theory of *local contexts* developed in work on presupposition by Karttunen (1974); Schlenker (2008, 2009). A local context is a quantity of information in some sense locally accessible in a given part of a sentence in a given context. In dynamic semantics, a local context for a given function is, in essence, just the argument of that function. But Schlenker shows how to systematically staticize the notion of a local context and recursively assign them to the parts of sentences, in a way which, crucially, is symmetric.

Given this account of local contexts, the bounded theory proposes that epistemic modals come with a *locality presupposition* which requires that, under the modal’s accessibility relation, local context worlds can access only local context worlds. In other words, the information in the local context must be incorporated into the modal’s accessibility relation throughout the local context. So epistemic modal claims have their classical, relational truth conditions; on top of that, they have a presupposition which ensures that they take into account their local information—and crucially, that they do so in a symmetric manner.

This theory predicts that Wittgenstein sentences can never be true *and* have their presuppositions satisfied at any context world. By recruiting local contexts in a symmetric way, this approach avoids the order-based objection to dynamic and pragmatic approaches. And, since the notion of a local context is as applicable in extensional as in intensional contexts, this approach avoids the objection to Yalcin’s informational approach, accounting for the infelicity of disjoined or quantified Wittgenstein sentences. Finally, Wittgenstein sentences, though never true at any context world when their presuppositions are satisfied, are not invariably false—so we avoid the bad conclusion.



In Mandelkern 2019a I spell out and argue for this system at much greater length. Since I am obviously sympathetic to this approach, I want to highlight some questions that the system raises. One concerns the logic of conjunction. Although the system builds on a classical system, the final result is not exactly classical (depending what one means by this). For instance, conjunction introduction will not always preserve satisfaction of presuppositions. So  $p$  and  $q$  can each be true and have their presuppositions satisfied at a given context, while  $\lceil p$  and  $q \rceil$  does not have its presuppositions satisfied (whether we want to say that conjunction introduction is thus not valid depends on our understanding of logical consequence, and our formal treatment of presuppositions; see Sharvit 2017; Chemla et al. 2017 for related discussion). This is central to the system's ability to predict that  $\lceil$ Might  $p$  and not  $p \rceil$  is inconsistent, without also predicting that  $\lceil$ Might  $p \rceil$  entails  $p$ . And this provides a nice illustration of the long shadow modality casts in the study of the logic of natural language. Like dynamic semantics and like some versions of the pragmatic approach above, the bounded theory uses tools developed to account for anaphora and presupposition. This raises many questions. Why are epistemic modals bounded by their local context in this way? And why is the relevant notion of local contexts symmetric? The latter question is especially pressing in light of evidence that other systems that involve local contexts, like anaphora, redundancy, and presupposition, at least in some cases appear to require asymmetric local contexts.<sup>10</sup> Divergences aside, why do these different systems pattern together in the first place?

Finally, let me note some of the many other theories of epistemic modals which I pass over merely for reasons of space: for instance, the various probability-based theories given in Swanson 2015; Lassiter 2011; Rothschild 2011; Moss 2015; Charlow 2019; the bilateral, state-based, and possibility-based theories of Hawke and Steinert-Threlkeld 2018, 2020; Aloni 2016; Flocke 2020; Incurvati and Schlöder 2020; the situation-based theory of Kratzer 2020b; and the relativist theories which I discuss in the next section. There are also many other important facets of the issues we have explored in this section, for instance about cross-linguistic facts about embeddability (Močnik, 2019a,b) and the syntax/semantics interface (Hacquard, 2006; Kratzer, 2020b).

<sup>10</sup> On the latter see e.g. Chemla and Schlenker 2012; Schwarz 2015; Mandelkern et al. 2020.

### 17.2.3 Attitudes and (dis)agreement

I will turn now to some further puzzles that arise from the behavior of epistemic modals when embedded under attitude operators. The first starts with the observation that sentences with the form ‘I believe  $p$ , but I know might not  $p$ ’ can be felicitous:

(8) I believe I’ll win but I know I might not.

By contrast, ‘I believe  $p$ , but I believe might not  $p$ ’ seems much worse:

(9) #I believe I’ll win but I believe I might not.

This is puzzling, since ‘I know  $p$ ’ is standardly taken to entail ‘I believe  $p$ ’, and so (8) should entail (9) (see Hawthorne et al. 2016; Beddor and Goldstein 2018; Bledin and Lando 2018).

In response to this puzzle, one could hold that the inference from knowledge to belief is not valid when  $p$  itself is modal. This is, in fact, a consequence of a number of contemporary theories, including the domain semantics and standard implementations of the dynamic approach. But this is not satisfying, since the inference from ‘knows might’ to ‘believes might’ does *feel* valid. If you *know* that it might rain, it’s hard to see how you could fail to *believe* that it might rain; sentences like ‘I know it might rain, but it’s not that I believe it might rain’ feel incoherent.

The bounded theory suggests the beginnings of a solution to this puzzle. That theory predicts that the inference from ‘S knows  $p$ ’ to ‘S believes  $p$ ’ preserves truth whenever both sentences have their presuppositions satisfied: but, whenever a sentence with the form of (8) is true, the corresponding sentence in (9) will not have its presuppositions satisfied (assuming it is assessed relative to the same accessibility relation as (8)).<sup>11</sup> More generally, the bounded theory predicts that (9), but not (8), must ascribe inconsistent beliefs to the speaker whenever its presuppositions are satisfied. From a technical point of view this solution looks satisfying, but, again, more needs to be said to explain why the interpretation of epistemic modals is constrained in this way.

<sup>11</sup> This is because the local context for ‘might’ in ‘I know might not  $p$ ’ is my knowledge worlds, while the local context for ‘might’ in ‘I believe might not  $p$ ’ is my belief worlds, a smaller set. If its presuppositions are satisfied, ‘I believe  $p$ , but I know might not  $p$ ’ can only be true if all of my belief-worlds are  $p$ -worlds, and all of my knowledge-worlds can access some  $\neg p$ -worlds in my knowledge state. But in that case, ‘I believe  $p$ , but I believe might not  $p$ ’ will not have its locality presupposition satisfied, since that presupposition would require all belief-worlds to access only belief-worlds.

A potentially related topic concerns epistemic modals under factive operators, as in ‘Susie knows it might be raining’ (Lasersohn, 2009; Moss, 2013a, 2018). Lasersohn (2009) brings out an interesting puzzle. Intuitively, what ‘Susie believes it might be raining’ says is that Susie believes her evidence is compatible with rain.<sup>12</sup> Generalizing from that intuition, we would predict that ‘Susie knows it might be raining’ would mean that Susie knows that her evidence is compatible with rain. But this does not seem to be what it means. Consider a context where *we* know that it’s not raining, but Susie doesn’t know this, and in fact knows that she has evidence compatible with rain. In this context, ‘Susie knows that her evidence is compatible with rain’ is true, but ‘Susie knows that it might be raining’ does not seem true, or at least does not seem assertible.

This is a fascinating puzzle. As Lasersohn discusses, this is a pattern that fits naturally with a relativist approach to epistemic modality, on which modal propositions are not sets of possible worlds but rather something like sets of judge-world pairs (see also Stephenson 2007b,a; Coppock 2018). To know such a proposition is for it to be true in every world compatible with your knowledge, relative to your own accessibility relation; but what projects due to the factivity presupposition of ‘knows’ is not a set of possible worlds, but rather the set of judge-world pairs. (Lasersohn observes that the puzzle extends to predicates of personal taste like ‘tasty’, and proposes a parallel relativist treatment of those predicates.)

Further complicating matters is the existence of cases with epistemic modals which parallel Gibbard (1981)’s Sly Pete case. Suppose you are sure that the murderer is either the gardener, the plumber, or the butler. Your two sleuths are out looking for clues about who it might have been. You know that the gardener and the plumber are not canny operators, and that, if either of them committed the crime, your sleuths will be able to figure it out. By contrast, if it was the butler, she will have set out misleading evidence to throw them off her path. The first sleuth comes to report, and says ‘I know that the culprit might be the gardener’. The second sleuth arrives and says ‘I know that the culprit might be the plumber’. You thereby conclude that it was the butler. It seems that you reached this conclusion via two true and felicitous knowledge ascriptions, and you can subsequently explain your course of reasoning

<sup>12</sup> Or perhaps not: Yalcin (2007) argues that a sentence like this is just a first-order claim that it is compatible with Susie’s belief that it is raining—though this claim has not gotten much subsequent uptake because it is very hard to extend this intuition to factives, for reasons discussed in Yalcin 2012; Mandelkern 2019b.

this way. But on a relativist approach, this would be impossible, since the complements of both knowledge ascriptions are false, relative to the information you now have. There is a real tension here, then, which needs to be sorted out.<sup>13</sup>

Relativist approaches have also been defended on other grounds, having to do with cross-contextual judgments (e.g. Egan et al. 2005; MacFarlane 2011; Egan 2007; Beddor and Egan 2018). This defense has recently been challenged by Phillips and Mandelkern (2019) in a way that raises interesting methodological issues. The key motivations for relativism from cross-contextual judgments come from cases like the following:

You overhear George and Sally talking in the coffee line. Sally says, ‘Joe might be in Boston right now.’ You think to yourself: Joe can’t be in Boston; I just saw him an hour ago here in Berkeley. (MacFarlane, 2011)

The relevant intuition is that it is reasonable, in this case, to say that Sally is wrong, or spoke falsely, or that she should retract what she said—even though it may have been compatible with *her* evidence that Joe was in Boston. But if that is reasonable, the thought goes, then speakers must evaluate Sally’s ‘might’, not relative to *her* evidence, but rather relative to *their* evidence.

But, as von Fintel and Gillies (2008) and others have noted, while this intuition seems reasonably robust, it seems like we find similar intuitions with attitude predicates. In particular, consider a close variant of this case which replaces ‘Joe might be in Boston right now’ with ‘I think Joe is in Boston right now’:

You overhear George and Sally talking in the coffee line. Sally says, ‘I think Joe is in Boston right now.’ You think to yourself: Joe can’t be in Boston; I just saw him an hour ago here in Berkeley.

In this variant, there is a similar intuition that we can reasonably say that what Sally said was wrong; that she spoke falsely; and that she should retract what she said—even though *she* thinks that Joe is in Boston. Phillips and Mandelkern (2019) argue for this by replicating experiments from Knobe and Yalcin 2014; Khoo and Phillips 2019; Beddor and Egan 2018 and showing that speaker intuitions for ‘I think...’ pattern in the same way as for modals. Insofar as we take the first set of intuitions to speak in favor of relativism about ‘might’, we would then have to take the second set of intuitions to speak in favor of relativism

<sup>13</sup> I’m indebted to Jeremy Goodman for discussion of this case.

about ‘thinks’. But the latter view seems untenable: clearly, whether *Sally* thinks Joe is in Boston doesn’t depend on what *we* think about where Joe is. So we need some theory other than relativism (or its close cousin, expressivism (Yalcin, 2007; Swanson, 2015; Moss, 2015)) to account for these latter judgments.

If this is right, then it raises important questions about how to account for these judgments in a unified way (one might, for instance, look to the account of modal disagreement in Khoo 2015a). But, if we reject relativism, that leaves us with the puzzle of how do we account for Lasnik’s striking observations about epistemic modals in the complements of factive attitude verbs. It seems to me an open question about how to best account for the range of phenomena here.

## 17.3 Conditionals

I will turn now from modals to conditionals, which have been a topic of lively philosophical debate since antiquity. The literature on conditionals is thus extraordinarily large. For some helpful overviews, see e.g. Edgington 1995; Bennett 2003; von Stechow 2011; Kaufmann and Kaufmann 2015; Gillies 2017; for some of the earlier history of the debate, see Mates 1953 and Algra et al. 1999, Part II. Let me emphasize again that I make no pretense of giving an overview here. (Conditionals have also played a central role in philosophical work well beyond philosophy of language, for instance in the theory of rational decision (Stalnaker, 1980b; Gibbard and Harper, 1981) and (relatedly) causation (Lewis, 1973a).) In my brief space here, I will start by explaining why the traditional identity of the conditional with the material conditional is not viable. Then I will introduce two influential theories of the conditional: one, from the philosophical literature, which regards ‘if’ as a two-place operator; and one, from the linguistics literature, which regards ‘if’ as simply providing a restriction on modals in the conditional’s consequent. I will argue that there is more disagreement between these approaches than first appearances suggest.

### 17.3.1 Not Grice’s ‘if’

Let me start by highlighting one of the most obviously interesting things about the conditional: it is a point where a part of the Gricean research program breaks down. That project aimed to vindicate the classical

Boolean analyses of natural language connectives, and to explain apparent divergences in usage by way of broadly pragmatic considerations. This program is alive (if controversial) for disjunction, conjunction, and negation. By contrast, it is no longer taken seriously by students of the conditional: identifying ‘if...then...’ with the material conditional (the connective true iff the antecedent is false or consequent true), and trying to explain deviations in usage by way of broadly pragmatic considerations, is largely considered a dead end.<sup>14</sup>

A simple way to see why is to reflect on negated conditionals. If the conditional were material, then the negated conditional would be equivalent to the conjunction of its antecedent and its negated consequent; so, e.g., (10-a) and (10-b) would be equivalent to (11):

- (10)    a.    It’s not the case that, if Patch is a rabbit, she is a rodent.  
           b.    It’s not the case that, if Patch had been a rabbit, she would have been a rodent.
- (11)    Patch is a rabbit and not a rodent.

But these are plainly inequivalent: the conditionals in (11) are true simply in virtue of facts about taxonomy, irrespective of whether Patch is a rabbit. Gricean pragmatic tools are generally most effective in explaining how inferences are *amplified*—how we draw inferences which are not logically entailed by what was asserted; it is not at all clear how they could explain our failure to draw a logically valid inference from (10) to (11).

For another example, note that, assuming a classical semantics for ‘every’, ‘Every p is q’ entails the material conditional ‘ $p(a) \supset q(a)$ ’, for any ‘a’ which names an individual in the domain. Suppose, then, that I tell you:

- (12)    Every coin in John’s pocket is a dime.

You are not sure if I’m speaking truly. You have a penny which you are particularly fond of, called Pen. You don’t know where Pen is, but you certainly know that (13) is false:

- (13)    If Pen is in John’s pocket, then Pen is a dime.

John’s pocket is not magic, after all. But the fact that (13) is false

<sup>14</sup> See Edgington 1995 for a good overview of arguments. For prominent dissent, see Grice 1989, Ch. 4; Jackson 1987; Williamson 2020.

obviously doesn't tell us that (12) is false. And so, again, 'if' cannot be material.

This is not to say that 'if' is *never* material on any use: on most theories of the conditional, the material interpretation is a limiting case (in which the world of evaluation is accessible and no other world is); some, like Kratzer 2020a, have argued that we sometimes find this special case in natural language. And this is not to say that 'if' is not truth-functional: intriguing recent discussion in Égré et al. 2020a,b,c has tried to revive the trivalent truth-functional approaches of de Finetti 1936; Reichenbach 1944 (cf. Cooper 1968; Cantwell 2008). The basic idea is that  $\lceil \text{If } p, \text{ then } q \rceil$  is true provided that  $p$  and  $q$  are both true, false when  $p$  is true and  $q$  is false, and otherwise undefined. Extending this with different treatments of the connectives, notions of logical consequence, and pragmatic theories leads to a variety of intriguing theories of the conditional

### 17.3.2 Two approaches to 'if'

I will, however, focus on two different analyses of the conditional here. The first is arguably the most prominent approach in the philosophical literature. That approach says that 'if' is a two-place operator which evaluates the consequent at the closest world(s) where the antecedent is true: so  $\lceil \text{If } p, \text{ then } q \rceil$  says, roughly, that the closest accessible  $p$ -world(s) are  $q$ -world(s) (if there are any accessible  $p$ -worlds, true otherwise) (Stalnaker, 1968; Stalnaker and Thomason, 1970; Stalnaker, 1975; Lewis, 1973b). The idea is that context provides some kind of ordering over worlds. In the Stalnakerian picture this is a well-order, so there is a unique closest  $p$ -world; in the Lewisian picture, it is a total pre-order, so there can be more than one equally close  $p$ -world.<sup>15</sup>

The most prominent line in the linguistics literature says that it is a mistake to treat 'if' as itself a modal operator. Instead, on this line, 'if'-clauses simply restrict the domain of a modal operator in the consequent of the conditional. When there is no overt operator, there is an unpronounced one. This is Kratzer's *restrictor theory* (Kratzer, 1981, 1986).<sup>16</sup> The idea is that, just as a sentence like 'The picnic must be canceled' says that the picnic is canceled in all the closest epistemically

<sup>15</sup> Or, indeed, no closest  $p$ -world, when there are infinite descending sequences; if we admit such cases, we need to elaborate our truth-conditions. I'll ignore cases like that for simplicity.

<sup>16</sup> With roots in Lewis 1975, and important developments in Heim 1982; von Stechow 1994 among others.

possible worlds, a sentence like ‘The picnic must be canceled *if it’s raining*’ is still an epistemic necessity claim—just one where the universal quantification is restricted to the closest worlds where it’s raining. A sentence like ‘The picnic was canceled if it was raining’, which has no overt modal, is assumed to contain an unpronounced modal—typically, an epistemic ‘must’—so that the ‘if’-clause again simply restricts the domain of quantification for the modal. So  $\lceil \text{If } p, [\text{must}] q \rceil$  says that the closest  $p$ -worlds are  $q$ -worlds (relative to a background partial pre-order on worlds), where ‘[must]’ is a possibly covert modal.

One thing that you might think from this exposition—something that has been argued for—is that there is no need to choose between these views: the Kratzer restrictor theory is essentially a view about the *syntax/semantics interface* of the conditional, and so is fully consistent with the Stalnaker/Lewis operator approach as far as semantic questions go. Indeed, in a famous passage, Kratzer wrote:

The history of the conditional is the history of *syntactic* mistake. There is no two-place ‘if. . .then’ connective in the logical forms for natural languages. ‘If’-clauses are devices for restricting the domains of various operators. (Kratzer, 1986, p. 656, my emphasis)

And indeed, a conciliatory line is taken by Rothschild (2020), as well as by Stalnaker (2014, p. 180), who writes:

There is no conflict between the Kratzer-style analyses and the kind of formal semantic analysis that I and David Lewis proposed for conditionals. Those analyses are not guilty of a “syntactic mistake” since they make no claim about the syntax of any natural language. . . I don’t want to suggest that Kratzer would disagree with the distinction I am making here, or that she intended a serious criticism of the kind of semantic account that Lewis and I gave.

I think this conciliatory line is wrong: there is more of a conflict between the Stalnaker/Lewis approach and the Kratzer restrictor approach than there first appears, even when we focus solely on semantic questions. In arguing for this, I will draw attention to an overlooked point of disagreement, and thus an exciting area for future work.

### 17.3.3 Kratzer’s restrictor theory

To develop this point, I will first say more about what Kratzer’s restrictor theory amounts to, remaining fairly informal throughout. There are different versions of the restrictor view in the literature; here I will follow



Kratzer 1981, 1991 in particular.<sup>17</sup> On this view (simplifying slightly in ways irrelevant to present purposes), the role of ‘if’-clauses is to add their prejacent to the modal base (the parameter which provides the background domain of quantification for modals). Let  $f$  be a modal base: a function which takes any world to a set of worlds. Then we have:

$$(14) \quad \llbracket \text{If } p, \text{ then } q \rrbracket^{f,w} = 1 \text{ iff } \llbracket q \rrbracket^{f^p,w} = 1$$

$f^p$  is the restriction of  $f$  to  $p$ : the smallest function such that for all worlds  $w$  :  $f^p(w) = f(w) \cap \llbracket p \rrbracket^f$ . We then assume that  $q$  contains a modal; if any part of  $q$  lies outside the scope of an overt modal, we assume a covert modal takes scope over the relevant part of  $q$ . Crucially, then,  $f^p$  will serve as the modal base for modals in  $q$ . Finally, a modal sentence like  $\llbracket [\text{Must}] p \rrbracket^{f,w}$  is true iff  $p$  is true in all the closest worlds to  $w$  in  $f(w)$ , according to a background function  $\preceq$  which takes any world to an ordering on worlds. So ‘If  $p$ , [must]  $q$ ’ is true at  $\langle f, \preceq, w \rangle$  iff all the closest worlds to  $w$  in  $f^p(w) = f(w) \cap \llbracket p \rrbracket^f$  are  $q$ -worlds—in other words, iff all the closest relevant  $p$ -worlds to  $w$  are  $q$ -worlds.

A direct motivation for Kratzer’s restrictor view comes from conditionals with overt modals, like ‘If you are going to England, you must bring an umbrella’ or ‘If it rained, the picnic might have been cancelled’. Since ‘if’-clauses, on the restrictor view, just restrict modal domains, the intuitive meanings of sentences like this fall out naturally.

### 17.3.4 Conditional Excluded Middle

So far, you might think that, as Stalnaker suggests, there really is nothing to choose between, from a *semantic* perspective, between the operator and restrictor theories. Before coming to my main point, let me start by giving you even more reason to believe this, by briefly considering the inference pattern known as *Conditional Excluded Middle (CEM)*, which says that disjunctions with the form ‘(If  $p$ ,  $q$ ) or (if  $p$ , not  $q$ )’ are logical truths. There is substantial intuitive evidence for *CEM* (see e.g. Stalnaker 1980a; Higginbotham 2003; Williams 2010; Klinedinst 2011; Cariani and Goldstein 2020; Cariani 2019; Mandelkern 2018; Santorio 2017; Dorr and Hawthorne 2018), but it famously conflicts with a different pattern which is also intuitive, namely *Duality*, which says that ‘If  $p$ ,  $q$ ’ and ‘If  $p$ , might not  $q$ ’ are contradictory (Lewis, 1973b). If

<sup>17</sup> This approach is elaborated in slightly different directions in von Stechow 1994; Kratzer 2020a. And this approach differs subtly from the exposition in Kratzer 1986; see Schulz 2009 for helpful discussion.

both *CEM* and *Duality* were true, then ‘If p, might q’ would entail ‘If p, q’, contrary to fact. (There are interesting parallels here, brought out by Santorio (2017), to the situation with epistemic modals that we explored above.)

The Stalnaker/Lewis theories crosscut *CEM*: it is validated by Stalnaker’s theory but not Lewis’s. For Stalnaker assumes that, for any  $p$ , there is a unique closest  $p$ -world if there is any accessible  $p$ -world. Since the closest  $p$ -world will either be a  $q$  or  $\bar{q}$ -world, at least one of ‘If p, q’ or ‘If p, not q’ will always be true. By contrast, Lewis does not assume that, for any  $p$ , there is a unique closest  $p$ -world if there are any accessible  $p$ -worlds; instead, conditionals quantify universally over a set of closest  $p$ -worlds. That set could include both  $q$ - and  $\bar{q}$ -worlds, in which case neither ‘If p, q’ nor ‘If p, not q’ is true.

Where does the restrictor view fall on this question? Apparently on the side of *Duality*. For the standard assumption is that the covert modal in ‘bare’ conditionals is a ‘must’; since ‘might’ is the dual of ‘must’, *Duality* falls out immediately, and *CEM* is invalid, since ‘must’ obviously quantifies over a set of worlds, rather than talking about a single world. But this assumption is not forced on us. As Cariani and Santorio (2018); Kratzer (2020a); Mandelkern (2018); Cariani (2019) explore, we could instead say that bare conditionals have a covert “selection” modal that selects the closest world in the modal base to the starting world. If we do that, then we validate *CEM* after all.<sup>18</sup>

This brings out the flexibility of the restrictor view, and illustrates why one might think that, indeed, it represents a semantically non-committal assumption about the syntax-semantics interface.

### 17.3.5 Logical divergences

And indeed, as long as  $p$  and  $q$  themselves do not contain modals or conditionals, the predictions of Kratzer’s theory about a sentence with the form ‘If p, [must] q’ closely match the predictions of Lewis’s theory about sentences of the form ‘If p, q’;<sup>19</sup> assuming a covert selection modal instead of ‘[must]’, the predictions match Stalnaker’s theory.

<sup>18</sup> This move would also help account for observed divergences between ‘If p, q’ and ‘If p, must q’, on which see Rothschild 2013 (citing Benjamin Spector). This issue, in turn, is closely related to questions about the difference between  $p$  and ‘Must p’ in general, on which see Karttunen 1972; von Stechow and Gillies 2010; Ninan 2014; Lassiter 2016; Goodhue 2017; Ippolito 2018; Mandelkern 2019c; see also Diti Bhadra’s chapter on evidentiality.

<sup>19</sup> See Lewis 1981. More precisely, the match is precise if we assess the conditionals relative to the same kind of background ordering; Kratzer in fact makes slightly

But when we turn to complex conditionals—conditionals whose antecedents or consequents themselves contain conditionals—Kratzer’s restrictor theory diverges in deep ways from the Stalnaker/Lewis theory. To see this, consider a sentence like (15):

- (15) If John had come, then if Mary had come, then it would have been a real mess.

(15) has the superficial form ‘If  $p$ , then if  $q$ , then  $r$ ’. On the restrictor theory, this will naturally get the logical form ‘If  $p$ , then if  $q$ , then  $\text{MODAL}(r)$ ’; and that, in turn, will be equivalent to ‘If  $p$  and  $q$ , then  $\text{MODAL}(r)$ ’, since the successive conditional antecedents each restrict the same modal.<sup>20</sup>

By contrast, the Stalnaker/Lewis theories do not validate this *Import-Export* equivalence: if the closest  $q$ -world from the closest  $p$ -world is an  $r$ -world, it does not follow that the closest  $pq$ -world is an  $r$ -world. So (15) could be true while ‘If John had come and Mary had come, it would have been a real mess’ is false, and vice versa. On the other hand, Stalnaker/Lewis theories validate *Modus Ponens*, while restrictor theories do not. *Modus Ponens* says that ‘If  $p$ ,  $q$ ’, together with  $p$ , entails  $q$ . On the Stalnaker/Lewis theory, if the closest  $p$ -worlds to  $w$  are all  $q$ -worlds and  $p$  is true at  $w$ , then  $q$  must be true there as well. But *Modus Ponens* is not validated by the restrictor theory, as Khoo (2013) discusses. For instance, ‘If  $p$ , then if not  $p$ , then  $q$ ’ will be trivially true on the restrictor theory, when  $p$  is not modal or conditional: assuming it has the logical form ‘If  $p$ , then if not  $p$ , then  $\text{MODAL}(q)$ ’, both of the antecedents will restrict the same modal, and so the modal base will be empty. But it is easy to see that ‘If not  $p$ , then  $\text{MODAL}(q)$ ’ can be false even if  $p$  is true.

So the restrictor theory and the Stalnaker/Lewis theory come down on different sides of *Import-Export* and *Modus Ponens*. And this divergence does not depend on the choice of covert modal in the restrictor theory:

weaker assumptions than Lewis about that ordering (see Boylan and Schultheis (2019)), but this is, again, independent from the choice of underlying framework.

<sup>20</sup> Assuming that  $p$  and  $q$  remain conditional-free; see Khoo and Mandelkern 2019; Mandelkern 2020c for the case where they don’t. It is difficult to make generalizations about the logic of the restrictor theory: to be stated rigorously, any such generalizations would need a full translation schema between sentences of natural language and logical forms (i.e., one which tells us where to put covert modals; see Rothschild 2020 for the beginnings of such a schema). So the claim is not that the restrictor theory validates *Import-Export* in full, but rather that it validates equivalences in the simple instances where  $p$  and  $q$  are conditional-free.

it is an architectural difference, and it shows that the restrictor theory is semantically committal after all.

There is a case to be made for the validity of each. While philosophers have tended to assume that *Modus Ponens* is valid, McGee (1985) makes a fascinating case against it, and in favor of *Import-Export*. I will not explore or assess those arguments; my aim is merely to highlight a fundamental logical difference between the two approaches.

In fact, the differences run even deeper than this: not only do the Kratzer and Stalnaker/Lewis views diverge on *Import-Export* vs. *Modus Ponens*, they also disagree about the *Identity* principle, which says that conditionals of the form ‘If p, then p’ are logically true. Arló-Costa and Egré (2016) call this principle ‘constitutive of the very notion of conditional’, and it has come in for very little explicit criticism.<sup>21</sup> But, while *Identity* is validated by the Stalnaker/Lewis theory, it is, intriguingly, not validated by the restrictor theory. The reason for this brings out a central contrast between the two approaches. On the restrictor theory, the interpretation of conditionals depends on the modal base; and the modal base can change, within a sentence, depending on the presence or absence of conditional antecedents. Now suppose that p itself contains a conditional. Then in the sentence ‘If p, then p’, the second occurrence of p will be evaluated relative to a different modal base than the first, meaning that it can express a different proposition than the first.

More concretely, consider a sentence with the form ‘If (a, and not(if b, then a)), then (a, and not(if b, then a))’. This sentence has the form ‘If p, then p’. *Identity* thus predicts that it will always be true. On the restrictor theory, this will have a form along the lines ‘If (a, and not(if b, then [MODAL](a)), then [MODAL](a, and not(if b, then [MODAL](a)))’. The modal base of the third modal will be restricted by the whole conditional’s antecedent, which entails a; and so the embedded conditional ‘not(if b, then [MODAL](a))’ will never be (nontrivially) true relative to this updated modal base; meaning the whole conditional can never be non-trivially true. (See Mandelkern 2021a for further discussion: there, extending results of Dale 1974, 1979; Gibbard 1981, I show that the failure of *Identity* will follow almost immediately for any theory that validates *Import-Export*.)

So the two approaches under discussion diverge, not just with respect to *Import-Export* versus *Modus Ponens*, but also with respect to the

<sup>21</sup> The most famous exception comes from Sextus Empiricus’s ‘emphasis’ account, which invalidates *Identity* (*PH 2.112*). See Weiss 2019 for a recent attempt to reconstruct that theory.

arguably more fundamental *Identity* principle. Again, I will not try to take sides here; my goal is rather to argue that the restrictor theory is semantically committal. There are real choices to be made here.

Given the extent of existing work on the conditional, it would be natural to think that all the interesting work has already been done. I hope this discussion brings out the degree to which many interesting issues remain open. And I have, of course, just brushed the surface of one active debate. To give just a few more examples (with, in turn, just a few references), recent work has brought out intriguing facts about the interaction of conditionals and attitude predicates (Drucker, 2017; Pasternak, 2018; Blumberg and Holguín, 2019; von Fintel and Pasternak, 2020); the alternative-sensitivity of conditionals, and their interactions with infinities (Fine, 2012a,b; Santorio, 2018; Ciardelli et al., 2018; Bacon, 2020); the relation between the semantics of conditionals, knowledge, and the evolution of conversations (von Fintel, 2001; Gillies, 2007; Williams, 2008; Moss, 2012; Lewis, 2018; Holguín, 2020b); the relation between conditionals and iteration principles in the logic of knowledge (Dorst, 2020; Holguín, 2020a; Boylan and Schultheis, 2020); conditionals and semantic paradoxes (Field, 2014, 2016), the probability of conditionals (McGee, 2000; Kaufmann, 2004, 2009; Williams, 2012; Bradley, 2012; Rothschild, 2013; Moss, 2013b; Bacon, 2015; Charlow, 2015; Khoo, 2016; Schultz, 2017; Schwarz, 2018; Khoo, 2019; Schultheis, 2020; Goldstein and Santorio, 2021); decision theory and conditionals (Stefánsson, 2015; Fusco, 2017; Bradley and Stefánsson, 2017); and tense, mood, aspect, and conditionals (Iatridou, 2000; Ippolito, 2003; Schulz, 2014; Biezma et al., 2013; Karawani, 2014; Romero, 2014; Martin, 2015; Khoo, 2015b; von Fintel and Iatridou, 2020).

## 17.4 Practical modality

In this final section, I will turn to a class of modals which I'll call *practical* modals. This class comprises, first, deontic modals—modals that communicate permissions, obligations, and requirements, as in (16):

- (16)
- a. You may have a cookie.
  - b. You should visit your grandmother.
  - c. John must stop cheating on his husband.

And, second, agentive modals: modals which ascribe abilities and compulsions, as in (17):

- (17) a. Dumbo can fly.  
b. I have to sneeze.

Anankastic modals, which represent something like conditional practical necessity, as in (18), are plausibly also in this class:

- (18) If you want to have a meeting, you have to give two weeks' notice.

Categorization here is controversial: one might think, for instance, that anankastic modals are just restricted compulsion modals. One might also think that agentive modals are just circumstantial modals: modals which say how things could or must go given local circumstances. There seems to be a difference, however, between the agentive (19-a) and the circumstantial (19-b):

- (19) a. Susie can hit the bullseye.  
b. It could be that Susie hit the bullseye.

If Susie is an untalented dart player, we may be disinclined to accept (19-a), whereas (19-b) still seems true, since of course she *could* hit a bullseye. In other words, (19-b) seems to say something about mere compatibility with local circumstances, while (19-a) says something stronger—something, intuitively, about Susie's abilities.

There is a related point in the neighborhood concerning deontic modals. While there are perfectly well-formed “impersonal” deontic modal claims, like ‘There have to be 50 chairs in the living room by 5 p.m.’ (Bhatt, 1998), it doesn't look like we can generally use deontic modals to simply describe preferable states of affairs which don't involve agents. For instance, suppose that your doctor tells you that you need to go running in the sun more. The best states of affairs, then, are ones where you run in the sun. However, while (20-a) seems true in this situation, (20-b) seems weird (on the intended deontic reading):

- (20) a. You should run more.  
b. It should be sunny more.

This raises an interesting possibility: perhaps practical modals always concern *actions*. This hypothesis would have both linguistic and philo-

sophical significance. It would suggest there is a distinction between modals which take propositions and those which take actions as complements, a distinction which maps onto a contrast between theoretical modality—claims about possibility, necessity, and conditionality—versus practical modality—claims involving ability, permission, and so on.

In Mandelkern et al. (2017), we develop this idea by arguing that ability ascriptions depend on an underlying representation of a set of actions which we treat as *practically available* to the relevant agent. Our aim there is to rehabilitate (in improved form) the classical conditional analysis of ability, which says that  $\lceil S \text{ can } q \rceil$  is true just in case  $S$  would do  $q$  if she tried to. This kind of theory has obvious appeal: for instance, our judgments about whether Susie can hit the bullseye seem to map neatly onto our judgments about whether she would, if she tried. In fact, it's natural to think the latter is rather unlikely, though not certainly false; and this seems true of the former, too. But, as is well known, this account faces some rather dramatic counterexamples; for instance, if you're going to a movie, you may be inclined to say you can't go to dinner with your friend—but of course, if you tried to go to dinner, you would have no trouble doing so (see Thomason 2005). These problems can be circumvented by relativizing the conditional analysis to a set of actions: we say that  $\lceil S \text{ can } q \rceil$  is true just in case there is an action  $A$  among the actions practically available to  $S$ , such that if  $S$  tried to do  $A$ ,  $S$  would do  $q$  (see Boylan 2020a for more recent developments).

Whether this strategy is successful depends on whether a principled account of practical availability can be given. We make some preliminary remarks about the notion in those papers, but there is much more work to be done here. Here I would like to draw out a connection to the high-level hypothesis that there is a distinctly practical kind of modality. The picture that results here is structurally reminiscent of theories of deontic modals put forward by Cariani et al. (2013); Cariani (2013), which make the evaluation of deontic modals depend on a partition of logical space—a partition that we can think of as a set of actions. Likewise, in Mandelkern and Phillips 2018, we use experimental results concerning order effects to argue that ascriptions of freedom and force similarly are built on domains of actions, not just possibilities. And all this, in turn, goes naturally with standard approaches in decision theory, which take for granted a background set of actions available to the agents. It seems plausible to me that there is a potential for unification across these domains: namely, all these models of practical

reasoning draw on the same core representation of practically available actions.

While I have emphasized here the distinctness of the class of practical modals, it is worth also noting here that, if our theory of agentive modality is correct, then at least that particular species of practical modality is intimately connected to our judgments about conditional facts. Along the same lines, Mandelkern and Phillips (2018) argue that the set of practically available actions is constrained by a theoretical representation of the causal structure of a given scenario (cf. Phillips and Cushman 2017; Phillips and Knobe 2018 for related work on the psychological representation of modality). Causal decision theory (Stalnaker, 1980b; Gibbard and Harper, 1981) likewise ties together practical modality—what one ought to do—with theoretical modality—what would happen if one did such-and-such.

Let me conclude this discussion by highlighting a puzzle about practical modality from Silk 2015, 2018; Mandelkern 2021b concerning orders.<sup>22</sup> We can use deontic modals to give orders; we can also use other constructions, like imperatives or performatives, which are presumably closely related:

- (21) a. You have to give me your cookie.  
 b. Give me your cookie!  
 c. I order you to give me your cookie!

An important fact about giving orders is that there is nothing wrong with giving an order when you aren't sure you will be obeyed. Susie could say any of (21-a)–(21-c) to John, knowing that John is very unlikely to part with his cookie. She might communicate this to an onlooker with a construction like one of the following:

- (22) a. He might not do it.  
 b. I'm not sure if he will give me his cookie.

The puzzle is that, in spite of this, there is something very weird about Susie telling *John* that he might not obey her at the same time that she is ordering him to give her the cookie:

- (23) a. #You have to give me your last cookie, but you might not.  
 b. #Give me your last cookie! I'm not sure if you will.  
 c. #I order you to give me your last cookie, but you might not.

<sup>22</sup> See Ninan 2005 for a slightly different but plausibly related puzzle.



The weirdness can be brought out if we contrast variants which are not used to give orders, like weak deontic modals or verbs of desire:

- (24) a. You should give me your last cookie, but you might not.  
 b. I want you to give me your last cookie, but I don't know if you will.

Sentences which both give an order and express uncertainty about whether it will be carried out (which I call *practical Moore sentences*) are generally infelicitous. But this is puzzling: if there's nothing wrong with giving an order while being unsure whether it will be carried out, what is wrong with giving an order and simultaneously saying that it might not be carried out? One thing that I want to point out here is that it's not clear what *kind* of puzzle this is. Is it a puzzle about the semantics of deontic modals, imperatives, and performative sentences? About the speech act of ordering? Or about the moral psychology of ordering? Or all of these, or something else? In Mandelkern 2021b, I argue that these sentences reveal a surprising norm on ordering: namely, in giving an order, you must act towards your orderee as though they will obey you. If this is correct, it might be revealing about the structure of conversational norms more generally; whether or not this is correct, this is an area where further exploration is clearly needed.

## 17.5 Conclusion

I have focused on a handful of puzzles concerning epistemic modals, conditionals, and practical modals, respectively. I have just brushed the surface of a rich and enormous literature, and I have done so in a necessarily idiosyncratic and autobiographical way. By delving into the details of these few topics, I hope to have said enough to show how much interesting work has been and remains to be done here by both philosophers and linguists.

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