

# CONTENT IN A DYNAMIC CONTEXT\*

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## Abstract

The standing tradition in theorizing about meaning, since at least Frege (1892), identifies meaning with propositions, which are, or determine, the truth-conditions of a sentence in a context. But a recent trend has advocated a departure from this tradition: in particular, it has been argued that modal claims do not express standard propositional contents. This non-propositionalism has received different implementations in expressivist semantics (Moss, 2015; Swanson, 2006; Yalcin, 2007) and certain kinds of dynamic semantics (Gillies, 2004, 2010; von Fintel and Gillies, 2007; Veltman, 1985, 1996). They maintain that the key aspect of interpretation of modal claims is the characteristic dynamic effect they have on the context. I argue that pessimism about truth-conditions arises from an overly simplistic picture of content, context and their interaction. While I agree with the critics that an important aspect of modal meaning is the dynamic effect modals have on the context, I argue that they have mischaracterized the nature and the complexity of this effect. A more nuanced account of the interaction between modals and context shows that far from being incompatible with propositional meaning, the dynamic aspect of meaning is precisely what allows us to predict the correct propositional content of an utterance.

## 1 Introduction

The standing tradition in theorizing about meaning, since at least Frege (1892, 1918), identifies meaning with propositions, where a proposition is, or at least determines, the truth-conditions of

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\*Acknowledgment:

a given sentence in a context. A recent trend, however, urges a departure from this tradition. Certain puzzling behavior of modal vocabulary has drawn critics to propose revisionary, non-truth-conditional accounts of meaning of utterances containing modal expressions, according to which, modal claims do not express propositions, and hence, do not represent the world as being a certain way, in the way ordinary non-modal ones do. I shall call this view *non-propositionalism*. It has received different implementations in expressivist semantics (Moss, 2015; Swanson, 2006; Yalcin, 2007) and certain kinds of dynamic update semantics (Gillies, 2010, 2004; von Fintel and Gillies, 2007; Veltman, 1985).<sup>1</sup> Though these semantics differ importantly, they all deny that modal claims express propositional contents. Instead, they hold that the key to the meaning of a modal is its characteristic effect on a conversational context. Let us say that this characteristic effect constitutes the *dynamic aspect of meaning*. Then, non-propositionalists maintain that modal claims do not express propositions, but that their meaning is exhausted by this dynamic aspect of meaning.<sup>2</sup>

The departure from tradition is radical. Propositions, or truth-conditions, are traditionally taken to play several fundamental roles. For one, they are taken to be what we assert and believe. When I say ‘It is raining’, in a normal context I will have expressed that it is raining, and my utterance will have been true just in case it is raining.<sup>3</sup> Moreover, if you take me to be sincere and reliable, you will likely come to believe that it is raining. This belief in turn can play an action-guiding role; for instance, you might decide to bring an umbrella. This is because my assertion and your belief represent the world to be a certain way. Denying that modal claims express propositions, in turn, implies that, for a bulk of natural language claims, assertion involves something different than expressing a proposition. When I say ‘It might be raining’, I do not express the proposition that represents the world to be a certain way, e.g., to be such that in it it might be raining. According to non-propositionalists, rather, I am merely expressing that I am in a mental state which does not rule out raining. Even if you take me to be sincere and reliable, and you accept what I said, you will not thereby come to believe some proposition that is representing the world to be such that in it, it might be raining. Rather, you will coordinate your mental state with mine, so that, now, you too are leaving open that the possibility of raining.<sup>4</sup>

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<sup>1</sup>Another type of non-propositionalism we find in various versions of relativist semantics (Egan, 2007; MacFarlane, 2014; Kolodny and MacFarlane, 2010). Insofar as similar data have been invoked to motivate relativism, on the one hand, and expressivism and update semantics, on the other, my case against the latter will carry over against the former as well. I do not discuss relativism directly here, however, since such a semantics, though not propositional, is not best described as non-representational, and it is in principle possible to recover propositional content(s) from relativists’ semantic contents. Moreover, such accounts tend to focus less on the dynamic aspect of meaning that expressivists and update semanticists tout.

<sup>2</sup>In dynamic semantics, the dynamic aspect of meaning goes by the name of *context-change potential*. I stick with the neutral term since, as we shall see, how best to understand this dynamic effect, as well as whether it is best understood as *the meaning* of a modal claim, or rather as its pragmatic effect, is a matter of debate among proponents of the revisionary accounts. I shall return to this in what follows.

<sup>3</sup>Strictly speaking, I will have expressed the proposition *that it is raining at the time  $t$  and location  $l$* , where  $t$  and  $l$  are determined by the context. I shall omit this sensitivity to times and locations of the context for ease of the exposition, since it will not matter for our purposes.

<sup>4</sup>This is, in particular, a gloss on non-propositionalism that is prominent in expressivist accounts. See e.g. Yalcin

Moreover, abandoning propositionalism seems to require a revision of the standard understanding of pragmatic inference. Going back to Grice (1975), the content of an assertion—*what is said* by an utterance—is identified with its truth-conditional content; *what is said*, in turn, is the input to further pragmatic reasoning, playing a role in calculating conversational implicatures. But, if modal claims do not traffic in informational content—if they do not express propositions, or truth-conditions—there is nothing that *is said* by them, in Grice’s sense. Thus, those who deny propositionalism face at least a *prima facie* challenge to explain how such utterances can generate implicatures. For instance, under normal circumstances, if I tell you ‘I might eat some of the cookies’, I implicate that it is not the case that I might eat all of them. While a Gricean account would explain this by appealing to pragmatic inference that begins with the asserted content of my utterance—the proposition that I might eat all of the cookies—a denial of propositionalism would require a modification of this account to accommodate for the fact that the modal claim in question does not express any proposition to begin with.

Thus, a rejection of propositionalism calls for a rethinking of the nature of meaning, communication, assertion and belief. Of course, non-propositionalists are demanding, indeed, offering, a reconceptualization—this is the surprising philosophical import of their view. It might well be that one is required were it to turn out that non-propositionalism best fits our linguistic practice. But, so I shall argue, this is not the case.

While I concur that an important aspect of modal meaning is its dynamic effect on the context in which it is uttered, I shall argue this is but *one aspect* of modal meaning. In addition, modals express propositional contents. Revisionary accounts have misdiagnosed the nature and the complexity of the characteristic effects of modality on a context of utterance. Once we appreciate the nuanced way in which modals interact with context, we shall find that there is nothing particularly non-standard about modal discourse. In short, I shall argue, although the propositionalist is wrong to neglect the dynamic aspect of meaning, the non-propositionalist is also wrong to reduce modal meaning to this dynamic aspect alone.

I shall proceed as follows. First, in §2, I present key challenges for truth-conditional accounts of meaning. In §3, I sketch how non-propositionalists account for these data. I then go on to argue, in §4, that pessimism about the prospects of a truth-conditional account is a result of an overly simplistic understanding of the interaction between context and content, as well as one of how modals are interpreted in a context. In particular, I argue that the account developed in Stojnić (2016) naturally explains the data in question, while maintaining that modal vocabulary has ordinary truth-conditional content. This account, I argue in §5, sheds new light on how we should think about both semantic content, and the interplay between context and content.

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(2007).

## 2 Modality and Propositional Content

The traditional semantics for modal expressions treats them as quantifiers over possible worlds [Kratzer \(1977, 1981\)](#). Of course, this quantification is not unrestricted: a modal does not simply quantify over *all* possible worlds. When I say ‘It might be raining’, though ‘might’ is normally understood as an existential quantifier over possible worlds, I am not saying that there is at least one world out of *all possible ones* in which it is raining. It is normally assumed that the context of utterance restricts the domain of quantification for a modal. So, the modal is a quantifier over a contextually restricted domain of possible worlds.

The standard account, developed primarily in [Kratzer \(1977, 1981\)](#), treats modal claims, in a context, as expressing propositions. An utterance of ‘It might be raining’ is true in a world and a context, just in case there is at least one world in the (contextually restricted) domain of quantification of the modal ‘*might*’ in which it is raining. The utterance expresses the proposition corresponding to the set of worlds in which it is true.<sup>5</sup>

A growing number of authors challenge Kratzer’s account maintaining that modal utterances do not express propositions ([Veltman, 1985, 1996](#); [von Stechow and Gillies, 2007](#); [Gillies, 2004, 2010](#); [Moss, 2015](#); [Yalcin, 2007](#)). Rather, a modal is used exclusively to convey the speaker’s attitude about the prejacent proposition.<sup>6</sup> The main motivation for this shift derives from certain puzzling behavior of modals that seemingly evades standard truth-conditional treatments. To see what the problem is, consider the following example, due to [Yalcin \(2007\)](#):

- (1) If it is not raining and it might be raining, then I’m uninformed about the weather.
- (2) If it is not raining and the body of information *i* doesn’t rule raining out, then I’m uninformed about the weather.<sup>7</sup>

Since, on the standard account, ‘It might be raining’ means that the (contextually determined) body of information *i* does not rule out raining, the contextualist owes us an explanation of the stark contrast between (1) and (2). But whatever body *i* the context delivers, (2) is coherent, but its counterpart, (1), is not.<sup>8</sup> Call this the problem of *epistemic contradiction*.

<sup>5</sup>I shall adopt the standard terminology:  $\phi$  is the *prejacent* of the modal ‘*might*’ in ‘*might*  $\phi$ ’.

<sup>6</sup>This gloss on the communicative impact of a modal utterance is not explicit in all versions of non-propositionalism, but fits very naturally even with those types of non-propositionalist accounts that leave the story of what modal utterances communicate somewhat implicit.

<sup>7</sup>I modified Yalcin’s example slightly, in a way that makes his point fully general, i.e., not presupposing that the contextually determined body of information is the one corresponding to what is known by the speaker, or perhaps a group of conversational participants including the speaker.

<sup>8</sup>Suppose that the relevant body of information is just the set of worlds compatible with what the speaker knows. Then, clearly, both ‘it is not raining and it might be raining’ and ‘it is not raining and for all I know it is’ seem equally bad. One might try to explain this on pragmatic grounds—the content of such assertions undermines the epistemic grounds for those very assertions. But, as [Yalcin \(2007\)](#) points out, the problem is that only the sentence containing a modal continues to be problematic even when it is not asserted, but rather embedded in an antecedent of a conditional, or under a supposition operator. This suggests that ‘it is not raining and it might be raining’ is not

A related problem is illustrated with the following example from [Yalcin and Knobe \(2014\)](#):

**Fat Tony.**

Fat Tony is a mobster who has secretly planted highly compelling evidence of his murder at the docks. The evidence is discovered by the authorities, and word gets out about his apparent death. The next evening, from his safe house, Fat Tony watches a panel of experts on the news discussing the situation. Expert A has had a good look at the evidence found at the scene. ‘Fat Tony is dead,’ she says. Expert B also had a good look at the evidence, but her assessment is more cautious. ‘Fat Tony might be dead,’ B says.<sup>9</sup>

While the Expert A is clearly wrong—Fat Tony is not dead—it is far less clear what to say about Expert B. On the one hand, there is a sense in which we want to say that what she said is true; after all, Fat Tony planted very compelling evidence. On the other, it seems that Fat Tony can react to Expert B’s utterance with ‘That’s false’; after all, Fat Tony knows that he is alive, and so, that it is false that he might be dead. The standard account has to say that the context determines some body of information  $i$  that the modal ‘might’ in Expert B’s utterance is quantifying over. But which body could that be? It could be the information compatible with what Expert B knows, or perhaps with what Expert B and his interlocutors know. Or it could be the information compatible with the planted evidence. Or it could be the information compatible with what Fat Tony knows. The problem is the first three options would make Fat Tony’s reaction flat out false—after all, according to Expert B’s knowledge, the knowledge of those that have examined the evidence, and according to the planted evidence, he might be dead. The fourth option would render Expert B’s utterance flat out false—Fat Tony knows he is not dead. Moreover, it would make it mysterious how Expert B could even assert her utterance in the first place—what grounds does she have to assert a claim about Fat Tony’s body of knowledge?

In fact, [Yalcin and Knobe \(2014\)](#) report on the results of an experimental survey that suggests that in the examples like these, the intuitions about the truth or falsity are somewhat divided:<sup>10</sup> Subjects tend to disagree with the claim that what Expert B said is false (the disagreement is just worse than flat out disagreement), but they do not fully endorse that what Expert B said is true, either: the agreement with ‘What expert B said is true’ seems just better than ambivalence. So, while they were significantly more inclined to agree that the modal claim is true than to agree that it was false, there was still considerable ambiguity in the response.<sup>11</sup>

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merely pragmatically defective.

<sup>9</sup>Similar cases are discussed in the literature as the so-called ‘eavesdropper’ cases, because they involve at least one agent that is not a party to the conversation, but merely ‘eavesdropping’. See, e.g., [Egan, Hawthorne, and Weatherson \(2005\)](#); [Egan \(2007\)](#). The eavesdropper cases are a particularly challenging instance of the more general problem of disagreement. Cf. [MacFarlane \(2011, 2014\)](#); [von Stechow and Gillies \(2008, 2009\)](#).

<sup>10</sup>The subjects responded on a 7 point Likert scale, with 7 being ‘completely agree’, 1 being ‘completely disagree’ and 4 being ‘in between’.

<sup>11</sup>See also [Khoo \(2015\)](#) for more on experimental results regarding disagreement cases.

So, cases like **Fat Tony** and (1)–(2) seem to pose a problem for the standard truth-conditional account. These problematic cases show, critics maintain, that there is no systematic way of determining plausible truth-conditional content for a modal utterance in a context. Their diagnosis is simple: the reason why we witness this behavior is because modal utterances do not express such content. Against these criticisms, I shall argue that modal discourse expresses ordinary propositional content. But first, in §3, I sketch the key aspects of the non-propositionalist accounts.

### 3 Modals and Context-Change

Motivated by the data in §2, expressivist and dynamic update semanticists alike reject propositionism and instead adopt a dynamic approach to meaning. Though there are important differences between the two accounts, the key motivating ideas are similar. Both accounts start from a broadly Stalnakerian model of communication, according to which a conversation takes place against a *common ground*, the set of propositions interlocutors mutually accept for the purposes of the conversation.<sup>12</sup> The common ground in turn determines a context—the set of worlds compatible with all the propositions in the common ground.<sup>13</sup>

The context thus characterizes all the open possibilities with respect to what the world is like, given what we accept for the purposes of a conversation. As the discourse evolves, we acquire more information about the world (or what we take the world to be like for the purposes of our conversation), and as a result, the space of open possibilities shrinks. The effect of an assertion, in particular, is to narrow down the space of possibilities with respect to what the world is like. So, when I assert  $\phi$  against a context  $c$ , the effect of my assertion is to rule out worlds from  $c$  incompatible with the proposition that  $\phi$  expresses in  $c$ ; that is, to add the proposition expressed by  $\phi$  to the common ground, eliminating worlds in which this proposition does not hold from the context. The characteristic effect of an assertion is, thus, an addition of the asserted proposition to the common ground. If an assertion of  $p$  is successful, the interlocutors will coordinate on a particular attitude towards  $p$ —e.g., they will come to know, or believe, or accept for the purposes of the conversation, that  $p$ .

Non-propositionalists maintain that (i) the key aspect of meaning of an utterance is the characteristic effect it has on the common ground, and (ii) the effect of an utterance of a modal claim does not amount to asserting a particular propositional content, and thus, adding a proposition to the common ground.<sup>14</sup> Here is a way to motivate such an account. Given the notion of context we

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<sup>12</sup>See Stalnaker (1978, 2002, 2014).

<sup>13</sup>Formally, thinking of a proposition as a set of worlds, a context is just a set of worlds in the intersection of all the propositions in the common ground.

<sup>14</sup>I am simplifying somewhat. At least some of the non-propositionalists replace the Stalnakerian picture of context with a more complex structure, e.g., letting the context be a set of probability spaces, rather than worlds (Yalcin, 2007, 2012b). Such complications have to do with the treatment of probabilistic vocabulary, and are orthogonal to our main concern, so I omit further discussion in the interest of space. I just note that the account I defend here

began with, let us say that a sentence is true in a context  $c$  just in case an utterance of that sentence does not further change  $c$ .<sup>15</sup> This idea is intuitive. Suppose I assert that it is raining, against a context  $c$ . If successful, my assertion will add the proposition *that it is raining* to the common ground, in turn eliminating all the non-raining worlds from  $c$ ; it will thus become established that it is raining. So, learning (or accepting) that it is raining rules out all non-raining possibilities as the candidates for the actual world. But if there are no non-raining worlds in  $c$  to begin with—if it is already a part of the common ground that it is raining—then removing all non-raining worlds from  $c$  just leaves  $c$  as is. So, if ‘It is raining’ is true in a context  $c$ , then asserting that it is raining does not change  $c$ .

Given this notion of truth in a context, let us turn to modal claims. Consider what it would take for ‘It might rain’ to be true in a context. Having existential force, ‘It might rain’ requires that there is at least one raining world in the context. Suppose  $c$  does not rule out that it is raining. Then, there is no proposition you need to add to the common ground—i.e., no worlds you need to remove from  $c$ —so as to make ‘It might be raining’ true in  $c$ . It is already true in  $c$  just in virtue of  $c$  not ruling out raining.<sup>16</sup> Similarly, starting with a context  $c$  that already rules out raining, there is no proposition you can add to the common ground—worlds you can remove from  $c$ —to make it the case that ‘It might be raining’ is true in thusly changed  $c$ .<sup>17</sup> So, unlike the effect of a non-modal utterance, which adds a proposition asserted by the utterance to the common ground, the effect of a ‘*might*’ claim is to *test* it for compatibility with the prejacent. A successful assertion of ‘*might p*’ is not to coordinate on a particular attitude towards the proposition that *might p*, for there is none. It is rather to coordinate on a particular attitude towards the prejacent proposition, namely, leaving open that  $p$ . This is reflected in the common ground—to say that ‘*might p*’ is true in a context  $c$  is just to deny that *not p* is a part of the common ground—the context does not rule out  $p$ . Accordingly, non-propositionalists maintain modal claims do not express propositional content. Instead, they propose that the key aspect of meaning is the effect an utterance has on the context. The ways in which dynamic update semanticists and expressivists cash out this proposal somewhat differ, so it will be useful to sketch and compare them. I start with dynamic update semantics.<sup>18</sup>

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straightforwardly captures the behavior of probabilistic modals as well. For details see Stojnić (2016).

<sup>15</sup>This notion of truth in a context comes from dynamic update semantics (Veltman, 1996; von Fintel and Gillies, 2007; Gillies, 2010). Notice that Veltman (1996) defines this notion as a notion of *acceptance*, rather than truth. The notion is closely related to Yalcin (2007) notion of *acceptance*, which we will return to below, as Yalcin’s account is drawing on Veltman’s.

<sup>16</sup>Note also that the context itself need *not* be a set of worlds in which it is true that it might be raining—a set of worlds such that there is some raining world accessible from each of them. So, a context which does not rule out raining does not thereby correspond to the proposition that it might rain, either.

<sup>17</sup>Of course, save from eliminating all the worlds from the context, thus leaving us in an absurd state that supports everything. Note that it is also possible to *accommodate*—to change the context in the face of infelicity—by expanding it to include some raining worlds. But this does not amount to adding a proposition, let alone the proposition *that it might rain*, to the common ground. Rather, it involves removing some propositions, at the very least the proposition *that it isn’t raining*, from the common ground, thus expanding the context to include some raining worlds.

<sup>18</sup>I shall omit formal details since the general sketch of the framework will suffice for our purposes. For the formal implementation of dynamic update semantics, see e.g. Veltman (1985, 1996); von Fintel and Gillies (2007). For the

Dynamic update semantics proposes we take the effect that an utterance has on a context as its *semantic content*: a sentence  $s$  is interpreted as a function that takes a context  $c$  and delivers a context  $c'$  that results from  $c$  after  $s$  is uttered. This function captures the characteristic context-change an utterance of  $s$  brings about. The dynamic notion of truth corresponds to the one defined above—a sentence is true in  $c$ , if updating with it does not further change  $c$ . When an utterance does not contain modal expressions it is easy to extract propositional content from these ‘dynamic meanings’, for reasons we have already seen: updating with  $\phi$  just amounts to adding the proposition expressed by  $\phi$  to the common ground.<sup>19</sup> So, dynamic update semantics for a non-modal fragment is obviously not a radical departure from the standard propositionalist account.<sup>20</sup>

However, things are radically different when it comes to modal claims. ‘It might be raining’, is interpreted, again, as a function that takes a context and returns a context, but one that merely tests the context to check if the prejacent is compatible with it: if it is, the context is returned as is (and hence, the modal claim is true in it); otherwise, the context is simply reduced to an absurd state,  $\emptyset$ . What’s noteworthy is that we can no longer extract the propositional meaning of a modal claim from its dynamic meaning. Since dynamic meanings of modals are merely testing whether the context as a whole has a certain property or not, they are not reducible to adding some proposition to the common ground, i.e. to narrowing down the space of open possibilities.<sup>21</sup> So, the dynamic

formal details of the expressivist account, see [Yalcin \(2007\)](#).

<sup>19</sup>Formally, this means that the dynamic meanings—updates to the context—for a non-modal fragment are *intersective*: updating the context  $c$  with  $\phi$ , where  $\phi$  is a non-modal claim, amounts to intersecting  $c$  with a proposition expressed by  $\phi$ .

<sup>20</sup>That such dynamic update semantics for a non-modal fragment of English reduces to a static system in which utterances add propositions to the common ground follows from a formal result due to [van Benthem \(1986\)](#), which establishes that any such reduction holds just in case, for all updates, the following two properties hold:

- *Eliminativity*: An update is eliminative just in case it always proceeds by (at most) eliminating worlds from  $c$ —starting from a context  $c$ , an update will always deliver a subset of  $c$ . Taking a propositional fragment of English, closed under negation and conjunction, where atomic sentences are interpreted as propositional constants, let  $[[\phi]]$  be the update function associated with a sentence  $\phi$ , and using standard prefix notation, let us write ‘ $c[[\phi]]$ ’, where the context  $c$  is an argument to the function  $[[\phi]]$ . Then eliminativity is defined as follows:

$$c[[\phi]] \subseteq c, \text{ for all } c \text{ and } \phi.$$

- *Distributivity*: For any update,  $u$ , the context obtained by updating  $c$  with  $u$  could be obtained by updating singleton subsets of  $c$  with  $u$ , and then taking a union of the results. Formally:

$$c[[\phi]] = \bigcup_{w \in c} \{w\}[[\phi]]$$

An update that is *Eliminative* and *Distributive* is also *Intersective*, which just means that it amounts to intersecting the context with a proposition, i.e. to adding a proposition to the common ground:

*Intersective Update*:  $c[[\phi]] = c \cap W[[\phi]]$ , where  $W$  is the set of all possible worlds.

For more on the relation between van Benthem’s result and its relation to truth-conditionality, see e.g., [von Fintel and Gillies \(2007\)](#) and [Rotschild and Yalcin \(2015, 2016\)](#).

<sup>21</sup>Formally, this is because, due to its test behavior, a modal claim is sensitive to the properties of the context as a whole, where these properties need not carry over to each singleton subset of the context. That is, an update with a ‘*might*’ claim violates distributivity. To see the failure of distributivity, consider the following counterexample from [von Fintel and Gillies \(2007\)](#). Suppose the context  $c$  has only two worlds, one in which the proposition  $p$  is true (say,  $w_1$ ), and one in which it is false (say,  $w_2$ ). Then, since  $c$  contains at least one  $p$ -world, the update with ‘*might p*’

meaning of ‘*might p*’ is not merely superficially dynamic. This is just to say that a ‘*might*’ claim does not express an ordinary proposition that gets added to the context by intersection.

One might wonder, of course, whether one could still understand this account as propositionalist. In particular, since an output of an update is a context, which itself is a set of worlds, i.e. a proposition, isn’t it the case that this account still delivers a proposition that can be recovered as the meaning of a modal claim? While the context can be understood as a proposition, it is not suited to play the role of a proposition expressed by a modal claim in any plausible sense. First, notice that an update with a modal claim, say, ‘*might p*’, will either return the whole context, or an empty set, depending on whether the prejacent is compatible with the common ground or not. But neither of these propositions—the absurd proposition, or the whole context—corresponds to the set of worlds in which *might p* is true; that is, neither of these is in any plausible sense the proposition expressed by ‘*might p*’. Even worse, notice that on this account an update with both ‘*might p*’ and ‘*must p*’ outputs either the empty set or the whole context. But then, ‘*might p*’ and ‘*must p*’ can both express only one of the two propositions relative to a context set  $c$ : namely,  $c$  or  $\emptyset$ . This, indeed, is extremely implausible as an account of the propositional meaning expressed by modal claims.<sup>22</sup>

Now, let us turn to expressivism. According to expressivism, the primary goal of a conversation is to coordinate interlocutors’ mental states.<sup>23</sup> The Stalnakerian common ground is a reflection of this coordination. The common ground supervenes on the collective attitudes of the speakers; it is a collection of propositions that the interlocutors mutually believe, know or accept (for the purposes of a conversation).<sup>24</sup> While, as before, an assertion of a non-modal claim is a proposal to add a particular proposition to the common ground—to make it common knowledge that the interlocutors all accept it for the purposes of a conversation—an utterance of a modal claim is not a proposal to add a proposition to the common ground. Rather, it is a proposal to strike a particular attitude towards the *prejacent* proposition: for instance, an utterance of ‘*might p*’ is a proposal to leave open the possibility that  $p$ . If the interlocutors successfully coordinate on this attitude—if it is common knowledge that they are all leaving open the possibility that  $p$ —then the common ground will not rule out  $p$ ; this means that the context will have to have a certain property, namely, being

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returns  $c$  as is, i.e.,  $\{w_1, w_2\}$ . But, if we update each singleton subset individually with ‘*might p*’, and then take the aggregate of the results, we will not get  $\{w_1, w_2\}$ , but  $\{w_1\}$  since only  $\{w_1\}$  will pass the test,  $\bigcup_{w \in c} \{w\} \llbracket p \rrbracket = \{w_1\}$ . So, the update associated with *might p* is not distributive, and hence, it is not intersective.

<sup>22</sup>*Must p* tests the context to see if all the worlds in  $c$  are  $p$  worlds: if so it returns  $c$ ; if not, it returns the empty set. Now if  $c$  contains only  $p$  worlds, then updates with ‘*might p*’ and ‘*must p*’ will both return  $c$ , and if  $c$  contains only  $\neg p$  worlds, or is empty, then updates with ‘*might p*’ and ‘*must p*’ will both return  $\emptyset$ . But we wouldn’t want to say that relative to such contexts, they express the same proposition. If  $c$  contains some  $p$  and some  $\neg p$  worlds, then an update with ‘*might p*’ will return  $c$  and the one with ‘*must p*’ will return  $\emptyset$ : but of course, neither of these two propositions correspond to the proposition *that might p* or *that must p*.

<sup>23</sup>In the exposition I shall follow Yalcin (2007). For related accounts, see e.g. Charlow (2015); Moss (2015); Starr (2016); Swanson (2006).

<sup>24</sup>As I mentioned above, I am simplifying somewhat; Yalcin (2007, 2012a) argues for a version of expressivism that employs a more complex notion of context, one which comprises probability spaces, rather than worlds; for the reasons mentioned above, this complexity is orthogonal to our present concern, so a simpler picture will suffice.

compatible with  $p$ . And, this means that the effect of the modal claim again is to test whether the context satisfies a particular property.

While dynamic semantics maintains that the compositional semantic content of a modal claim is the update function characterizing context-change, expressivists maintain it is a property of bodies of information (information states, for short):<sup>25</sup> an utterance of ‘It might be the case that  $p$ ’ expresses the property of being compatible with  $p$ . To make the key ideas behind expressivism more precise, it is instructive to compare it with the standard truth-conditional account. The standard account treats utterances as expressing ordinary propositional content in a context:  $\phi$  is true in a context  $c$ , at a world  $w$  just in case the proposition expressed by  $\phi$  at  $c$  holds in  $w$ . Expressivists, in turn, further relativize truth to an information state. For a non-modal language, this relativization has no effect: within a non-modal fragment, a sentence  $\phi$  is true in a context  $c$ , at a world  $w$  and an information state  $s$ , just in case the proposition expressed by  $\phi$  in  $c$  holds in  $w$ . The relativization to an information state is idle, and so, the propositional content can be easily recovered. But, once we turn to modals, things change, because the relativization to an information state is no longer idle: ‘*might*  $\phi$ ’ is true in a context  $c$ , at a world  $w$  and an information state  $s$ , just in case there is some world in  $s$  in which the proposition expressed by  $\phi$  in  $c$  is true. The information state serves as the domain of quantification for a modal operator. Crucially, expressivists deny that the context of utterance determines this information state. Otherwise, we could easily recover the propositional content by letting the context supply the value of the information state parameter. But the puzzling data in § 2 precisely show, expressivists maintain, that the context cannot play a role of supplying an information state in a way that would deliver plausible truth-conditions.<sup>26</sup> So, again, in a context, a modal claim does not express a proposition.<sup>27</sup>

The difference between dynamic update semantics and expressivism lies in the division between semantic and pragmatic labor. The dynamics of context-change for an expressivist is not a matter of the compositional semantic content of an utterance, but is rather a matter of the pragmatics of conversation. Expressivists hold that an utterance of ‘*might*  $p$ ’ invites the audience to leave open the possibility *that*  $p$ ; they successfully coordinate on this attitude when the context does not

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<sup>25</sup>An information state, like a context, is a set of worlds, in particular, a set of worlds compatible with certain information. For instance, Jane’s information state is the set of worlds compatible with what she knows or accepts.

<sup>26</sup>Note, for instance, that whichever body of information  $i$  context sets, there would still be a contrast of the type exhibited by (1) and (2). For example, all of the following, *inter alia*, are perfectly felicitous, whereas the counterpart (1) remains incoherent.

- (i) If it is not raining and for all our group knows it is, then we are uninformed about the weather.
- (ii) If it is not raining and for all I know it is, I’m uninformed about the weather.
- (iii) If it is not raining and given the salient body of information it is, then that body of information is uninformed.

<sup>27</sup>And for exactly the same reason discussed above, the context, or the information state, that results from an update with a modal utterance cannot be plausibly taken to be the propositional content expressed by the modal utterance.

rule out  $p$ . This is just to make the context satisfy the property that the compositional semantics assigns to ‘*might p*’. So, as Yalcin (2007) puts it, in uttering ‘*might p*’, the speaker is proposing to make the context satisfy (or make explicit that it satisfies) the property of being compatible with  $p$ . Adopting expressivist terminology (Yalcin, 2007), let us say that an information state  $s$  *accepts* a sentence  $\phi$  just in case  $\forall w \in s: \llbracket \phi \rrbracket^{c,w,s} = 1$ .<sup>28</sup> Then an utterance of ‘*might p*’ is a proposal to make ‘*might p*’ accepted in the context, in this sense; i.e. it is the proposal to make the context set satisfy the property that the semantics assigns to ‘*might p*’.<sup>29</sup>

In sum, both expressivist and dynamic update semantics treat modals as posing conditions on information states, and both agree that the effect of a modal claim is to test whether the context satisfies this condition. They differ insofar as the dynamic approach takes this characteristic effect of a modal claim on context to be the semantic content of a modal utterance, while the expressivist takes it to be part of the pragmatics of conversation. Crucially, on neither approach is the semantic content of a modal reducible to a proposition. Nor is, on either of the accounts, a proposition expressed or asserted by an utterance of a modal claim. And both approaches maintain that the dynamic effect is the key aspect of the meaning of modal discourse.

Returning to the contrast between (1) and (2) (repeated below), in order to see how dynamic update semantics and expressivism capture it, we need to say how both accounts interpret conditionals:

- (1) If it is not raining and it might be raining, then I’m uninformed about the weather.
- (2) If it is not raining and the body of information  $i$  doesn’t rule raining out, then I’m uninformed about the weather.

On the dynamic update semantics approach, a conditional ‘*if p, q*’ is true in  $c$ , just in case ‘ $q$ ’ is true in  $c$  hypothetically updated with ‘ $p$ ’. The expressivist account endorses a corresponding non-dynamic interpretation: a conditional hypothetically shifts an information state parameter  $s$  to the maximal non-empty subset of  $s$  that accepts the antecedent, and checks whether this state accepts the consequent as well. The conditional is true (relative to a context, a world, and the original information state  $s$ ) just in case it does.

Given this, the dynamic and expressivist accounts can provide very similar explanations of the contrast between (1) and (2). On the dynamic account, hypothetically updating a context  $c$  with ‘It is not raining and it might be raining’, requires first updating  $c$  with ‘it is not raining’ and then updating the resulting context with ‘it might be raining’. ‘It is not raining’ eliminates all the raining worlds from  $c$ . ‘It might be raining’ tests so updated context  $c$  requiring that it is compatible with

<sup>28</sup> $\llbracket \cdot \rrbracket$  is a function that maps a sentence, context, world and an information state to a truth-value.

<sup>29</sup>Note that an expressivist does not maintain that the informational content, what’s expressed by an utterance of ‘*might p*’, is its semantic content. Rather, an utterance of ‘*might p*’ is not even in the business of expressing informational content: it merely invites the interlocutors to coordinate on a particular attitude towards  $p$ .

it raining. But since there are no remaining raining worlds in  $c$ , this test fails, and we get an absurd state,  $\emptyset$ . The conditional requires us to hypothetically entertain a possibility that does not hold in any non-absurd state. By contrast, there are non-absurd information states in which it holds that it is not raining, but that the relevant body of information  $i$  is compatible with raining. Hence, the contrast between (1) and (2).

An expressivist offers a similar explanation. The conditional in (1) requires us to hypothetically shift an information state  $s$  to a maximal subset of  $s$  that accepts the antecedent—‘It is not raining and it might be’. But there is no (non-empty) state that accepts this. ‘It is not raining’ is accepted at an information state  $s$  just in case all the worlds in  $s$  are non-raining ones. But, an information state accepts ‘It might be raining’, just in case there is a raining world in  $s$ . So, there is no non-absurd state that accepts the conjunction, because the two conjuncts pose contradictory conditions on an information state: there is no non-empty  $s$  such that all the worlds in it are non-raining ones, yet it contains a raining world. This is why it is infelicitous to hypothetically suppose that it isn’t raining, but it might be. And this explains why (1) is infelicitous. Meanwhile, there are some non-empty states that accept ‘it is not raining, and the relevant body of information  $i$  doesn’t rule out raining’; hence, the contrast with (2).

Both accounts can also explain the mixed intuitions about the **Fat Tony** case. Both claim that a modal utterance expresses a proposal to update an information state in a particular way. Then, Fat Tony’s reaction is merely a refusal to go along with the update proposed by Expert B, presumably, since he knows he is alive.<sup>30</sup> Intuitively, Fat Tony fails to coordinate his mental state with Expert B and the panel members, because his information state rules out his death. Hence, he doesn’t endorse the attitude that leaves open the possibility that he is dead, and hence, he rejects Expert B’s assertion. Meanwhile, Expert B’s utterance can be accepted in the conversational setting involving her and the expert panel (the one that does not include Fat Tony): if it is mutual knowledge that Expert B and the members of the panel (have come to) have the appropriate attitude, it will become common ground that they are all leaving open the possibility that Fat Tony is dead. Hence, they will endorse the modal claim.<sup>31</sup>

So far, so good for the non-propositionalists. However, as I shall argue, these accounts do not adequately capture the interaction between context and modal vocabulary. A host of other data suggests a more nuanced picture of how modals interact with context. I argue that the behavior of modals in context favors the account originally developed in Stojnić (2016), which in turn preserves the idea that modals express ordinary propositional content. I start, in §4, by presenting the relevant data and arguing that they motivate a more nuanced account of the interaction between

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<sup>30</sup>Similarly, the reader, as an informed eavesdropper, when presented with **Fat Tony** case, might likewise reject Expert B’s claim, given that the reader knows that Fat Tony is alive. At the same time, the reader, as well as Fat Tony, might recognize that Expert B and her interlocutors can all accept her claim, given their limited knowledge. This, is in accordance with the mixed intuition pattern.

<sup>31</sup>For a further discussion, see Yalcin and Knobe (2014); Khoo (2015).

modals and context, than what both the non-propositionalists and even the standard contextualists assume.

## 4 Anaphora and Modality

The standard truth-conditional account subscribes to the following claim:

CONTENT IN CONTEXT: The context of an utterance determines its semantic content, which in turn is, or at least determines, the utterance’s truth-conditions.<sup>32</sup>

But the type of context-sensitivity a modal exhibits calls for a more nuanced view of how context affects interpretation. I want to suggest that modal expressions are sensitive to the prominence of information states in a discourse—their domain of quantification is restricted by the most prominent body of information. This means that modals exhibit a more flexible type of context-sensitivity than what has been assumed, because prominence is a parameter that changes as the discourse progresses. But, as we shall see, this type of context-sensitivity is also more constrained than what the traditional model assumes, because the changes in prominence are governed by linguistic rules.

To begin, note that how a modal is interpreted in a context depends often on the prior discourse.<sup>33</sup> This is clearly manifested in classic examples of modal subordination, as in (3), where a modal is interpreted relative to another one introduced earlier in a discourse:

- (3) A wolf might walk in. It would eat you first. (Roberts, 1989)

Such dependency on prior discourse suggests a picture according to which the context evolves as the discourse progresses. Whatever the context is in which the second sentence in (3) is uttered, it has to keep track of the fact that the previous utterance introduced the possibility of a wolf walking in, because the modal ‘*would*’ in the second sentence is interpreted relative to this possibility—*a wolf would eat you first, if one were to walk in*. Moreover, a dependent interpretation is possible even within a single sentence, as witnessed by the following examples:

- (4) There *may* be other 1961 state committee retirements come April 18, but they *will* be leaving by choice of the Republican voters.<sup>34</sup> (Stone, 1997)

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<sup>32</sup>CONTENT IN CONTEXT goes back at least to Kaplan (1989b). Context, on this picture, is thought to comprise all the relevant information for determining the semantic content of context-sensitive expressions. Thus, at the very least, a context has to contain information that helps determine the referent of indexicals (such as ‘I’, ‘you’, or ‘today’); and given other context sensitive expressions, it might have to include more features, relevant for these other context-sensitive expressions.

<sup>33</sup>This type of evidence for the idea that modals are interpreted relative to a prominent body of information, just as pronouns are interpreted relative to a prominent antecedent, has been used as the starting point for the account developed in Stojnić (2016). Some of the evidence is familiar from the literature on modal subordination (Roberts, 1989), but the extensive argument for the parallel between modals and pronouns is due to Stone (1997, 1999).

<sup>34</sup>Note that the example is replicated even if ‘*will*’ is replaced with ‘*would*’.

(5) If a wolf walks in, it would eat you.

Intuitively, in both (4) and (5), the modal that occurs earlier in the sentence introduces the possibility that affects the interpretation of the one later within the same sentence.

This kind of behavior is not restricted to modals. Notably, pronouns, too, are interpreted with respect to some antecedent either introduced earlier in the discourse, or given by the non-linguistic context, as witnessed by the examples of cross-sentential anaphora, and bound anaphora in (6) and (7), respectively:

(6) A man walked in. He sat down.

(7) Every woman believes that she's happy.

In fact, as argued by Stone (1997, 1999), modals and pronouns exhibit the same range of interpretive behavior. In addition to the kind of discourse and operator-bound readings we have seen, both modals and pronouns allow for so-called 'donkey anaphora' readings, as witnessed by (8) and (9):

(8) If a man owns a donkey, he beats it.

(9) If a submarine cannot self-destruct if an enemy captures it, the enemy will learn its secrets. (Stone, 1997)

Similarly, Stone (1997, 1999) points out, just as a pronoun can be used to refer to an individual that is salient within a non-linguistic context, a modal can be interpreted with respect to some possibility that is prominent within a non-linguistic context:

(10) (Referring to a certain significant female) She left me. (Partee, 1984)

(11) (Looking at a high-end stereo in an electronics store) My neighbors would kill me. (Stone, 1997)

And just as with the rest of the modal discourse, conditionals also exhibit anaphoric behavior, as witnessed by the following example:

(12) If a wolf walks in, it might attack. If John has a tranquilizer gun, he will shoot it. (Stojnić, 2016)

We said before that modals are naturally thought of as quantifiers over possible worlds. But 'would' in (3) is not quantifying over *all* possible worlds, or even all the epistemically accessible worlds. Rather, it is quantifying over those epistemically possible worlds in which a wolf walked in. In other words, the restriction on the domain of quantification of the modal '*would*' is provided by the prior discourse: the modal '*might*' in the first sentence introduces the possibility of a wolf

walking in, that restricts the domain of quantification for the subsequent ‘*would*’. Since the domain of quantification is just a set of worlds, we can think of the restrictor as a set of worlds—a proposition (in our example the restrictor is the proposition *that a wolf walks in*); the domain of quantification is then restricted by intersecting it with the restrictor proposition.<sup>35</sup> We can think of the context-sensitivity of a modal as retrieving the restrictor on the domain of quantification. The examples above show that, as is the case with an antecedent of a pronoun, the restrictor on the domain of quantification of a modal is anaphorically retrieved in a context, in the sense that it is either provided by a prior discourse, or by non-linguistic context.

But neither dynamic update, nor expressivist, semantics captures the anaphoric dependencies of the modals described in (3)–(11). In (3), on the dynamic update semantics, its first sentence merely tests the input context, *c*, checking whether it is compatible with the prejacent proposition; if the context passes this test, it is passed down as an input context for the second sentence. The second sentence tests this context again, requiring that in all the worlds in the context the wolf eats the addressee. But this delivers the intuitively wrong, unrestricted, reading: (3) expresses that a wolf would eat the addressee, were one to come in, not that it would eat the addressee come what may.<sup>36</sup> Similar problems arise for other examples above, all of which require that modals can introduce propositions into the discourse context, and that the context can keep track of those that were introduced earlier in the discourse, and use them to restrict the domain of quantification of subsequent modals. The standard dynamic update, and expressivist, account has no built-in resources that allow for this kind of bookkeeping.<sup>37</sup>

The same problem befalls the expressivist account. On this account, an utterance of the first sentence in (3) makes (it explicit that) the context leave(s) open the possibility that a wolf walks in. The second sentence, in turn, makes (it explicit that) the context entail(s) that it eats the addressee.<sup>38</sup> This again delivers an unrestricted reading: a wolf would eat the addressee come what may. The problem is the same as before—modals simply test whether the context satisfies a particular property. The account does not capture the idea that they can introduce propositions,

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<sup>35</sup>Cf. Stone (1997, 1999).

<sup>36</sup>Moreover, since the indefinite ‘a wolf’ is introduced within a hypothetical context, we would struggle to avoid reference failure for the pronoun ‘It’.

<sup>37</sup>Worse yet, note that non-propositionalists struggle to predict the following type of examples, as well:

- (i) If a wolf might walk in, we should hide.
- (ii) A wolf might walk in. We must hide.

Intuitively, ‘*should*’ in (i) is restricted by the proposition expressed by the antecedent, and similarly, ‘*ought*’ in (ii) is restricted by the proposition expressed by the first sentence; that is, both are restricted by the proposition that a wolf might walk in (given some prominent body of information). But on a non-propositionalist account there is no such proposition. The output of the update with ‘a wolf might walk in’ is not a proposition *that a wolf might walk in*, the proposition we need for the restriction of the subsequent modal. Nor is such a proposition recoverable from the output information state.

<sup>38</sup>Again, as before, the situation is even worse: as the indefinite is introduced within a hypothetical context, we face a challenge of avoiding reference failure for ‘It’.

which can in turn restrict the domain of subsequent modals.

The standard Kratzerian truth-conditional account does not capture the anaphoricity of modals (and conditionals) either. In particular, it does not allow for a modal to select a restriction from the prior discourse context.<sup>39</sup> However, the standard account need only be modified slightly to do this. One simple way to modify the standard Kratzerian truth-conditions for modals and conditionals is proposed in [Stojnić \(2016\)](#). I use ‘ $M(p, q)$ ’ for the truth-condition expressed by an utterance of ‘*might*  $\phi$ ’, where  $q$  is the proposition expressed by the prejacent  $\phi$  of the utterance of ‘*might*  $\phi$ ’, and  $p$  the proposition corresponding to an anaphorically retrieved restrictor, and I use ‘ $R$ ’ to denote a contextually provided accessibility relation, that determines a set of epistemically accessible worlds from a given world  $w$ . Then we can define the truth-condition expressed by an utterance of ‘*might*  $\phi$ ’, ‘ $M(p, q)$ ’, as follows:

**Definition 4.1.**

$$M(p, q) = \{w \mid \exists w' : wRw' \ \& \ w' \in p \ \& \ w' \in q\}$$

4.1 says that an utterance of ‘*might*  $\phi$ ’ is true at  $w$  relative to a context  $c$  if and only if there are worlds  $R$ -accessible from  $w$ , in which both the anaphorically retrieved restrictor,  $p$ , and the prejacent proposition,  $q$ , are true. The accessibility relation  $R$  provides the domain of quantification, while  $p$  is the anaphorically retrieved contextual restriction on this domain.<sup>40</sup> Crucially, we factor in the contribution of the restrictor separately, which will allow us to track how it is recovered in a context. (As is standard, ‘*must*’ is the universal dual of ‘*might*’.)

The following modification of the standard Kratzerian (1983) truth-conditions for a conditional captures in turn the anaphoricity of a conditional:<sup>41</sup>

**Definition 4.2.**

$$Cond(p, q, r) := \{w \mid \forall w' : wRw', \text{ if } w' \in p \ \& \ w' \in q, \text{ then } w' \in r\}$$

Where  $p$ , as before, is the anaphorically retrieved restrictor,  $q$  corresponds to the proposition expressed by the antecedent, and  $r$  to the one expressed by the consequent, an utterance of a conditional expresses truth-conditions corresponding to a set of worlds such that for each  $w$  in the set, all the worlds  $R$ -accessible from  $w$ , that are  $p$  and  $q$  worlds, are  $r$  worlds as well. So, an utterance of a conditional is true in  $w$  if and only if all the  $p$  and  $q$  worlds in the domain of quantification

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<sup>39</sup>That the standard Kratzerian semantics for modals does not accommodate this anaphoric behavior has been forcefully argued by [Stone \(1997\)](#). As [Stone \(1997\)](#) points out, the context-sensitivity of modals on Kratzer’s semantics is factored in via complex contextual parameters—a modal base and an ordering source—which are both determined in complex ways, so that neither provides a semantic parameter that can be contributed by prior discourse, except in the special case when the antecedent of a conditional restricts the modal in the consequent. See also the discussion in ([Kratzer, 2012](#), ch 4), as well as in [Brasoveanu \(2010\)](#) and [Bittner \(2014\)](#).

<sup>40</sup>There is still a question of what determines the relevant set of epistemically accessible worlds in a given context, which is here delivered by the  $R$  relation. We will turn to this question presently.

<sup>41</sup>For simplicity, I shall ignore the ordering source—the contextually supplied parameter that ranks worlds relative to their proximity to the world of evaluation given some standard. We could easily factor this parameter back in.

are  $r$  worlds as well. Crucially, the conditional is always evaluated against some prominent body of information, that need not correspond to the unrestricted set of epistemically live worlds discourse initially.

So, while expressivist, and dynamic update, semantics have trouble capturing the fact that modals can select a restrictor from a prior discourse, the truth-conditional account in 4.1 and 4.2 captures this by design. But we have seen that the truth-conditional account, at least of the standard sort, faces the challenge of explaining the data in §2. I suggest, however, that the truth-conditional account of the form in 4.1 and 4.2, once complemented by an account of the modal anaphora resolution, accounts for the data straightforwardly. Modals are, just as the standard account would have it, context-sensitive expressions which select a prominent body of information that restricts their domain of quantification. The problem with (1) is not that there is no body of information that the context can select that yields the plausible interpretation; rather, I shall argue, it is that the context *determines* a body of information that delivers an inconsistent interpretation. As we shall see, the resolution of context-sensitivity of modal expressions is a rule-governed process. The rules that govern the resolution deliver an inconsistent interpretation in (1), but not in (2). This is why we witness the contrast. To illustrate what I have in mind, consider the following example:

(13) John came to the party, and he didn't come.

(14) John came to the party, and the contextually prominent male didn't come.

While (13) is infelicitous, (14) is perfectly fine.<sup>42</sup> But everyone agrees that 'he' is context sensitive, and that in a context it refers to some contextually prominent male.<sup>43</sup> I suggest that the source of contrast in (13) and (14) is exactly analogous to the one (1) and (2). What (13) and (14) show is not that 'he' isn't context-sensitive, or that (13) doesn't express truth-conditions, but rather, as I shall argue, that there are rules governing the resolution of context-sensitivity, that determine the inconsistent interpretation in (13) and (1), but not in (14) and (2).

As witnessed by (3)–(5), and (9), an utterance containing a modal, or a conditional, does not passively receive its content from the context—rather, it induces an active change in the context, in a way that directly affects the interpretation of subsequent discourse, e.g., by supplying a potential restrictor for a subsequent modal. Moreover, as examples like (4) and (5) show, certain expressions (like modals, or antecedents of conditionals) bring about changes in a context mid-utterance as well.

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<sup>42</sup>Of course, depending on how (13) is embedded in a larger discourse or broader context, it could be made felicitous. As it will become clear shortly, this, if anything, provides further evidence that anaphora resolution is governed by linguistic mechanisms that affect the dynamics of prominence. I shall return to this point shortly.

<sup>43</sup>Note that 'John came to the party, and the person I intend to refer to didn't', or 'John came to the party and the contextually determined male didn't', or 'John came to the party and the the actual contextually salient male didn't', and so on, are all likewise perfectly consistent. In other words, it does not matter what one takes to be the character, in Kaplan's (1989b) sense, of 'he'; replacing the occurrence of 'he' with a paraphrase corresponding to the character rule by which the context determines its value still produces the contrast.

Indeed, it is part of the meaning of an ‘*if*’-clause, or a modal, that it raises a certain possibility to prominence.<sup>44</sup> These changes in contextual prominence, as we have seen, affect the resolution of modal anaphora.

Moreover, as I have argued in [Stojnić \(2016\)](#), not only do modal expressions actively induce changes in context, but our linguistic practices provide a wide range of robust mechanisms that make propositions prominent in a context, in a way that systematically affects the resolution of modal anaphora. In particular, drawing on resources from Discourse Coherence Theory ([Asher and Lascarides, 2003](#); [Kehler, 2002](#); [Hobbs, 1979](#)), I have argued that the resolution of modal anaphora is sensitive to mechanisms of *discourse coherence*. For ease of exposition, let me briefly flesh out the key insights behind the Coherence Theoretic approach.

Coherence Theory starts from an observation that there is more to a discourse than just random sequencing of unrelated information. This observation points to an implicit organization of discourse, a network of rhetorical connections—*coherence relations*—among utterances ([Hobbs, 1979](#); [Kehler, 2002](#); [Asher and Lascarides, 2003](#)), which signals how the speaker is organizing her ideas, through shared standards that her interlocutors can readily recognize. To get a more concrete sense of what’s at stake, consider (15):

(15) Phil tickled Stanley. Liz poked him. ([Smyth, 1994](#))

One can either understand the second sentence in (15) as describing the result of the event described by the first—Phil tickled Stanley, and *as a result*, Liz poked him (perhaps she was acting in disapproval)—or, one could understand the two sentences as comparing two events: Phil tickled Stanley, *and similarly* Liz poked him.<sup>45</sup> Coherence Theorists capture this difference by positing that, on the one reading, the discourse (15) is organized around the Result relation, which belongs to a broader class of cause-effect (or event-result) relations, while, on the other, it is organized around the Parallel relation, which is an instance of a broader class of resemblance relations. Crucially, the choice of the relation affects the resolution of the pronoun: if (15) is understood as organized by the Result relation, ‘*him*’ is Phil; if it is organized around Parallel, then ‘*him*’ is Stanley.

A number of empirical studies corroborate the observation that pronoun resolution co-varies with the choice of coherence relation.<sup>46</sup> Moreover, the data suggest that the mutual constraints between these two processes are more than merely correlated: as argued by [Stojnić, Stone, and Lepore \(2017, 2013\)](#), the choice of coherence relation governs the interpretation of a pronoun. The

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<sup>44</sup>That introducing a hypothetical scenario is a part of the meaning of an ‘*if*’-clause is reflected in the Kratzerian restrictor analysis of the conditional, according to which the sole meaning of an ‘*if*’-clause is to restrict the domain of an (overt or covert) modal expression, as well as in the update and expressivist accounts of conditionals, which posit that an ‘*if*’-clause, as a matter of compositional semantics, introduces a hypothetical, local context, in which the consequent is evaluated. However, as we have seen above, these accounts are nevertheless not expressive enough to fully capture the ways in which conditionals and modals make propositions available for subsequent modal discourse.

<sup>45</sup>I am assuming that (15) is not accompanied by a pointing gesture.

<sup>46</sup>See e.g. [Wolf, Gibson, and Desmet \(2004\)](#), [Kehler et al. \(2008\)](#), and [Kaiser \(2009\)](#).

following example from Kehler (2002, 2004) illustrates the point:

(16) Margaret Thatcher admires Ronald Reagan, and George W. Bush absolutely worships her.

(16) is generally judged infelicitous.<sup>47</sup> This is very surprising from the standpoint of the standard pragmatic accounts of anaphora resolution. ‘*Thatcher*’ is a perfectly available antecedent, and she is generally known to be a subject of Bush’s admiration.<sup>48</sup> Thus, plausibility and relevance would both require that ‘*her*’ is resolved to Thatcher. Moreover, charity would require that ‘*her*’ is resolved to Thatcher, as well, since otherwise we would be interpreting the speaker as having made a mistake by using a pronoun with the wrong grammatical gender feature. However, in the face of a perfectly available interpretation, one that would be favored by plausibility, relevance and charity, Kehler reports his subjects still judge (16) as infelicitous. This is puzzling from the standpoint of a standard pragmatic account. It is, however, perfectly expected if coherence relations force a particular resolution of the pronoun as a matter of an underlying convention.<sup>49</sup> (16) is organized by the coherence relation of Parallel, comparing Thatcher’s and Bush’s respective attitudes.<sup>50</sup> Parallel requires that a pronoun in the object position be resolved to an antecedent introduced in the object position, which is Reagan. But since the pronoun is feminine, this results in a gender mismatch, which explains why the utterance is infelicitous.<sup>51</sup>

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<sup>47</sup>See Kehler (2004, 2002) for empirical support.

<sup>48</sup>In fact, note that ‘*Thatcher*’ is in the subject position. In English, prominence of candidate antecedents for anaphora resolution follows the grammatical role of the NPs: the NP in the subject position is preferred for anaphora resolution than those in the object position (Kameyama, 1996; Walker, Masayo, and Cote, 1994; Kehler, 2002; Bittner, 2011). This, if anything, should make Thatcher the preferred referent. But, as Kehler reports, the infelicitous interpretation is the one retrieved instead.

<sup>49</sup>This line of argument is advanced in Stojnić, Stone, and Lepore (2017).

<sup>50</sup>In particular, Parallel relation is signaled by the scalar relationship between ‘*admires*’ and ‘*absolutely worships*’.

<sup>51</sup>Now we can also revisit why (13) is infelicitous, by contrast with (14). The second sentence in (13) is naturally understood as relating to the first one by Elaboration, providing further information about the party John attended. Elaboration makes John prominent; ‘*he*’ selects the most prominent male referent, and thus is resolved to John. Notice, that, as mentioned before, (13) could, of course, be made felicitous, but not while holding the relation fixed: there’s no reading of (13) where the relation is Elaboration, and the referent is not John. (13) can be made felicitous if, for instance, the speaker accompanied the utterance of ‘*he*’ with a pointing gesture, or placed a focal stress on ‘*he*’, thus invoking a Contrast between John and some other individual. Elsewhere I have argued that pointing gestures and prosodic focus are conventional mechanisms that affect prominence much like coherence does (Stojnić, Stone, and Lepore, 2017). In particular, English exploits these mechanisms to signal prominence of candidate referents, but neither the role of these mechanisms nor their effect is universally shared across languages, suggesting that their effects in English are underscored by conventions of the language. More generally then, while (13) can be made felicitous, it can only be made felicitous by employing linguistic resources—by changing the coherence relation organizing the discourse, and/or by employing prominence shifting mechanisms such as pointing gestures or prosodic accents—which govern the resolution of a pronoun. One way to evoke these resources is by embedding a sentence within a larger discourse, as this can affect how we disambiguate which coherence relation is organizing the relevant bit of the discourse. For instance, the speaker could utter ‘*John came to the party, but he didn’t come*’, as a response to the question ‘*Did Bill come to the party?*’, thus contrasting John’s and Bill’s respective presence or absence. But this response is only felicitous if the discourse is organized by Contrast, rather than Elaboration, and moreover if the pronoun is stressed. Since Contrast requires that ‘*he*’ refers to John, one has to invoke focus marking or pointing to make Bill prominent: that Bill was mentioned earlier does not suffice. Similar remarks apply to (16). As Kehler (2002) reports, one can make (16) felicitous but stressing ‘*her*’, but this changes the organizing relation as well: the discourse would no longer be understood as comparing Bush’s and Thatcher’s attitudes, but rather explaining

Elsewhere, I argued that the mechanisms of discourse coherence likewise affect the prominence of propositions that are potential restrictors of subsequent modals.<sup>52</sup> So, in (3), the second sentence elaborates on the hypothetical possibility described by the first. I have argued that it is an effect of this Elaboration relation that ‘*would*’ in the second sentence is understood as restricted by the possibility described by ‘*might*’ in the first. Elaboration makes the hypothetical scenario in which a wolf walks in, introduced by the modal in the first sentence, prominent, and in turn, ‘*would*’ in the second sentence is understood as quantifying over the epistemically accessible worlds in which this scenario holds. Similarly, an Elaboration relation between the antecedent and the consequent in (5) promotes the proposition describing the hypothetical scenario introduced by the antecedent, and consequently ‘*would*’ in the consequent is understood as restricted by this proposition.

Crucially, the mere fact that one modal follows another does not suffice to establish that the second modal is further restricted by the proposition introduced by the first one—the import of coherence is crucial, as witnessed by the following example.<sup>53</sup>

(17) If a wolf walks in, it would eat you. But, one probably won’t walk in. (Stojnić, 2016)

The Elaboration relation between the antecedent and the consequent of the first sentence in (17) promotes the hypothetical scenario introduced by the antecedent; since ‘*would*’ searches for the most prominent possibility as a restrictor, it ends up being restricted by it. But, the second sentence does not further elaborate upon the scenario described by the first one. Rather, the two stand in Contrast relation, contrasting two hypothetical scenarios—one in which a wolf walks in, and one in which one does not.

Stojnić (2016) argues that Contrast relation requires that the two bits of discourse provide contrasting information about some information state. Now, in (17), the first sentence is interpreted as providing information about whatever is the most prominent body of information at the point at which it is uttered. If uttered discourse initially, it is understood as providing information about the set of epistemically accessible worlds given by the context discourse initially. It is thus understood as describing what might be the case if a wolf walked in, *given this body of information*. Contrast requires, then, that the second sentence provides a contrasting bit of information about this body of information. It makes this body of information prominent, and hence, the modal in the second sentence is restricted by it. Thus, we get the interpretation that *given the same overall body of information that the first sentence is about*, a wolf probably won’t come in. And this is intuitively correct: (17) conveys that *given the overall body of information, if a wolf walks in*, it would eat the addressee, but *given the same body of information*, one probably won’t walk in.

These data show, at the very least, that there are systematic mechanisms by which a context how Bush follows Thatcher’s opinions. For a more general discussion of these issues, see Stojnić, Stone, and Lepore (2017).

<sup>52</sup>See Stojnić (2016).

<sup>53</sup>Cf. Asher and McCready (2007).

changes, not only between utterances, but also within a single utterance. In particular, it changes at least in such a way so that it reflects the change in the relative prominence of possibilities that can serve as restrictors for modal expressions. This systematic context-change in turn determines which propositions are expressed by subsequent utterances; this is because the prominent body of information, determined through the systematic mechanisms of context change, factors into the truth conditions of modal expressions, as per 4.1 and 4.2. And all this suggests that **CONTENT IN CONTEXT** is false—it is only once we account for the systematic context-change, both within a single utterance, and between utterances, that we can predict the intuitive truth-conditions.<sup>54</sup>

Suppose we endorse the idea that modals express truth-conditional content. Then we can capture the idea that the restriction on a domain of quantification of a modal is determined through systematic mechanisms of context-change described above in the following way: as I proposed in [Stojnić \(2016\)](#), suppose that the context represents a ranking of propositions that can serve as domain restrictors of modals in a discourse according to their relative prominence, where the most prominent is the top-ranked one. Then, let the modal retrieve the most prominent proposition representing an epistemically live possibility as the restrictor for its domain of quantification. As the discourse evolves, the prominence ranking changes: modals and conditionals can introduce propositions, and similarly, coherence relations make certain possibilities prominent for subsequent modal anaphora. Importantly, we have seen, the changes in prominence are governed by systematic mechanisms of context-change: by linguistic items that introduce new propositions, and by mecha-

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<sup>54</sup>Of course, I am by no means the first theorist to suggest that the context can change mid-utterance, thus affecting the interpretation of context sensitive items. This was already recognized by [Kratzer \(1977\)](#) herself, and is often pointed out in the literature. (See, e.g. [Lewis \(1979\)](#); [Braun \(1996\)](#); [Stanley \(2004\)](#); [Stanley and Williamson \(2004\)](#).) My point is different. The crucial issue is not whether the context *can* change mid-utterance but rather what are the mechanisms whereby it *has to* change. In particular, I argue that the context not only can, but rather *has to* change mid-utterance, because the linguistic expressions that an utterance comprises come with a layer of grammatically encoded meaning specifically designed to change the context. For instance, antecedents of conditionals, modal expressions, and coherence relations all come with linguistically specified context-change mechanism, affecting the prominence of possibilities in a discourse. Moreover, typically, it is implicitly assumed or explicitly endorsed that the contextual change is governed by general pragmatic reasoning about speaker’s referential or communicative intentions, and various epistemic cues that the utterance situation makes available to make those intentions manifest. (This idea goes back to [Kaplan \(1989a\)](#) and [Grice \(1989\)](#), but is widely implicitly or explicitly assumed in various theories of context-sensitivity, e.g. [Cohen \(1998\)](#); [Dowell \(2011\)](#); [Kennedy \(2007\)](#); [Neale \(2004\)](#); [King \(2014a,b\)](#); [Reimer \(1992\)](#); [Schiffer \(1981\)](#), *inter alia*). The contextual parameters change in the way that makes most sense to yield the overall most plausible interpretation. What I argue, instead, is that the linguistic rules of context-change force the context to change in a certain way even when that leads to an overall implausible, and even inconsistent interpretation (as we see in, e.g., (13), (16) and, I shall argue, in (1)). These context-changing effects are persistent even when pragmatic factors would advise against them: the mechanisms of discourse coherence can sometimes set the context in such a way to mandate an inconsistent interpretation, even when there’s a perfectly plausible, grammatically preferred one that’s available. This is puzzling for most extant accounts of context-sensitivity, that assume that context-sensitivity resolution is mainly governed by general pragmatic reasoning. It is also worth pointing out that, while update semantics associates expressions with context-change potentials, and though some expressions on this account can indeed *change* the context (e.g. an utterance of ‘it is raining’ eliminates all the raining worlds from a context *c*, if any), it does not recognize the full range of mechanisms that affect context in more nuanced ways, which leads to empirical inadequacy we have seen. Could this account (or an expressivist one) be supplemented with the mechanisms I appeal to? I shall argue that the answer is ultimately negative, if the account is still supposed to be a non-propositionalist one. I return to this point below.

nisms of discourse coherence that promote certain propositions, while demoting others. This allows us to capture the anaphoric behavior of modals manifested in the examples above.

Importantly for us, given this account, we also have resources to explain the puzzling contrast between (1)–(2), repeated below as (18) and (19):

- (18) If it is not raining and it might be raining, then I’m uninformed about the weather.
- (19) If it is not raining and the body of information *i* doesn’t rule raining out, then I’m uninformed about the weather.

Let us begin with (18). The antecedent of (18) contains a conjunction. The first conjunct introduces a hypothetical non-raining scenario. The second conjunct, ‘It might be raining,’ is understood as elaborating on this scenario.<sup>55</sup> As before, the Elaboration relation between the two conjuncts makes the proposition elaborated upon—the proposition comprising the epistemically accessible worlds in which it is not raining—prominent. ‘*Might*’ in the second conjunct searches for the most prominent possibility as its restrictor; consequently, it selects this proposition as a restrictor, and so, is understood as quantifying over all the relevant epistemically accessible worlds in which it is not raining. So, we get the interpretation according to which the antecedent is expressing the proposition *that it is not raining, and within the epistemically accessible worlds in which it is not raining, there is at least one raining world*. This, of course, leads to a contradiction, and so the conditional is judged infelicitous.<sup>56</sup>

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<sup>55</sup>Just as, for example, in (i), the second conjunct elaborates on a hypothetical scenario in which there are wolves around the house:

- (i) If there are wolves around our house, and a wolf might walk in, then we are in trouble.

<sup>56</sup>This explanation identifies the coherence relation Elaboration as the prominence affecting mechanism that makes the possibility described by the first conjunct prominent. But isn’t the following still infelicitous?

- (i) If it is not raining but it might be raining, then I’m uninformed about the weather.

Indeed, it is. But that it is is readily predicted by the present account. While the second conjunct in the antecedent of (i) doesn’t stand in Elaboration relation with the first one, it does stand in Violated Expectation relation—a relation in the category of Cause-Effect Relations or Event-Result relations (Kehler, 2002)—which, much like Elaboration, makes the possibility described by the first conjunct, the one with respect to which the expectation is violated, prominent (as witnessed by examples such as ‘A wolf might walk in, but it will not eat you.’). The modal in the second sentence selects this possibility as the restrictor, and thus we again get the inconsistent reading: *it is not raining and it might be raining given that it is not*. This example brings about another important point: an overt connective doesn’t uniquely correspond to a single coherence relation. So, just as ‘*and*’ can signal a number of different relations, e.g., Narration, Elaboration, Result or Parallel, ‘*but*’ can signal, e.g., Contrast or Violated Expectation. And, as illustrated by (15), a coherence relation needn’t be signaled by an overt connective (Knott, 1996; Asher and Lascarides, 2003; Kehler, 2002). Bear in mind that the view is *not* that either ‘*but*’ or ‘*and*’ is ambiguous; rather, while a connective has a single meaning, it can appear alongside a number of different relations that are separately represented in the LF. For a formal implementation of the framework sketched here see Stojnić (2016). It is worth noting that, unlike Violated Expectation, Contrast is somewhat hard to embed in the antecedent of a conditional, as witnessed by the oddity of the following:

- (ii) If it might be raining but it might not be raining, then it’s not guaranteed that it will rain.

But what about (2)? The antecedent of (2) likewise contains a conjunction. The conjunct likewise introduces a hypothetical non-raining possibility. The second conjunct still elaborates on this possibility, and Elaboration still makes it prominent. However, since the second conjunct does not contain a modal expression anaphorically dependent on this possibility, we get a perfectly consistent reading: the antecedent in (2) expresses the proposition corresponding to the most prominent epistemically live possibility in which *it is not raining, and moreover the body i doesn't rule out raining*. And *this* proposition is not a contradiction. So, we have an explanation of the contrast between the two examples.<sup>57</sup>

Now, turning to the second type of puzzling data that the opponents of truth-conditional accounts point to, can we account for the examples like **Fat Tony**? It turns out that the anaphoricity of modals easily predicts this kind of behavior as well. Remember, on this account, modals are looking for a prominent proposition that restricts their domain of quantification. We have seen that a proposition can be made prominent by explicitly mentioning it. But, as witnessed by (11), a proposition need not be explicitly introduced by an overt linguistic expression in order for it to be prominent. With this in mind, here is how we can explain the **Fat Tony** example. One can understand Expert B's comment as commenting on the proposition corresponding to the body of information of those who have examined the evidence, or perhaps as commenting on the body of information of those who've engaged with the question of whether Fat Tony might be alive. An utterance, indeed, might be ambiguous between these different interpretations. Depending on which body of information is commented upon, different propositions are expressed—on one disambiguation, it would be inappropriate for Fat Tony to react with 'That's false', while on another, this might be a perfectly appropriate reaction.<sup>58</sup> This is all perfectly compatible with (and predicted

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<sup>57</sup>But what happens if we reverse the order of conjuncts, as in (i)?

- (i) If it might be raining and it's not raining, then we are uninformed about the weather.

The account does not predict that all conditionals of the form 'If it might  $p$ , and not  $p$ , then...,' will automatically be bad. This is a good result: as [Dorr and Hawthorne \(2014\)](#) and [Sorensen \(2009\)](#) note, reversing the order of the conjuncts in some cases (indeed, in Yalcin's original example) makes the conditional felicitous. For instance, [Dorr and Hawthorne \(2014\)](#) also note the contrast between the following:

- (ii) If Jack and Jill fail and they might pass, their preparation is to blame.  
 (iii) If Jack and Jill might pass and they fail, then their preparation is to blame.

However, my account also does not predict that all such cases will automatically be felicitous. This is again a good result. Whether such conditionals are felicitous or not depends on which coherence relations hold between the two conjuncts in the antecedent, and between the conditional and the prior discourse. All these factors affect the resolution of modal anaphora. This is a significant advantage of my view over the ones that hard-wire the preference for either a strong order effect, or no order effect whatsoever.

<sup>58</sup>There are other contextualist accounts that aim to explain disagreement by arguing that in cases such as **Fat Tony** there might be more than one body of information that the modal can be interpreted as quantifying over (e.g., [Dowell \(2011\)](#) and [von Fintel and Gillies \(2009\)](#).) However, while they recognize the need for a more flexible story about how context impacts the interpretation of an epistemic modal, these accounts are different than the one I

by) an account according to which modals express ordinary propositional content. Since on this account modals search for a prominent possibility from the context, and since there might be ambiguity with respect to which possibility is made prominent by the context, we expect to see some ambiguity in, as well as potential disagreement about, which proposition is expressed by a modal claim discourse initially.<sup>59</sup>

The problem for the standard contextualist accounts was that there seemed to be no uniform rule that tells us how the context sets the domain for the modal—whether we say that the contextually relevant information is that of the speaker, or of the conversational participants, or of some other contextually determined group, any such unique way of resolving context-sensitivity would leave the disagreement data unexplained.<sup>60</sup> The present account, by contrast, argues that modals are essentially referential: they refer to the prominent body of information in the context. This is what allows for a more nuanced approach to disagreement phenomena: the account doesn't postulate that the relevant body of information is always the speaker's body of information, or some other contextually relevant group's body of information. The modal simply quantifies over the most

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advocate here in terms of how this observation is cashed out. In particular, they appeal to pragmatic mechanisms in explaining context-sensitivity resolution in these cases. Moreover, they do not give us a story about the embedded occurrences of modals and their contextual resolution, whereas the present account explains both embedded and unembedded occurrences uniformly.

<sup>59</sup>A word of clarification is in order. In 4.1 and 4.2, I assumed that an epistemic accessibility relation  $R$ , which provides the domain of quantification for epistemic modals, is provided by the context discourse initially, and further restricted by an anaphorically retrieved restrictor,  $p$ , the most prominent proposition in the given context. We could assume that this set of epistemically accessible worlds discourse initially is at the same time the top-ranked proposition discourse initially. But, of course, part of the problem is determining what  $R$  is discourse initially and this is precisely the problem stressed by the puzzling disagreement data, and examples like **Fat Tony**. I have suggested that even here, the modal is looking for some prominent body of information, as witnessed by (11), and as I argue is the case with **Fat Tony**. We can easily modify our truth-conditions to accommodate the fact that modals can be restricted by a proposition that hasn't been explicitly mentioned, but which determines the relevant set of epistemically accessible worlds discourse initially. Let's define a class of expressions, ' $P_w$ ', interpreted as follows:  $P_w = \{w'|w' \in p\}$ , where  $p$  is some proposition. Now, let  $p$  be the proposition comprising the most prominent body of knowledge relative to a world  $w$ , and  $P_w = \{w'|w' \in p\}$  (we relativize knowledge to worlds in this way, because what, e.g., Tony knows in  $w$  might be different from what he knows in  $w'$ ); moreover, let  $q$  be the proposition expressed by a prejacent  $\phi$  of '*might*  $\phi$ ', and  $Q_w = \{w'|w' \in q\}$ . Then, we define the truth-conditions for '*might*  $\phi$ ' be as follows:

**Definition 4.3.**

$$M(p, q) := \{w \mid \exists w' \in P_w \ \& \ w' \in Q_w\}$$

This captures the idea that a modal can be restricted by some proposition prominent in the non-linguistic context. *Mutatis mutandis*, we make the same change for the conditional. Where  $p$  and  $P_w$  are defined as in 4.3,  $q$  is the antecedent proposition,  $Q = \{w'|w' \in q\}$ ,  $r$  is the consequent proposition, and  $R = \{w'|w' \in r\}$ , the truth-condition for a conditional is defined as follows:

**Definition 4.4.**

$$Cond(p, q, r) := \{w \mid \forall w' \text{ if } w' \in P_w \ \& \ w' \in Q_w \text{ then } w' \in R_w\}$$

For the most part, we can disregard this modification, and work with the definitions in 4.1 and 4.2.

<sup>60</sup>Recall, if the relevant information is that of the speaker, we cannot explain why her audience can challenge her by saying 'That's false'. If the relevant information is that of some other contextually determined group, then it seems unclear why she can assert it in the first place.

prominent possibility; but there, of course, might be disagreement over which possibility that is.

To be somewhat more precise, the present account can predict the kind of divided judgment in the **Fat Tony** case in the following way. On the present account, modals are expressions that refer to the most prominent possibility in the discourse context. Now, which possibility is made prominent, we have seen, depends on discourse structuring, prominence affecting, mechanisms. But what such mechanisms can be at play in the case of **Fat Tony**, where the utterance of Expert B, let us suppose, does not follow up on a prior discourse, but is uttered discourse initially? I have argued elsewhere, that coherence relations might relate utterances not just to the prior discourse, but also to real-world situations they are about (Stojnić, Stone, and Lepore, 2013). To illustrate this idea, consider the following example.<sup>61</sup> Suppose there is a conjunction of Venus and Jupiter in the sky, so that you cannot tell them apart by a naked eye. The speaker has set a telescope facing a window over the western sky. She adjusts the telescope, and says to you, without any further demonstration:

(20) That's Jupiter. You can even see four moons.

What is crucial for the interpretation of (20) is that it is a comment on a situation as seen through the telescope. Unless the audience recognizes this, they will have failed to understand the utterance; but recognizing that the speaker is making a comment about the scenery seen through the telescope is all it takes to understand what *that* is. Given the astronomical conjunction, one cannot know, without looking through the telescope, which of the two objects the speaker is referring to; yet once the audience recognizes that the speaker is making a summary of a scene viewed through the telescope, there is no further ambiguity of the pronoun left to resolve. The referent is whatever the central entity in the situation seen through the telescope is. In other words, once it is recognized that Summary relation relates the utterance to the situation seen through the telescope, one is not left with a further task of disambiguating the pronoun. Summary makes whatever entity is central in the situation seen through the lenses of the telescope prominent, and that's what *that* selects as its referent.

Similarly, in the case of modal expressions, an utterance can be related to a real world situation it is about. When the speaker is making a comment about a particular situation, the relation renders the most prominent possibility in that situation prominent. However, just as the interlocutors don't know what *that* in (20) is until they look through the telescope—even though they perfectly well know that whatever *that* picks out is the most prominent entity seen through the telescope—they might not know, or might even disagree about what the prominent possibility is in a given situation. This is because they might have different ideas about which other descriptions the prominent possibility fits. For instance, the speaker might think that the prominent possibility is the one that involves what the evidence suggests, or what is compatible with the knowledge of those

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<sup>61</sup>The example is due to Stojnić, Stone, and Lepore (2013).

who have examined the evidence. The hearer might think that it involves what the agents best informed about the case know. And even when it is settled that the prominent possibility is, say, the one that is compatible with the information of those who have examined the evidence available in the relevant situation, the agents might still disagree, as they might have different conceptions of what the totality of the available evidence is, or who the relevant agents that have examined it are. And of course, there might be ambiguity about which situation the speaker has made the comment about, in the first place.<sup>62</sup>

Of course, sometimes we might not exactly care about what the prominent possibility is: if I ask you where the keys are and you say ‘They might be in the drawer,’ if I don’t know that they are not in the drawer, it might not matter for me whether the prominent possibility that your ‘*might*’ statement quantifies over is the one involving my information or only yours. I’ll look in the drawer all the same. But sometimes we do care to be more precise about which possibilities are prominent, and this is where disagreements can ensue.

Note, crucially, that this behavior is not specific to modal vocabulary, but is something we see with other context-sensitive expressions as well.<sup>63</sup> Suppose you are at a dinner party in a restaurant, and everyone invited seems to be having fun. You utter (21):

(21) Everyone is having a great time.

The waiter, who is working his third shift that day, overhears this from a distance, and reacts with (22):

(22) Well, that’s false. I’m having a terrible day over here.

It seems that these examples give rise to similar intuitions as **Fat Tony**. There is a sense in which (21) could be interpreted as true, and then one in which it is understood as false. Just as in the case of modals, this has to do with how we resolve the restriction on the domain of the quantifier.

Moreover, we see a similar type of behavior even with pronouns. For instance, consider the following type of a scenario:

### Detectives.

Fat Tony has been killed, and a team of detectives is investigating his murder. I have just

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<sup>62</sup>This holds for pronouns as well. Suppose Mary is a biologist and an astronomer. She has a microscope and a telescope set in her lab. Standing between the two, I say:

- (i) That is  $\alpha$ -complex. It has just been discovered.

In that case, it might be ambiguous whether my utterance is a summary of the situation seen through the microscope, or the one seen through the telescope; as a result, it might be ambiguous whether ‘*that*’ is referring to an astronomical object, or a microorganism.

<sup>63</sup>For a related point about ordinary quantifiers and epistemic modals, see [von Stechow and Gillies \(2009\)](#).

talked to Detectives A and B, who informed me that they still don't know who killed Fat Tony. Unbeknown to me, Expert C is a part of their team, and (unbeknown to A and B) she has just discovered who the murderer is.

- (23) (Me, reporting on what I've learned:) They haven't discovered who the killer is yet.  
(24) (Expert C, listening in from another room:) False! We have.

As before, here, my utterance of 'They' could pick out the group involving only A and B, or it could pick out A, B and C. In the former case, it would be false. In the latter, it is true. Often, with discourse initial utterances, it might be vague or ambiguous which particular resolution is, or should be, relevant in the context. When I tell you, out of the blue, that it might be raining, it might be vague or ambiguous whether I expressed that given all I know it might be raining, or given all we as a group know, it might be raining, or perhaps whether given the best evidence, it might be raining. Similarly, if I say, 'They are having fun' looking at a group of people laughing in the distance, it might be vague or ambiguous who exactly 'they' picks out; I might even be unable to precisify whom exactly I intended to refer to. Such ambiguities are prevalent, but they are perfectly compatible with the present truth-conditional account.<sup>64</sup> On the present account, modals are like pronouns (and quantifiers) insofar as they search for a prominent antecedent either from the prior discourse, or broader context. Thus, it is unsurprising that we see the same type of ambiguity in the resolution of modal expressions that we see with pronouns and quantifiers. Indeed, the fact that we do speaks in favor of the present account.

So, in summary, I argued that pessimism towards truth-conditional accounts rests on an overly simplistic conception of the context-sensitivity of modal expressions, one that neglects their anaphoric behavior, and more importantly, on an overly simplistic idea of how context interacts with content, one that presupposes **CONTENT IN CONTEXT**. We have seen, however, that **CONTENT IN CONTEXT** is false: context changes with evolving discourse, both between utterances and within a single utterance. Moreover, the mechanisms by which the context changes are both systematic and robust. This allows us to meet the key challenges from non-truth-conditional accounts.

One might wonder, however, whether the non-propositionalists could appeal to the same prominence affecting mechanisms—in particular, mechanisms of discourse coherence—to account for the anaphoric behavior of modals discussed above. While this is not in principle impossible, there are

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<sup>64</sup>Of course, as in all such cases, we might favor a particular disambiguation depending on the context, and our background goals and plans. For example, suppose that you and I are searching for the keys, and I say 'The keys might be in the drawer'. Unbeknown to me, you have already checked the drawer and determined that the keys are not there. In such a case, we might decide that it is more pertinent to disambiguate the modal so that it is understood as targeting the more informed information state. So, I might even say 'I guess I was wrong'. This would be reasonable, given that we want to find the keys. But instead I might be difficult, and decided to insist on standing my ground. So I might say 'Well, I only say they might be, and they might have been'. (The key-searching example is due to von Stechow and Gillies (2008).) On my present account, it is the ambiguity in the resolution of context-sensitivity that allows for this variation.

several things that are important to note in this regard. First, to do so, they would have to modify the formal framework to allow for a way of keeping track of the relative prominence of propositions (possibilities) across a discourse; an information state, or a context-set generated by the common ground doesn't in itself allow us to recover relevant propositions introduced by particular utterances across a discourse.<sup>65</sup> Moreover, as we have seen in some of the earlier examples, modeling anaphoric behavior of modals will sometimes require recovering a proposition expressed by a modal utterance, which non-propositionalists deny exist. Furthermore, and more importantly, if one were to try to accommodate the anaphoric behavior of modal expressions, one would, in the course of it, end up mimicking the predictions of the present account, which in turn delivers non-trivial propositional content of modal utterances for free. At this point, it is no longer clear what motivation one would have for denying that modal claims express propositions. The charge against propositionalism was that the standard propositionalist accounts cannot capture the problematic data in (1)–(2) and **Fat Tony**. But we have seen that the account advocated here not only explains these data, but does so in a way that also predicts the anaphoric behavior of modal expressions that turns out to be problematic for non-propositionalists. Even if they could mimic the predictions of the present account, it seems that they would have to do that in a way that re-introduces a lot of the propositionalist machinery that they advocated we should reject. Since the charge was that the behavior of modal discourse cannot be captured by a propositionalist framework, at this point it seems that such linguistic basis for non-propositionalism is no longer available.<sup>66</sup>

The present account, thus, captures the data that initially troubled propositionalists, as well as those that are problematic for non-propositionalists, by design. However, as I shall argue in the next section, there is something right about the non-propositionalist accounts: there is a dynamic aspect of meaning capturing the effect of an utterance on context. But, non-propositionalist were mistaken in how they specify this dynamic meaning. Once we characterize it correctly, we will see that not only is it not incompatible with the propositional meaning, but rather is necessary in determining the correct propositional content of modal claims, and crucially interacts with it.

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<sup>65</sup>Furthermore, notice that on the expressivist account the domain of quantification for a modal utterance is provided by a point of evaluation relative to which the truth is assessed, not by the context of utterance. This means that on such an account, coherence relations would have to operate on points of evaluation—that is, they would have to behave like intensional operators. While this in itself is not problematic, we have seen that in the case of pronouns, coherence makes certain referents prominent by operating on parameters of context. Since it is not plausible to think of the effect of coherence on pronouns as governed by shifts in points of evaluation, rather than contexts, a more uniform treatment suggest modeling the contribution of coherence relations uniformly as updates that manipulate the parameters of context in both cases.

<sup>66</sup>Of course, one might have independent theoretical reasons for denying that modal claims express propositional content (just as one might have, for instance, theoretical reasons for thinking that normative vocabulary does not traffic in propositions). My concern in the present paper has been to show that the linguistic argument mounted in support of non-propositionalism fails. But notice that even if one had independent theoretical reasons for non-propositionalism, one would still have to explain the anaphoric behavior of modals, and the effects of coherence on modal anaphora resolution.

## 5 Content in a Dynamic Context

My account maintains that modals express truth-conditional content. We have seen that the mechanisms affecting the resolution of context-sensitivity are systematic and robust; certain expressions—e.g. modals, and antecedents of conditionals—systematically manipulate context in a way that affects the truth-conditions expressed. Moreover, we have seen that mechanisms structuring the information flow in a discourse—in particular, mechanisms of discourse coherence—likewise systematically change context in a way that affects the interpretation of modal discourse. I want to suggest that these mechanisms contribute another layer of semantic content—over and above truth-conditions. In particular, I shall argue that these mechanisms contribute a dynamic aspect of meaning, capturing the change in context, provoked by an utterance. Thus, in this, and only in this, regard I agree with the non-propositionalist—a dynamic effect on context is an important aspect of meaning. But it is only one aspect of meaning. Once we correctly characterize the dynamics of context-change, the truth-conditions naturally fall out of this characterization.

The account I sketched above suggests that the resolution of context-sensitivity is sensitive to the changes in context induced by certain linguistic expressions (e.g., modals, antecedents of conditionals), and other linguistic items (e.g. coherence relations). The following picture of context-content interaction emerges.<sup>67</sup> I shall understand the context as a Lewisian scoreboard (Lewis, 1979). A scoreboard is an abstract record of important linguistic information about the discourse: it records which moves in the conversation have been made, what has been contributed, who contributed what, whose turn it is to speak, what has been presupposed, etc. Most importantly for us, the conversational scoreboard keeps track of the values of contextual parameters that govern the resolution of context-sensitive expressions. One such parameter keeps track of relative prominence of possibilities that can serve as restrictors for modal expressions. Somewhat less vaguely, as we speak, we introduce and promote new propositions, putting them on the record. As the discourse progresses, the state of the record changes. Interlocutors make different conversational moves, reflected on the scoreboard. New questions are raised, others answered; new propositions are made prominent, others demoted.

Utterances can change the record in a way that affects the truth-conditions expressed. For instance, we have seen that they can introduce propositions that can serve as restrictors for subsequent modals or conditionals. How do we capture the fact that utterances induce these kinds of systematic changes in context? For instance, how do we capture that modal expressions introduce possibilities that can serve as restrictors for subsequent anaphora? In addition to expressing propositional content, I suggest that we interpret utterances as updates to context, i.e. as instructions on how to change the state of the scoreboard. To make this more concrete, let us focus again on modal anaphora. The key aspect of a conversational context that matters for the resolution

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<sup>67</sup>I have advocated this approach to context-content interaction in Stojnić (2016), as well. Here I shall argue that such an account is best understood as assigning two layers of content to modal utterances.

of modal anaphora is the relative prominence of propositions that are candidate restrictors for a modal. Thus, we can focus on a single aspect of context—a prominence ranking of propositions that are potential restrictors for modal expressions. So abstracting away from other features of the scoreboard, let the context be a ranking of propositions by their prominence, as sketched in § 4: those higher in the ranking being more prominent than those lower.<sup>68</sup> At the beginning of a conversation, the top-ranked proposition is the set of epistemically accessible worlds determined by the initial context—it might be the body of knowledge compatible with the common ground, or some other body of knowledge that is relevant given our present practical purposes.<sup>69</sup>

Let us interpret utterances as instructions to update the context, promoting certain propositions, and demoting others.<sup>70</sup> So, an utterance of ‘*might p*’ is not merely associated with truth-conditional content, defined in 4.1; it is also interpreted as an update to a conversational context the effect of which is to promote a new proposition—the proposition corresponding to the top-ranked set of epistemically accessible worlds in which the prejacent proposition holds. To illustrate, take the first sentence of (3). Suppose that (3) is uttered out of the blue, and that the relevant body of information that it is about is some set of epistemically accessible worlds, which comprises a proposition *p*. Given that *p* is the top-ranked proposition in the context, the modal selects it as its restrictor: so, the utterance expresses the proposition that given *p*, the possibility of a wolf walking in is open. But the utterance also makes the proposition comprising all the epistemically accessible *p*-worlds in which a wolf walks in prominent, demoting all others one position in the ranking. Thus, apart from merely expressing a propositional content, a modal claim also affects the conversational record, by updating the prominence ranking. It introduces a proposition that a conversational record can track across the discourse, so that it can serve as a restrictor for subsequent modals.<sup>71</sup>

Apart from modals and conditionals, we have seen, the mechanisms of discourse coherence also affect context, by changing the prominence ranking. In (3), since the second sentence is elaborating on the hypothetical scenario introduced by the first one—the epistemic possibility of a wolf walking in—Elaboration makes this proposition the new top-ranked one (demoting all others

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<sup>68</sup>I have proposed a formal implementation of an account along these lines in Stojnić (2016). In that development, I borrow the resources from centering theories (see Sidner (1983), Grosz, Joshi, and Weinstein (1995), and Bittner (2014)) to model prominence ranking.

<sup>69</sup>Recall the **Fat Tony** example: depending on which body of information the speaker is understood as commenting on, different bodies of information might be made prominent.

<sup>70</sup>I undertook a detailed formal development of such an account in Stojnić (2016). Here we need not concern ourselves with formal details—the general sketch of the framework will suffice for our purposes.

<sup>71</sup>Plausibly, an utterance of a declarative sentence also makes the proposition expressed by the utterance prominent. For example, an utterance of ‘It is raining,’ promotes the proposition that it is raining, which is witnessed by the fact that we can easily pick it up as a propositional anaphor, e.g. by following up with ‘That is true’. If that is so, then the modal claim in (3) first makes the proposition comprising all the *p*-worlds in which a wolf walks in prominent, demoting all others one position down, and then it makes prominent the proposition that given *p*, a possibility of a wolf walking in is open. Note that, as a consequence, both propositions are stored on the conversational record, and potentially available as restrictors for subsequent modals. Since the second sentence in (3) elaborates on the epistemic possibility of a wolf walking in, introduced by the first, as a result of the Elaboration relation, this proposition is again promoted, and thus, the modal in the second sentence selects it as a restrictor.

one position down). Thus, we interpret coherence relations as making a two-fold contribution: first, they contribute updates to the conversational context (e.g., Elaboration promotes the possibility elaborated upon) and second, they signal a particular relation between the relevant bits of discourse (e.g., it is signaled that the proposition expressed by the utterance of the second sentence in (3) stands in an Elaboration relation with the epistemic possibility of a wolf walking in).<sup>72</sup> In other words, apart from signaling that a particular relation holds between different bits of discourse, coherence relations also contribute updates to the context that affect prominence ranking.

My account thus treats utterances as having two layers of content. One is characterized by the updates, the role of which is to structure and rearrange the context and contextual parameters as the discourse evolves. This kind of content encodes the characteristic effect an utterance has on the conversational record. The other is ordinary propositional content. The account is designed to capture both aspects of modal meaning at the same time. Both are necessary and are related. Unless we factor in the context-change that an utterance induces, we wouldn't be able to predict how the utterance sets the context for subsequent discourse, e.g., by making a proposition prominent for subsequent modal anaphora. This context-change brought about by the updates associated with utterances, in turn, affects the truth-conditions—in particular, given the anaphoric behavior of modals, the proposition expressed by a modal utterance depends on which propositions were made prominent by the prior discourse. And this propositional content can then itself be promoted on the record via an update associated with the utterance expressing it, thus making it available for subsequent anaphora. The two types of content are thus crucially interrelated: an utterance depends on the context to determine the proposition it expresses, but it also dynamically changes the context, thus directly affecting the propositional content of the subsequent discourse. Far from being incompatible with the propositional content, this dynamic meaning is precisely what allows us to systematically compute it.

Notice that, while the present account assigns utterances two layers of content—propositional content and dynamic content—one shouldn't think of these two layers as aligning with the distinction between compositional semantic value and content, in the sense of Yalcin (2015).<sup>73</sup> While the compositional machinery of the present system is dynamic—expressions are recursively assigned updates to the conversational record—the propositional content isn't merely recovered as the informational, assertoric content of an utterance. Rather the dynamic updates are specified in such a way that they, on the one hand, manipulate the parameters of context, but, on the other, also contribute truth-conditional content of each expression to the proposition expressed, thus building the propositional content expressed. So, the propositional content plays a proper role in the semantic

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<sup>72</sup>An Elaboration relation between propositions  $p$  and  $q$ , holds just in case  $p$  and  $q$  are centered around the same event or entity, i.e. just in case the event or scenario described by  $q$  is a part of the one described by  $p$  (cf. Hobbs (1979), Asher and Lascarides (2003)). Since we only care about how the relations affect prominence, we needn't worry about possible ways of cashing out this provisional characterization.

<sup>73</sup>See also Dummett (1973, 1993); Lewis (1980); Ninan (2010); Stanley (1997a,b); Rabern (2012) and Stojnić (forthcoming) for further discussion of the distinction between the compositional semantic value and content.

composition. Crucially, notice that even the non-asserted bits of an utterance have propositional content. For instance, the antecedent of the conditional in, say, (5), crucially express propositional content, and this propositional content is made prominent on the conversational record by the update associated with conditional antecedents, and the subsequent update with coherence relation Elaboration, and is thus made available as a potential restrictor for subsequent modals. In this way, the propositional content of the antecedent affects the propositional content expressed by the modal claim in the consequent, through modal anaphora resolution. Notice that on this picture, neither the antecedent proposition, nor the consequent proposition, is asserted: what’s asserted is the conditional. But it is crucial for computing the right interpretation that the antecedent and the consequent have propositional content that can play a role in semantic composition.<sup>74</sup> So, while non-propositionalist maintain that modal claims have compositional semantic value, but don’t express content, on the present account, they do express contents, which both plays a role in semantic composition and is determined by it.

Note that my account treats the dynamics of prominence as governed by linguistic mechanisms, building into the semantics proper the mechanisms affecting the prominence ranking. Couldn’t we, instead, keep the anaphoric account of modals and conditionals, as specified in 4.1 and 4.2, but leave the mechanisms structuring the context (and thus governing anaphora resolution) out of the semantics? In particular, couldn’t the dynamics of prominence be governed by speaker’s intentions

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<sup>74</sup>This raises a further issue. Since the propositional content expressed by an utterance is affected by discourse dependences that are underscored by the dynamics of context-change, which proposition is expressed by a given utterance, on this account, depends on the prior discourse that the utterance is following up on. So for instance, an utterance of ‘He sat down’ within a quantificational context created by an indefinite, e.g., following an utterance of ‘A man came in,’ will express a proposition that some man came in and sat down (assuming that the utterance is continuing a narrative about the aforementioned man, and is not accompanied by a pointing gesture (cf. [Stojnić, Stone, and Lepore \(2017\)](#)); however, following ‘John came in,’ it will express a proposition that John came in and sat down (again, assuming that the utterance is continuing a narrative about John, and is not accompanied by a pointing gesture). As shown by [Stojnić, Stone, and Lepore \(2017\)](#), this allows us to assign a uniform meaning to a pronoun that captures its deictic, bound and discourse bound (“E-type”) readings in a uniform way. Similarly, an utterance of ‘It would eat you’, in a context in which an epistemically live possibility of a wolf walking in is made prominent, e.g., by a prior modal, as in ‘A wolf might walk in,’ will express a proposition that a wolf would eat the addressee, given the prominent epistemically live possibility in which one walks in. The framework developed here thus captures the familiar idea that the proposition expressed depends on a (antecedently set) context, while accommodating the insight that the context changes in a rule governed way—both across a discourse, and across a single utterance—in a way that affects which proposition is expressed by what’s to come. The insight is that the rules of language dictate which proposition will be expressed by an utterance given an input context  $c$ , as they determine how  $c$  will evolve to build the proposition expressed. Since the dynamic layer of meaning builds a proposition through a manipulation of a context, an utterance does not simply receive an interpretation from an antecedently fixed, static context. This means that the information expressed by an utterance is a function of the change in context brought about by that utterance. But this also means that since the information carried by utterances depends on the dynamics of context to a certain extent, this can make it surprising or misleading to focus on the interpretation of a particular utterance, when one is looking more broadly at the information and interpretive dependencies in a discourse. Applying this to (1), then, we shouldn’t ask which proposition ‘It is raining and it might not be’ expresses in a context  $c$ , but rather, which proposition the dynamic meaning associated with it will build, given an input context  $c$ . The answer is that it will always build the proposition corresponding to an empty set (given that the second conjunct elaborates on the first), as the first conjunct is associated with the update that creates a context in which the prominent possibility is a non-raining one, and the second conjunct contains a modal expression sensitive to the prominence of possibilities in the context.

and general pragmatic cues? Nothing in principle rules out such an account. But the account fails on empirical grounds, as it cannot satisfactorily explain our key datum, namely, the contrast between (1) and (2).

Recall, the Elaboration relation between the conjuncts in the antecedent of (1) makes the possibility described by the first conjunct prominent, and that is why the modal in the second conjunct selects it as its restrictor. This in turn delivers an inconsistent interpretation. If the effect on prominence associated with the Elaboration were merely a byproduct of pragmatic reasoning, we would expect the interlocutors to re-interpret, selecting some other body of information as the restrictor for the modal (perhaps the body of information of the speaker, delivering the unrestricted reading: ‘if it’s not raining, and for all I know it is...’). Indeed, that there is contrast between (2) and (1) is utterly surprising on a pragmatic account. Namely, there is at least one possible, plausible interpretation of (1), namely (2), that is available.<sup>75</sup> Considerations of relevance and plausibility favor this interpretation over the one actually retrieved as it, by contrast with the incoherent one, provides a plausible scenario that the speaker can be hypothetically considering and reasoning about. And clearly, considerations of charity favor this interpretation over the one actually retrieved since this interpretation is plausible and potentially true, while the alternative one is inconsistent. So, from the standpoint of a pragmatic account it would be mysterious why we get the interpretation that we do. But, if we understand it to be a part of the linguistic contribution of Elaboration to promote the possibility elaborated on, in this case, *that it is not raining*, and given that modals look for the most prominent possibility as their restrictor, the inconsistent truth-condition is calculated as a matter of grammar. That it would be the one recovered, even if infelicitous, is precisely expected.

Other data, too, suggest that the context-changing effect of discourse coherence is a matter of linguistic rules, rather than a byproduct of pragmatic reasoning. It seems that hearers follow a narrow set of linguistic cues that signal how the discourse is organized when resolving anaphoric dependencies. We have seen this already with pronominal anaphora in (16) and with modal anaphora in (1). To take another example, consider the contrast between (25) and (26):

(25) John might come to the party, and he probably won’t.

(26) John might come to the party, but he probably won’t.

While (25) seems odd, (26) is perfectly fine. The only difference between the two is that (26) is organized around the Contrast relation, signaled by ‘but’, while in (25) we naturally expect Elaboration. We have seen before, in §4, that the effect of Contrast is to promote the body of

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<sup>75</sup>Indeed there are many: a plausible candidate is likewise ‘If it is not raining and for all I know it is, then I’m uninformed about the weather’. It is clear that plausibility and relevance would favor this interpretation, and more so since epistemic modals are most often (though as the present account makes clear, not always) interpreted as quantifying over bodies of information that at least include the information of the speaker. And charity would likewise favor this interpretation over the one naturally retrieved, since this interpretation does not involve any incoherence or infelicity.

information that the two bits of discourse in (26) are providing contrasting information about, which yields the intuitive interpretation of (26)—given the information available discourse initially, John might come to the party, but given this same information, he probably won't. On the other hand, the expected effect of Elaboration would deliver an inconsistent interpretation for (25)—it is compatible with the information available discourse initially that John will come to the party, but he will probably not come, *given that he comes*. If this effect of Elaboration were a mere byproduct of pragmatic reasoning, there would be no reason, in principle, why the hearers would not be selecting the body of information available discourse initially as the restrictor for the modal 'won't' in (25), which would essentially yield the interpretation we get in (26). Moreover, note that if one were to re-interpret (25) in this way when faced with inconsistency, one could no longer understand (25) as organized by the Elaboration relation—one cannot freely change the resolution of modal anaphora while holding the relation fixed. This again suggest that the effect of the relation is linguistically encoded.

Further support for my linguistic account comes from the examples like the following:

(27) A wolf might walk in. But, then again one will probably not walk in. It would eat Harvey.

In (27), we cannot understand '*would*' in the final sentence as restricted by the proposition describing the epistemic possibility of a wolf walking in, introduced by the modal in the first. While this is expected on a linguistic account, which maintains that the resolution of modal anaphora is governed by the underlying discourse structure, it is less clear why there would be such a constraint on a purely pragmatic account—after all, there is a prominent proposition in the context that could serve as the restrictor, and which would yield a plausible interpretation. In other words, the possible resolutions of a modal anaphora are much more constrained than what one would expect if they were determined by pragmatic principles.

Just as the robustness of the effect of coherence on prominence seems to be linguistically constrained, so too does the effect of modal expressions. It is a part of the meaning of a modal (or an antecedent of a conditional) that it makes the proposition introduced by the preajcent prominent for subsequent modal anaphora. Note that a proposition is made prominent regardless of whether the modal is embedded, say under a negation, as in (29) and (30), or in a question, as in (28), or an antecedent of a conditional, as it is in (1):

(28) Might a wolf walk in? It would probably eat Harvey.

(29) No wolf will come in. It would have to get through the security gate.

(30) John will probably not come to the party. That's a pity. He would have fun.

In all these examples, the dynamics of prominence is in play. If the effect on prominence were a matter of a pragmatic effect of an utterance of a modal, it would be surprising that they persist

even under embeddings, and even when the possibility that is made prominent is questioned (as in (28)), or explicitly said not to obtain (as in (29) or (30)).<sup>76</sup>

In addition, there is also cross-linguistic variation in how languages exploit coherence in signaling shifts in prominence that affect modal anaphora. For example, the data presented by Asher and McCready (2006) show that the direct truth-conditional translation of (3) in Japanese is infelicitous; however, if an overt discourse marker is inserted signaling an Elaboration relation, the discourse becomes felicitous.<sup>77</sup> This, again, would be surprising if the interpretation according to which the second modal is understood as elaborating on the scenario described by the first one, were merely a byproduct of general reasoning.

These data suggest, then, that not only are the mechanisms of context-change that affect the resolution of modal anaphora systematic and robust, but they are also part of grammar. This, in turn, suggests that not only do we need to take into account mechanisms of context-change in order to derive the plausible truth-conditions for modal utterances, but moreover, language encodes the effects of these mechanisms along (and beyond) ordinary truth-conditional content. This is precisely what the account which interprets utterances as carrying both dynamic and propositional content maintains.<sup>78</sup>

## 6 Conclusion

Taking stock, I have argued against the non-propositionalists. In particular, I have argued that their argument from the puzzling behavior of modal vocabulary in context does not warrant the conclusion that modal claims fail to express propositional content. The data is better explained once we recognize that modals are anaphoric expressions, and that the resolution of modal anaphora is sensitive to systematic and robust mechanisms of discourse structure and discourse coherence. Once we take these mechanisms into account, we can easily explain the puzzling behavior of modals that fueled non-propositionalist accounts, while maintaining that modals express ordinary propositional content.

The view I am defending maintains that context systematically changes with the evolving discourse, both between utterances, and also within a single utterance. Thus, it rejects the traditional picture in *CONTENT IN CONTEXT*. Hence, though modal claims express ordinary truth-conditions, there is an important sense in which my view is dynamic: much like the non-propositionalist ac-

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<sup>76</sup>Moreover, the effect is present even when the possibilities made prominent are extremely far-fetched, which, too, would be somewhat surprising on a pragmatic view, since general reasoning often allows us to disregard far-fetched scenarios.

<sup>77</sup>Asher and McCready (2006) are not themselves committed to the view that coherence relations contribute prominence-affecting updates, nor do they use these data to argue that coherence relations have conventionalized effects on the resolution of modal anaphora. Still their data illustrates this point nicely.

<sup>78</sup>See the discussion in Lepore and Stone (2015) for arguments that discourse relations themselves are learned conventions for signaling how utterances are organized into a coherent discourse.

counts, it too crucially relies on the idea that an important aspect of meaning is the characteristic effect an utterance has on context, and this aspect of meaning goes beyond the truth-conditional content. However, unlike these other accounts, I have argued that once we adequately capture the dynamic aspect of meaning, the ordinary propositional meaning naturally falls out.

More precisely, I have defended a theory according to which utterances are interpreted as carrying two types of content—they are interpreted as instructions to update existing dependencies in a context, and they express propositional content. Both types are needed, and they are interrelated: the kind of context-change that an utterance induces on a context draws on the truth-conditional content of the prior discourse, and directly affects the truth-conditional content of the subsequent discourse. Thus, it turns out, though dynamic semantics is often understood as competing with traditional truth-conditional semantics, the two are in sync.

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