'Might' Counterfactuals[1]

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February 2024

1 Introduction

This paper is about the semantics of 'might' counterfactuals like (1).

(1)   If Matt had gone to the parade, David might have gone to the parade.

One popular thesis about the semantics of 'might' counterfactuals is *Duality*. Duality says that the 'might' counterfactual

(2)   If it had been that A, it might have been that B.

and the 'would not' counterfactual

(3)   If it had been that A, it would not have been that B.

are contradictories: exactly one is always true. On this view, (1) is true if and only, it's not the case that, if Matt had gone to the parade, David would not have gone.[2]

There are reasons to like Duality. Perhaps most notably, Duality provides a simple, compelling explanation of why speeches like (4) are infelicitous.

(4)   #If Matt had gone to the parade, David might have gone to the parade. But if Matt had gone to the parade, David would not have gone.

According to Duality, (4) is infelicitous because it is inconsistent.

But I believe Duality should be rejected. Given weak background assumptions, Duality is inconsistent with the principle of Conditional Excluded Middle: the principle that ⌜if A, would B, or if A, would not B⌝ is always true. And there are powerful arguments for Conditional Excluded Middle—arguments showing that it plays a central role in our best theories of the probabilities of conditionals, and in our best theories of the interaction between conditionals and other logical operators (such as negation and quantifiers).[3]

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[1] I am indebted to Melissa Fusco and Matt Mandelkern for feedback. Special thanks to David Boylan for detailed feedback on two drafts and many helpful conversations.

[2] For theories of counterfactuals that validate Duality, see Lewis (1973) and Kratzer (1981,1986).

[3] For discussion of the role of Conditional Excluded Middle in accounting for the probabilities of conditionals, see van Fraassen (1976), Kaufmann (2009), Bacon (2015), and Mandelkern (2018). For the role of Conditional Excluded Middle in accounts of the interaction between conditionals and negation and quantifiers, see Higginbotham (1986), von Fintel and Iatridou (2002), and Klinedinst (2011).

If we reject Duality in favor of Conditional Excluded Middle, we need a different account of 'might' counterfactuals. Stalnaker (1981) and DeRose (1994, 1999) suggest the *Epistemic Thesis*, which says that (1) has the same meaning as (5).[4]

(5)   Maybe, if Matt had gone to the parade, David would have gone to the parade.

The Epistemic Thesis provides a compelling alternative explanation of why (4) is defective. It says that (4) is equivalent to the Moorean (6).

(6)   #Maybe, if Matt had gone to the parade, David would have gone. But if Matt had gone to the parade, David wouldn't have gone.

But while there are principled, compositional accounts of 'might' counterfactuals that predict Duality, there are not, to my knowledge, principled, compositional accounts of 'might' counterfactuals that predict the Epistemic Thesis.

My aim in this paper is to fill this gap. I defend a new theory of the counterfactual interpretation of the modal 'might'—the interpretation it receives in (1)—on which 'might' has the same meaning as 'maybe would'. And I show that, when coupled with a plausible semantics for 'if' clauses, my theory validates the Epistemic Thesis. Importantly, I make no revisionary syntactic assumptions: I assume that 'would' and 'might' counterfactuals have the logical forms that they appear to have.

The paper opens in §2 with a new account of the epistemic and temporal interpretation of 'may'. I defend a *referential selection semantics* on which 'may' has roughly the same meaning as 'maybe will'. In §3, I combine this referential selection semantics for 'may' with a semantics for the past tense. The result is a semantics for the counterfactual interpretation of 'might' on which it has the same meaning as 'maybe would'. §4 concludes.

2   'May'

I start by introducing two facts about 'may': first, that 'may' often has the same meaning as 'maybe will'; and second, that a 'may' conditional ⌜if A, may B⌝ often has the same meaning as ⌜maybe, if A, will B⌝.

A quick preliminary note. The modal 'might' has an epistemic use on which it is synonymous with 'may'. I set this epistemic interpretation to one side for now. I return to it in §3.6.

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[4]This name comes from DeRose (1994). Note that DeRose does not characterize the Epistemic Thesis using the modal 'maybe' as I do in this paper. He defines the Epistemic Thesis as follows, where '◇→' stands for the 'might' counterfactual, '□→' for the 'would' counterfactual, and '◇$_e$' stands for epistemic possibility: A ◇→ B $=_{df}$ ◇$_e$(A □→ B).

2.1 Two Facts About 'May'

Condoravdi (2002) introduces a distinction between the *temporal orientation* of a modal and the *temporal perspective* of a modal. Temporal orientation concerns the time at which the sentence that is the modal's scope—the modal's *prejacent*—is evaluated. Consider:

(7)   Matt could lift his hand (yesterday).

(8)   Matt may go to the wedding (tomorrow).

(7) has past orientation: the prejacent of 'could' is about past events—namely, whether Matt lifted his hand yesterday. (8) has future orientation: the prejacent of 'may' is about future events—namely, whether Matt will go to the wedding tomorrow.

The temporal perspective of a modal concerns the time at which the modality is evaluated. (7) has past perspective: it says that Matt *was* able, yesterday, to lift his hand. (8) has present perspective: it says it is *now* possible that Matt will go to the wedding.

The first fact about 'may' is that 'may' claims often have *future orientation* and *present perspective*.[5] Consider:

(9)   Matt may go to the wedding.

(10)   John may miss his flight.

(9) is interpreted as saying that it is now epistemically possible that Matt will go to the wedding at some future time. That is to say, (9) is heard as equivalent to:

(11)   Maybe, Matt will go to the wedding.

Likewise, (10) is interpreted as saying that it is now epistemically possible that John will miss his flight at some future time. That is to say, (10) is heard as equivalent to:

(12)   Maybe, John will miss his flight.

In what follows, I will understand the claim that 'may' often has present perspective and future orientation to mean that 'may' often has the same meaning as 'maybe will.'

(Note that 'may' does not always have future orientation. Consider:

(13)   Sarah may be sleeping in the other room.

(13) has present perspective and *present* orientation: it says that it is possible,

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[5]See Enc (1996), Condoravdi (2002), Arregui (2007), and Stowell (2004).

right now, that Sarah is sleeping, right now, in the other room. I will set 'may' claims with present orientation to one side for now. I will return to them in §2.5.)

The second fact about 'may' concerns 'may' conditionals. Consider:

(14)   If Matt cancels his appointment, he may go to the wedding.

Notice that (14) seems to have the same meaning as both (15) and (16).

(15)   If Matt cancels his appointment, maybe he will go to the wedding.

(16)   Maybe, if Matt cancels his appointment, he will go to the wedding.

That (14) has the same meaning as (15) follows from the fact that 'may' means maybe will in (14). But that (14) has the same meaning as (16) does not follow from this fact: saying that 'may' means maybe will does not explain why 'maybe' can take wide scope over the conditional.

How might we explain this second fact—the fact that (14) has the same meaning as (16), and more generally, that ⌜if A, may B⌝ often has the same meaning as ⌜maybe, if A, will B⌝?

Here is one idea. Start with a *restrictor semantics* on which 'if' clauses act as restrictors on modals in the consequents of conditionals.[6] Now, if 'may' means maybe will, then there are two parts to the meaning of 'may': the 'maybe' part and the 'will' part. Many linguists and philosophers say that 'will' is also a modal.[7] Let's suppose they're right. Then the consequent of (14) in effect contains two modals: 'maybe' and 'will'. Suppose we say the 'if' clause restricts 'will' but not 'maybe'. That will allow 'maybe' to take wide scope over the conditional without changing its meaning, and so we will predict that (14) says the same thing as (16).[8]

This is the idea I will pursue. In the next section, I introduce a *referential selection semantics* for 'will'. I model the modal part of the meaning of 'will' with Cariani & Santorio's (2018) *selection semantics* and the temporal part of the meaning of 'will' with a *referential semantics* that mimics referential theories of tense. I will then introduce a parallel referential selection semantics for 'may', and I will show that, when combined with a plausible restrictor semantics for 'if' clauses and a semantics for 'maybe', the theory captures our two observations.

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[6]Kratzer (1981, 1986).

[7]See Abusch (1997), Condoravdi (2002), Kaufman (2005), Copley (2009), Klecha (2014), Cariani & Santorio (2018), and Cariani (2021).

[8]I do not claim that this is the only way to explain our two observations. But it is one natural way to do so, and, as we will in §3, it works especially well for predicting the Epistemic Thesis.

2.2 Referential Selection Semantics

I begin with some preliminary remarks about syntax. When it is said that 'will' is a modal, what is usually meant is that 'will' contains a modal morpheme—often called 'woll'—that it shares with 'would': 'will' is composed of 'woll' under a present tense operator ('Pres') and 'would' is composed of 'woll' under a past tense operator ('Past').[9] Consider (17).

(17)   Matt will go to the wedding.

I will assume that the logical form of (17) involves 'will' scoping over a tense-less phrase. Given our assumption that 'will' is composed of 'woll' under present tense, this gives us the following logical form for (17).

(18)   Pres[Woll[Matt go to the wedding]]

If 'woll' is a modal, what kind of modal is it? Ordinary modals like 'must' and 'may' are *quantificational*: 'must' is a universal quantifier over possible worlds and 'may' is an existential quantifier over possible worlds. Cariani & Santorio convincingly argue that 'woll' is unlike these ordinary modals. It is not a quantificational modal. Instead, it is what they call a *selection modal*: 'woll' selects a world from the historically possible worlds and says that its prejacent is true in that world.

To state the semantics, we introduce two semantic parameters: a modal base m and a selection function f. The modal base takes a world w and a time t and returns the set $m(w, t)$ of *historical alternatives* to w at t: the set of worlds that are exactly like w up to t.[10]

The selection function f takes a world w and a proposition **A** and returns the 'closest' world to w where **A** is true.[11] (Note that I use boldface uppercase letters, like '**A**', for variables ranging over propositions.) f satisfies two constraints.

> **Success**
> $f(\mathbf{A}, w) \in \mathbf{A}$
>
> **Minimality**
> If $w \in \mathbf{A}$, then $f(\mathbf{A}, w) = w$

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[9] Abusch (1997) and Condoravdi (2002).

[10] Note that 'woll' is not always interpreted relative to a historical modal base. As Cariani & Santorio note, there are epistemic readings of 'will'. For example:

(19)   John will be in London by now.

Following Cariani & Santorio, I assume that we can account for epistemic readings of 'will' by saying that its modal base can have different modal flavors.

[11] The selection function comes from Stalnaker's (1968) semantics for conditionals.

The selection semantics for 'woll' then says that ⌜woll A⌝ is true, in a world w, if and only if A is true in the world that is selected from the set of historical alternatives to w.

I will use this selection semantics to model the modal meaning of 'woll'. What about its temporal meaning? 'woll' talks about the future: 'will' talks about the future of the present, and 'would' talks about the future of the past. For example:

(20)   Later today I will make dinner.

(21)   Later that day I would make dinner.

There are different ways to model the temporal meaning of 'woll'. I will propose a *referential* account on which 'woll' refers to a particular, contextually-determined time.[12] Formally, I will say that 'woll' is indexed to a free variable whose value is supplied by a contextually-supplied assignment function g, and ⌜woll$_j$ A⌝ tells us that A is true at g(j). To capture the fact that 'woll' talks about the future, I will say that ⌜woll$_j$ A⌝ presupposes that g(j) is no earlier than the time supplied by tense.[13]

Before I introduce the referential selection semantics for 'woll', I need to in-

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[12]A more standard account of the temporal meaning of 'woll' is the so-called *Ockhamist semantics* on which 'woll' is an existential quantifier over future times. The main reason to prefer a referential account is that 'will' is scopeless with respect to negation: (22) and (23) are true in exactly the same situations.

(22)   It's not the case that it will rain.

(23)   It will not rain.

The Ockhamist semantics does not predict scopelessness. The referential account does. (For discussion of scopelessness, see Cariani & Santorio (2018) and Cariani (2021).) Another account that predicts scopelessness is the *extension semantics* given by Abusch (1997) and Condoravdi (2002): on this account, 'woll' extends the time of evaluation into the future. Let $\text{ext}(t) = \{t' : t' \geq t\}$. The extension semantics says that ⌜woll A⌝ is true at a time t iff A is true in $\text{ext}(t)$. The reason that I do not adopt this account is that I do not know how it can make sense of the future perfect. Consider:

(24)   I will have finished dinner.

I assume that (24) has the following logical form.

(25)   Will[Perfect[I finish dinner]]

On a standard semantics, ⌜Perfect A⌝ is true at t iff A is true some time before t. If we combine this semantics for the Perfect with the extension semantics for 'will', we predict that (24) is true at t iff I finish dinner at some time that precedes $\text{ext}(t)$, and hence, iff I finish dinner before t. This is wrong. (A similar problem arises with 'may': see footnote 20.)

  Note that my main arguments will not turn on my decision to use a referential account. The core of my theory would be preserved if I replaced the referential semantics with an Ockhamist or extension semantics.

[13]This referential theory of 'woll' parallels referential theories of tense. (See Partee (1973) and Heim (1994).) I remain neutral on how to formally model the presupposition that g(j) must be no earlier than the time supplied by tense. One option is to model the presupposition as a definedness condition. This would give us the following entry for 'woll':

troduce one last bit of terminology. I will say that a *temporal proposition* is a function from worlds to a function from times to truth values—or, equivalently, a set of world-time pairs. An *atemporal proposition* is a function from worlds to truth values—or, equivalently, a set of worlds. When I need to be clear about whether I am talking about a temporal or atemporal proposition—as in the semantic entries—I will indicate the type of the proposition in a subscript: $\langle s, t \rangle$ is the type of an atemporal proposition and $\langle i, st \rangle$ is the type of a temporal proposition.

Where g is an assignment function, m is a modal base, and f is a selection function, we have the following entry for 'woll'.

Referential Selection Semantics for 'Woll'
$$[\![\text{Woll}_j]\!]^{g,m,f} = \lambda \mathbf{A}_{\langle i,st \rangle} \lambda t \lambda w.\mathbf{A}(g(j))(f(m(w,t),w))$$

This says that 'woll$_j$' denotes a function that takes a temporal proposition $\mathbf{A}$, a time t, and a world w and returns true if and only if $\mathbf{A}$ is true at $g(j)$—a time no earlier than t—in the world u that is selected from the set $m(w,t)$ of historical alternatives to w, at t.[14]

Importantly, w is one of w's historical alternatives: $w \in m(w,t)$. So it follows from Minimality that the selected historical alternative to w is w itself: $f(m(w,t),w) = w$. This has an important consequence: the modal part of the meaning of 'woll' does not show up for unembedded 'woll' claims: ⌜woll$_j$ A⌝ is true in w if and only if A is true in w at $g(j)$. But then, one might wonder, why bother with the selection semantics? The main reason concerns 'will' (and 'would') conditionals. As we will soon see, if 'woll' comes with a modal base, we can adopt a restrictor semantics for 'will' (and 'would') conditionals: following

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(26) $[\![\text{Woll}_j]\!]^{g,m,f} = \lambda \mathbf{A}_{\langle i,st \rangle} \lambda t : t \leq g(j) \lambda w.\mathbf{A}(g(j))(f(m(w,t),w))$

Another option is to model the presupposition in a multidimensional framework, which does not require definedness conditions. See Herzberger (1973), Kartunnen & Peters (1979), and Mandelkern (2023). (I will also remain neutral on how to model the presuppositions for 'may' and for the present and past tenses.)

[14]One might wonder why I do not say that 'woll$_j$' presupposes that $g(j)$ is *later* than the time supplied by tense. There are at least two reasons. One is that there are present-directed uses of 'will'. Here is one example due to Cariani (2021).

(27)   The laundry will be done by now.

The second reason is that when 'woll' occurs under Past it can refer to a time that overlaps with the time supplied by Past.

(28)   In those days, when I came home from work, he would be sleeping on the couch.

The same is true of counterfactual uses of 'would'.

(29)   If I had come home from work, he would have been sleeping on the couch.

Kratzer (1981, 1986), we can say that the 'if' clause of a 'will' (or 'would') conditional restricts a modal base.

Earlier I said that 'will' is composed of the modal 'woll' under a present tense operator, Pres. I will assume a referential theory of tense: tenses are indexed to free variables whose values are determined by our contextually-supplied variable assignment g. ⌜Pres$_i$ A⌝ says that A is true at $g(i)$ and presupposes that $g(i)$ overlaps with the time of the context.

We can now combine this semantics for tense with our semantics for 'woll' to give a semantics for 'will'. Where g is an assignment function, m is a modal base, f is a selection function, and c is a context, we have the following entry.

Semantics for 'Will'

$$[\![\text{Will A}]\!]^{g,m,f,c} = [\![\text{Pres}_i \, [\text{Woll}_j \, \text{A}]]\!]^{g,f,m,c}$$

$$= [\![\text{Woll}_j]\!]^{g,f,m,c}([\![\text{A}]\!]^{g,m,f,c})([\![\text{Pres}_i]\!]^{g,f,m,c})$$

$$= [\lambda \mathbf{A}_{\langle i,st\rangle} \lambda t \lambda w. \mathbf{A}(g(j))(f(m(w,t),w))]([\![\text{A}]\!]^{g,m,f,c})(g(i))$$

$$= [\lambda t \lambda w. [\![\text{A}]\!]^{g,m,f,c}(g(j))(f(m(w,t),w))](g(i))$$

$$= \lambda w. [\![\text{A}]\!]^{g,m,f,c}(g(j))(f(m(w,g(i)),w))$$

To see how this works, let's look an example. Consider:

(30)   I will make dinner.

(30) has the following logical form.

(31)   Pres$_i$[Woll$_j$[I make dinner]]

To determine whether (31) is true, in a world w, we check whether (32) below is true, in w, at the time $g(i)$ supplied by Pres.

(32)   Woll$_j$[I make dinner]

And to determine whether (32) is true in w at $g(i)$, we find the world u that is selected from the set of historical alternatives to w, at $g(i)$. Then we ask whether, in u, I make dinner at $g(j)$—the time introduced by 'woll'. Since w is one of w's historical alternatives, it follows from Minimality that $u = w$. And so we predict that (30) is true, in w, if and only if I make dinner in w at $g(j)$.[15]

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[15]I have assumed that ⌜woll$_j$ A⌝ denotes a temporal proposition. This temporal proposition combines with the time supplied by tense, yielding an atemporal proposition (a function from worlds to truth values) as the semantic value of ⌜will$_j$ A⌝. There are familiar reasons, having to do with uncertainty about the time, for thinking that the semantic value of ⌜will$_j$ A⌝ should instead be a temporal proposition. I set this complication aside in this paper.

That completes our referential selection semantics for 'will'. I will now introduce a parallel referential selection semantics for 'may'. I will say (roughly) that 'may' means maybe will. Accordingly, there will be two parts to the meaning of 'may' on my theory. First, the 'maybe' part: 'may' quantifies over epistemic possibilities. Second, the 'will' part: $\ulcorner$may A$\urcorner$ says that $\ulcorner$will A$\urcorner$ is true in an epistemically possible world.

Let's make this more precise. To model the 'maybe' part of the meaning of 'may' I adopt a standard quantificational treatment: 'may' existentially quantifies over epistemically possible worlds.

To model the 'will' part of the meaning of 'may' I assume that 'may', like 'will', is indexed to a free variable j whose value is supplied by our variable assignment g: $g(j)$ will represent the temporal orientation of the 'may' claim—the time at which the prejacent of 'may' is evaluated. I will assume that 'may$_j$', like 'woll$_j$', presupposes that $g(j)$ is no earlier than the time supplied by tense.

I will also assume that temporal perspective—the time at which the modality is evaluated—is determined by tense: 'may' receives a present-perspective interpretation because it occurs under our present tense operator, Pres. (This is a bit imprecise. What I should really say is that 'may' is composed of a modal morpheme—call it 'mo'—under the Present. In the next section, I will argue that, when 'might' receives a counterfactual interpretation, 'might' is composed of 'may' under Past. Strictly speaking, what I should say is that, in these instances, 'might' is composed of the modal morpheme 'mo' under Past.)

We are now ready to state the semantics for 'may'. Where E_c is a contextually-supplied epistemic accessibility relation, we have the following semantic entry.

Referential Selection Semantics for 'May'
$\llbracket \text{Pres}_i[\text{May}_j\ A] \rrbracket^{g,m,f,c}$

$= \llbracket \text{May}_j \rrbracket^{g,m,f,c}(\llbracket A \rrbracket^{g,m,f,c})(\llbracket \text{Pres}_i \rrbracket^{g,m,f,c})$

$= [\lambda \mathbf{A}_{\langle i,st \rangle} \lambda t \lambda w. \exists v \in E_c(w), \mathbf{A}(g(j))(f(m(v,t),v))](\llbracket A \rrbracket^{g,m,f,c})(\llbracket \text{Pres}_i \rrbracket^{g,m,f,c})$

$= [\lambda t \lambda w. \exists v \in E_c(w), \llbracket A \rrbracket^{g,m,f,c}(g(j))(f(m(v,t),v))](g(i))$

$= \lambda w. \exists v \in E_c(w), \llbracket A \rrbracket^{g,m,f,c}(g(j))(f(m(v,g(i)),v))$

This says $\ulcorner$may A$\urcorner$ is true, in a world w, if and only if, for some epistemically possible world v, A is true at $g(j)$—a time no earlier than the present time $g(i)$—in the world u that is selected from the set $m(v, g(i))$ of historical alternatives to v at $g(i)$.[16]

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[16]Earlier I said that 'will' is sometimes interpreted relative to an epistemic modal base. Recall:

Consider an example. Take (9), repeated below.

(9)   Matt may go to the wedding.

I assume that (9) has the following logical form.

(35) $\text{Pres}_i[\text{May}_j[\text{Matt go to the wedding}]]$

To determine whether (35) is true, in a world w, we check whether

(36) $\text{May}_j[\text{Matt go to the wedding}]$

is true, in w, at $g(i)$—the time supplied by the Present. And to determine whether (36) is true at $g(i)$, in w, we check whether there's an epistemically possible world v such that

(37)   Matt goes to the wedding.

is true at $g(j)$—the time supplied by 'may'—in the world u that is selected from $m(v, g(i))$, the set of historical alternatives to v, at the present time $g(i)$. Remember, v is one of v's historical alternatives. It follows from Minimality, then, that $u = v$. And so we predict that (9) is true, in w, if and only if there's an epistemically possible world v where Matt goes to the wedding at a contextually-determined time $g(j)$, no earlier than $g(i)$.

2.3 'Maybe' and 'If' Clauses

I began this section with two observations about 'may'. The first was that 'may' often means maybe will. The second was about 'may' conditionals. Recall:

(14)   If Matt cancels his appointment, he may go to the wedding.

We observed that (14) seems to have the same meaning as (16), repeated below.

(16)   Maybe, if Matt cancels his appointment, he will go to the wedding.

To show how we can use the referential selection semantics to predict these observations, we need only introduce a standard semantics for 'maybe' and 'if' clauses.

I assume that 'maybe' denotes a function that takes an *atemporal proposition* **A** and returns another atemporal proposition—the proposition that there is an

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(19)   John will be in London by now.

If 'may' is co-indexed with an epistemic 'will' like that in (19), then we predict that:

(33)   John may be in London by now.

has the same meaning as (34), where the embedded 'will' claim is read epistemically.

(34)   Maybe, John will be in London by now.

This prediction seems fine to me.

epistemically possible world where **A** is true. For example:

(11)   Maybe, Matt will go to the wedding.

In (11), 'maybe' denotes a function that takes the atemporal proposition that Matt will go to the wedding, and returns the atemporal proposition that it is epistemically possible that Matt will go to the wedding.

Here is the semantic entry for 'maybe'.

Semantics for 'Maybe'

$$[\![\text{Maybe A}]\!]^{g,f,m,c} = [\lambda \mathbf{A}_{\langle s,t\rangle}\lambda w.\exists v \in \mathsf{E}_c(w), \mathbf{A}(v)]([\![\text{A}]\!]^{g,m,f,c})$$

$$= \lambda w.\exists v \in \mathsf{E}_c(w), [\![\text{A}]\!]^{g,m,f,c}(v)$$

Following Kratzer (1981, 1986)—and many others since—I will assume a restrictor semantics for 'if' clauses. On this view, the semantic role of an 'if'-clause is to update a modal base with the antecedent of the conditional. Where m is any modal base, and $\mathbf{A}_{\langle s,t\rangle}$ is any atemporal proposition, I will let $\mathsf{m} + \mathbf{A}_{\langle s,t\rangle}$ be the modal base updated with $\mathbf{A}_{\langle s,t\rangle}$.

Updated Modal Base

$$\mathsf{m} + \mathbf{A}_{\langle s,t\rangle}(w,t) = \mathsf{m}(w,t) \cap \mathbf{A}_{\langle s,t\rangle}$$

Then we state the semantics for conditionals as follows.

Semantics for 'If' Clauses

$$[\![\text{If A, B}]\!]^{g,f,m,c} = [\![\text{B}]\!]^{g,f,m+\mathbf{A},c}$$

A conditional ⌜if A, then B⌝ is true relative to a modal base m if and only if B is true relative to the result of updating m with **A**, the proposition expressed by the antecedent.

2.4   Predictions

We can now show that our theory captures our two observations.

First we show that when 'may' and 'will' are co-indexed, 'may' has the same meaning as 'maybe will'. Consider (9) and (11), repeated below.

(9)   Matt may go to the wedding.

(11)   Maybe, Matt will go to the wedding.

We are assuming that (9) and (11) have the logical forms in (38) and (39), respectively.

(38)   Pres$_i$[May$_j$[Matt go to the wedding]]

(39)   Maybe[Pres$_i$[Woll$_j$[Matt go to the wedding]]]

We want to show that (38) is true if and only if (39) is true. First observe that (38) is true, in a world w, if and only if (40) below is true in w at g(i)—the time introduced by the Present.

(40)   May$_j$[Matt go to the wedding]

And (40), in turn, is true in w at g(i) if and only if there's an epistemically possible world v where Matt goes to the wedding at g(j)—the time introduced by 'may'. (This follows from our referential selection semantics for 'may'.) To say that there's an epistemically possible world v where Matt goes to the wedding at g(j)—a time no earlier than g(i)—is just to say that there's an epistemically possible world v where (41) below is true. (This follows from our referential selection semantics for 'will'.)

(41)   Pres$_i$[Woll$_j$[I make dinner later today]]

And finally, to say that there's a world v that is epistemically accessible from w where (41) is true is just to say that the 'maybe' claim (39) is true in w. (This follows from our semantics for 'maybe'.)

  Next we show that when 'may' and 'will' are co-indexed, ⌜if A, may B⌝ has the same meaning as ⌜maybe, if A, will B⌝. Recall:

(14)   If Matt cancels his appointment, he may go to the wedding.

(16)   Maybe, if Matt cancels his appointment, he will go to the wedding.

Ignoring the internal structure of the 'if' clauses, I assume that (14) and (16) have the logical forms in (42) and (43), respectively.

(42)   If[Matt cancels his appointment] [Pres$_i$[May$_j$[Matt go to the wedding]]]

(43)   Maybe[If [Matt cancels his appointment] [Pres$_i$[Woll$_j$[Matt go to the wedding]]]]

We want to show that (42) is true if and only if (43) is true. Let *Cancel* be the proposition that Matt cancels his appointment. By our semantics for 'if' clauses, (42) is true, in a world w, and relative to modal base m, if and only if (44) below is true in w, relative to the updated modal base m + *Cancel*.

(44)   Pres$_i$[May$_j$[Matt go to the wedding]]

Since 'may' means maybe will, (44) is true in w, relative to m + *Cancel* if and only if (45) below is true in w, relative to m + *Cancel*.

(45)   Maybe[Pres$_i$[Woll$_j$[Matt go to the wedding]]]

By our semantics for 'maybe', (45) is true in w, relative to m + *Cancel* if and only if, for some epistemically possible world v, (46) is true in v, relative to m + *Cancel*.

(46)　　$\text{Pres}_i[\text{Woll}_j[\text{Matt go to the wedding}]]$

To say there's an epistemically possible world v at which (46) is true relative to m + *Cancel* is just to say that there's an epistemically possible world v at which (47) below is true, relative to our original modal base m. (This follows from another application of our restrictor semantics.)

(47)　　$\text{If}[\text{Matt cancels his appointment}]\ [\text{Pres}_i[\text{Woll}_j[\text{Matt go to the wedding}]]]$

And finally to say that there's a world v epistemically accessible from w where (47) is true is just to say that the 'maybe' claim (43) is true in w. (This follows from our semantics for 'maybe'.)

2.5　Present Orientation

Earlier I mentioned that 'may' does not always have future orientation. Recall:

(13)　　Sarah may be sleeping in the other room.

(13) has present perspective and present orientation: it says that it is now possible that Sarah is now sleeping in the other room. To account for this, I will assume that the time supplied by 'may' in (13) is a present time. With this assumption in place, we predict that (13) is true if and only if there's an epistemically possible world where, right now, Sarah is sleeping in the other room.[17]

　　I treat the present perfect 'may have' in a similar way. Consider:

(48)　　Sarah may have finished dinner.

I assume that (48) has the logical form in (49): 'may' scopes over a perfect operator ('Perfect'), which, in turn, scopes over a tenseless phrase.

(49)　　$\text{Pres}[\text{May}[\text{Perfect}[\text{Sarah finish dinner}]]]$

I assume the following semantics for the Perfect.[18]

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[17]As Condoravdi (2002) observes, the temporal interpretation of 'may' depends on whether its prejacent is eventive or stative. When 'may' combines with an eventive sentence, it always has future orientation; when it combines with a stative sentence, it usually has present orientation. The question of how temporal interpretation is determined by lexical aspect is important but falls beyond the scope of this essay.

[18]See Condoravdi (2002). Note that are reasons to be concerned about the semantics for the Perfect that I have adopted in the main text. The Perfect (like 'will') seems to be scopeless with respect to negation: 'it's not the case that Sarah has finished dinner' seems to be equivalent to 'Sarah has not finished dinner.' (Thanks to an editor for pushing me to address this concern.) In light of this, we may wish to adopt a referential semantics for the Perfect. I do not have the space to explore this in detail, but as far as I can tell, the choice between a quantificational and

Semantics for Perfect

$[\![\text{Perfect}]\!]^{g,m,f,c} = \lambda \mathbf{A}_{\langle i,st \rangle} \lambda t \lambda w. \exists t' < t, \mathbf{A}(t')(w)$

Let's assume that the time introduced by 'may' in (48) is a present time. We will then predict that (48) is true if and only if there's an epistemically possible world where (50) below is true at $g(i)$—the time supplied by the Present.

(50)   Perfect[Sarah finish dinner]

By our semantics for Perfect, (50) is true, at the present time $g(i)$, if and only if Sarah finishes dinner some time before $g(i)$. And so, putting everything together, we predict that (48) is true if and only if there's an epistemically possible world where Sarah finished dinner some time before the present time.[19]

3 'Might'

In the previous section, I introduced two facts about 'may': first, that 'may' often means maybe will; and second that ⌜if A, may B⌝ often has the same meaning as ⌜maybe, if A, will B⌝. In this section, I introduce two parallel observations about the counterfactual interpretation of 'might'.

3.1   Two Facts About Counterfactual 'Might'

First, counterfactual 'might' seems to have the same meaning as 'maybe would'. For example, (1) seems to have the same meaning as (53).

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a referential account of the Perfect will not affect any of my main points: all I need to assume is that the Perfect shifts the time of evaluation to the past.

[19]Condoravdi (2002) offers an alternative account of the temporal interpretation of 'may'. She defends an extension semantics that parallels the extension semantics for 'will' discussed in footnote 12. On this view, ⌜may A⌝ is true at a time t iff, roughly, it is epistemically possible that A is true in $\mathsf{ext}(t)$. I noted that the extension semantics for 'will' appears to make the wrong predictions about 'will have'. The extension semantics for 'may' faces a parallel problem. Consider (48), repeated below.

(48)   Sarah may have finished dinner.

The default interpretation of (48) is a present perfect interpretation. But that is not the only interpretation that (48) can receive. Consider:

(51)   By the time David gets home, Sarah may have finished dinner.

(51) has a future perfect interpretation. It has the same meaning as (52).

(52)   By the time David gets home, maybe Sarah will have finished dinner.

The extension semantics says that (48) has only one reading—a present perfect reading. By contrast, a referential semantics can account for both readings. (48) receives a present perfect interpretation when the time supplied by 'may' is the present time, and it receives a future perfect interpretation when the time supplied by 'may' is a future time.

(1)   If Matt had gone to the parade, David might have gone to the parade.

(53)   If Matt had gone to the parade, maybe David would have gone to the parade.

Likewise, (54) seems to have the same meaning as (55).

(54)   If John won the lottery tomorrow, he might quit philosophy.

(55)   If John won the lottery tomorrow, maybe he would quit philosophy.

We find the same thing when we look at unembedded occurrences of counterfactual 'might'. For example, (56) seems to say the same thing as (57).

(56)   I'm sorry that we didn't try the tofu. Sarah might have loved it.

(57)   I'm sorry that we didn't try the tofu. Maybe Sarah would have loved it.

Likewise, (58) seems to have the same meaning as (59).

(58)   I didn't know Sarah dropped out of art school. She might have become a great photographer.

(59)   I didn't know Sarah dropped out of art school. Maybe she would have become a great photographer.

Moreover, asserting the counterfactual 'might have' claim while denying the corresponding 'would have' claim sounds incoherent.

(60)   #I'm sorry that we didn't try the tofu. Sarah might have loved it. But she wouldn't have.

(61)   #I didn't know Sarah dropped out of art school. She might have become a great photographer. But she wouldn't have.

(60) and (61) are completely unacceptable.

The second fact about counterfactual 'might' is the Epistemic Thesis that I introduced at the start of the paper: a 'might' counterfactual like (1), repeated below, seems to have the same meaning as (5).

(1)   If Matt had gone to the parade, David might have gone to the parade.

(5)   Maybe, if Matt had gone to the parade, David would have gone to the parade.

Importantly, the fact that (1) has the same meaning as (5) does not follow from our first fact: saying that 'might' means maybe would does not explain why 'maybe' can take wide scope over the conditional.

How might we explain this second fact—that (1) has the same meaning as

(5), and more generally, that ⌜if it had been A, might have been B⌝ has the same meaning as ⌜maybe, if it had been A, it would have been B⌝?

I think that we should explain it in the same way as we explained the parallel observation about 'may' conditionals. Assume that 'if' clauses act as restrictors on modals in the consequents of conditionals. If 'might' means maybe would, then the consequent of (1) in effect contains two modals: 'maybe' and 'would'. Suppose we say the 'if' clause restricts 'would' but not 'maybe'. That will allow 'maybe' to take wide scope over the conditional without changing its meaning, and so we will predict the Epistemic Thesis—that (1) says the same thing as (5).

This is the idea I will pursue. In §3.2, I introduce a semantics for 'would' and 'might' on their counterfactual interpretations, building on the referential selection semantics for 'will' and 'may' introduced in §2. In §3.3 I will show that the theory captures our two observations.

3.2 Semantics for Counterfactual 'Would' and Counterfactual 'Might'

Earlier we said that 'would' is composed of 'woll' under a past tense operator, Past. I also assume that, when 'might' receives a counterfactual interpretation, it is the past of 'may', and so, in these instances, 'might' is composed of 'may' under Past. (As I said earlier, this is a bit imprecise. Strictly speaking, what I should say is that, in these instances, 'might' is composed of the modal morpheme 'mo' under Past.) We already know what 'woll' and 'may' mean: ⌜woll$_j$ A⌝ says that A is true at g(j) in the selected historically possible world. And ⌜may$_j$ A⌝ says that ⌜woll$_j$ A⌝ is true in an epistemically possible world. The task that remains, then, is to say what Past means.

There are two theories about the meaning of Past in counterfactual uses of 'would'. The first theory is the *temporal past* theory.[20] On this view, Past has a purely temporal meaning: it shifts the time of evaluation to the past.[21] To see how this works, consider (62).

(62)   If Matt had gone to the parade, David would have gone to the parade.

I assume that the consequent of (62) involves 'would' scoping over a Perfect operator, which, in turn, scopes over a tenseless phrase. Ignoring the internal structure of the antecedent, this means that (62) has the following logical form.

(63)   If[Matt go to the parade] [Past[Woll[Perfect[David go to the parade]]]]

According to the temporal past theory, the Past takes us back to a time when

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[20]I borrow this name from Khoo (2022).

[21]See Ippolito (2013) and Khoo (2015) for defenses of the temporal past theory.

it was still historically possible for Matt to go to the parade—some time shortly before the parade, let's suppose—and the counterfactual (63) is true, roughly, if and only if the 'woll' conditional,

(64)   If[Matt go to the parade] [Woll[Perfect[David go to the parade]]]

is true at this past time.[22]

The second theory—the *modal past* theory—says that the Past in counterfactual uses of 'would' does not have its usual temporal meaning. It has a special modal interpretation: it shifts a modal parameter, such as a world or a modal base, and we evaluate (64) relative to this counterfactual world or counterfactual modal base.[23]

I will adopt the temporal past theory. I will assume a referential semantics for Past, paralleling our referential semantics for Present: ⌜Past$_i$ A⌝ says that A is true at $g(i)$ and presupposes that $g(i)$ precedes the time of utterance.

Note that I am adopting the temporal past hypothesis purely for ease of exposition. My central project is to defend a referential selection semantics for 'would' and 'might' that captures our two observations. To do this, I need to assume a particular semantics for Past, and the temporal past theory is in some ways more straightforward. I believe it is possible to reconstruct my theory in a modal past framework, but I do not have the space to do so in this paper.

We can now put our semantics for Past together with our referential selection semantics for 'woll' and 'may' to give a semantics for 'would' and 'might'. We have the following entry for 'would'.

Referential Selection Semantics for 'Would'

$[\![\text{Would A}]\!]^{g,m,f,c} = [\![\text{Past}_i\ [\text{Woll}_j\ \text{A}]]\!]^{g,m,f,c}$

$$= [\![\text{Woll}_j]\!]^{g,m,f,c}([\![\text{A}]\!]^{g,m,f,c})([\![\textbf{Past}_i]\!]^{g,m,f,c})$$

$$= [\lambda \textbf{A}_{\langle i,st\rangle}\lambda t\lambda w.\textbf{A}(g(j))(f(m(w,t),w))]([\![\text{A}]\!]^{g,m,f,c})(g(i))$$

$$= [\lambda t\lambda w.[\![\text{A}]\!]^{g,m,f,c}(g(j))(f(m(w,t),w))](g(i))$$

$$= \lambda w.[\![\text{A}]\!]^{g,m,f,c}(g(j))(f(m(w,g(i)),w))$$

To see how this works, let's walk through the predicted meaning of a 'would' counterfactual. Take (62), repeated below.

(62)   If Matt had gone to the parade, David would have gone to the parade.

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[22]This is a greatly simplified presentation of the temporal past theory. But it will suffice for my purposes. See Khoo (2022) for a much more detailed discussion.

[23]See Iatridou (2000) and Schulz (2014).

We are assuming that (62) has the logical form in (63), repeated below. (I continue to ignore the internal structure of the antecedent.)

(63)   If [Matt go to the parade][Past$_i$[Woll$_j$[Perfect[David go to the parade]]]]

Let *Parade* be the proposition that Matt goes to the parade. Remember, we are assuming a restrictor semantics: (63) is true relative to a modal base m if and only if

(65)   Past$_i$[Woll$_j$[Perfect[David go to the parade]]]

is true relative to the updated modal base m+*Parade*. It follows from our semantics for Past that (65) is true relative to m + *Parade*, if and only if

(66)   Woll$_j$[Perfect[David go to the parade]]

is true, relative to m + *Parade*, at g(i)—the time supplied by Past. Let's assume that g(i) is some time shortly before the parade.[24] Importantly, shifting the time of evaluation to the past shifts the temporal input to the modal base. To determine whether (66) is true in a world w, relative to m + *Parade*, at the past time g(i), we find the world $u =$ f(m + *Parade*(w, g(i)), w) that is selected from m + *Parade*(w, g(i)): the set of historical alternatives to w, *at the past time g(i)*, where Matt goes to the parade. And we ask whether (67) below is true, in u, at g(j)—the time introduced by 'woll'.

(67)   Perfect[David go to the parade]

Putting everything together, and simplifying, we predict that (62) is true, in a world w, if and only if David goes to the parade in the closest world to w where Matt goes to the parade, that was historically possible shortly before the parade.

That completes our semantics for 'would'. I turn now to 'might'. Putting our semantics for Past together with our referential selection semantics for 'may' gives us the following entry.

Referential Selection Semantics for 'Might'
$[\![\text{Might A}]\!]^{g,m,f,c} = [\![\text{Past}_i\,[\text{May}_j\,\text{A}]]\!]^{g,m,f,c}$

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[24]I am assuming that when the antecedent of a counterfactual concerns a particular interval of time, the Past takes us back to some time shortly before that interval. Is there some semantic mechanism or pragmatic mechanism that ensures that this is so? Many authors say that counterfactuals carry a *compatibility presupposition*: they presuppose that their antecedents are compatible with the value of the modal base. (See von Fintel (1998, 2001) and Gillies (2007).) If the antecedent is false, it's natural to think that speakers will try to accommodate the presupposition by selecting a time g(i) that is before the interval that the counterfactual's antecedent concerns. Normally, the selected time is not *too* long before the interval: there is a general preference for holding fixed as much as we can about history before the interval. I do not have the space to discuss this pattern of holding history fixed in detail in this paper. See Dorr (2016) for discussion.

$$= [\![\mathrm{May}_j]\!]^{g,m,f,c}([\![A]\!]^{g,m,f,c})([\![\mathrm{Past}_i]\!]^{g,m,f,c})$$

$$= [\lambda\mathbf{A}_{\langle i,st\rangle}\lambda t\lambda w.\exists v \in \mathsf{E}_c(w), \mathbf{A}(g(j))(\mathsf{f}(\mathsf{m}(v,t),v))]([\![A]\!]^{g,m,f,c})(g(i))$$

$$= [\lambda t\lambda w.\exists v \in \mathsf{E}_c(w), [\![A]\!]^{g,m,f,c}(g(j))(\mathsf{f}(\mathsf{m}(v,t),v))](g(i))$$

$$= \lambda w.\exists v \in \mathsf{E}_c(w), [\![A]\!]^{g,m,f,c}(g(j))(\mathsf{f}(\mathsf{m}(v,g(i)),v))$$

This tells us that ⌜might A⌝ is true if and only if ⌜may A⌝ is true at the time supplied by Past.

3.3 Predictions

We can now show that our theory captures our two observations.

First we show that when 'might' and 'would' are co-indexed, 'might' has the same meaning as 'maybe would'. Recall:

(56)   I'm sorry we didn't try the tofu. Sarah might have loved it.

We want to show that the 'might' claim (68) has the same meaning as (69).

(68)   Sarah might have loved it.

(69)   Maybe, Sarah would have loved it.

I assume that (68) and (69) have the logical forms in (70) and (71), respectively.

(70)   Past$_i$[May$_j$[Perfect[Sarah love it]]]

(71)   Maybe[Past$_i$[Woll$_j$[Perfect[Sarah love it]]]]

We want to show that (70) is true if and only if (71) is true. To see that this is so, first observe that (70) is true, in a world w, if and only if

(72)   May$_j$[Perfect[Sarah love it]]

is true in w at $g(i)$—the time supplied by Past. And (72), in turn, is true in w at $g(i)$ if and only if there's an epistemically possible world v where

(73)   Woll$_j$[Perfect[Sarah love it]]

is true at $g(i)$. (That follows from our semantics for 'may' and 'woll'.) To say that there's an epistemically possible world v where (73) is true at $g(i)$ is just to say that there's an epistemically possible world v where

(74)   Past$_i$[Woll$_j$[Perfect[Sarah love it]]]

is true. (That follows from our semantics for Past.) And finally, to say that there's an epistemically possible world v where (74) is true is just to say that the 'maybe' claim (71) is true in w. (This follows from our semantics for 'maybe'.)

Next we establish the Epistemic Thesis. Specifically, we show that when 'might' and 'would' are co-indexed, (1) has the same meaning as (5).

(1)   If Matt had gone to the parade, David might have have gone to the parade.

(5)   Maybe, if Matt had gone to the parade, David would have gone to the parade.

I am assuming that (1) and (5) have the structures in (75) and (76), respectively.

(75)   If[Matt go to the parade] $[\text{Past}_i[\text{May}_j[\text{Perfect}[\text{David go to the parade}]]]]$

(76)   Maybe[If[Matt go to the parade] $[\text{Past}_i[\text{Woll}_j[\text{Perfect}[\text{David go to the parade}]]]]]$

We want to show that (75) is true if and only if (76) is true. I will leave the full proof to the appendix, but here is the basic explanation. Let *Parade* be the proposition that Matt goes the parade. By our restrictor semantics for 'if' clauses, we know that (75) is true, relative to a modal base m, if and only if

(77) $\text{Past}_i[\text{May}_j[\text{Perfect}[\text{David go to the parade}]]]$

is true relative to the updated modal base, m + *Parade*. It follows from our proof that 'might' means maybe would, that (77) is true, in a world w, and relative to the modal base m + *Parade* if and only if

(78) $\text{Maybe}[\text{Past}_i[\text{Woll}_j[\text{Perfect}[\text{David go to the parade}]]]]$

is true in w, relative to m + *Parade*. And by another application of our restrictor semantics, it follows that (78) is true in w, relative to m + *Parade*, if and only if the 'maybe' claim (76) is true in w, relative to our original modal base m.[25]

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[25]The focus of this paper has been 'might' counterfactuals. One might wonder whether we should also accept an epistemic thesis for 'could' counterfactuals. Consider:

(79)   If the treasure hadn't been in the kitchen, it could have been in the attic.

On the one hand, (80) does not sound great to me.

(80)   ? If the treasure hadn't been in the kitchen, it could have been in the attic. But it wouldn't have been.

An epistemic thesis for 'could' counterfactuals would explain this. (It would say that (80) is a Moorean contradiction.) But other 'could' counterfactuals seem not to obey an epistemic thesis. Consider:

(81)   If David hadn't hidden the treasure in the kitchen, he could have hidden it in the attic. But of course he never would have.

(81) sounds fine to me, which suggests that 'David could have' in (81) does not have the same meaning as 'maybe David would have'.

    I am not sure what accounts for this difference between (80) and (81). One possible explanation is that 'could have' has two readings. On one reading, it means maybe would have. (Perhaps this reading is easiest to access when 'could' functions as a sentence-level operator as in 'it could have been that'.) On another reading, it has a metaphysical or abilitative meaning. (Perhaps this reading is easiest to access when 'could' occurs in a control structure like 'David could have hid-

3.4 The Epistemic Thesis and Duality

At the start of the paper, we observed that speeches like (4), repeated below, are always infelicitous.

(4)   # If Matt had gone to the parade, David might have gone to the parade. But if Matt had gone to the parade, David would not have gone.

Duality gives one explanation. It says that the 'might' counterfactual

(1)   If Matt had gone to the parade, David might have gone to the parade.

is true if and only if the 'would not' counterfactual (82) is false.

(82)   If Matt had gone to the parade, David would not have gone to the parade.

Therefore, according to Duality, (4) is inconsistent.

The Epistemic Thesis gives a different explanation. It says that (4) is infelicitous because it is equivalent to the Moorean (6).

(6)   #Maybe, if Matt had gone to the parade, David would have gone. But if Matt had gone to the parade, David wouldn't have gone.

We have two competing explanations of the infelicity of (4), each of which assumes a different semantics for 'might' counterfactuals. Which should we prefer? I think that we should prefer the Epistemic Thesis, and my theory of 'might' counterfactuals. Duality is inconsistent with the principle of Conditional Excluded Middle, and as I said in the Introduction, there are powerful arguments for Conditional Excluded Middle.

But even setting Conditional Excluded Middle aside, I think we have reason to prefer my theory of 'might' counterfactuals to Duality. I say that counterfactual 'might (have)' means maybe would (have). Duality does not. It says that counterfactual 'might (have)' has a purely metaphysical meaning, just as its dual 'would (have)' has a purely metaphysical meaning. But, as I have argued, counterfactual 'might (have)' really does seem to mean maybe would (have): (1) and (53) seem to say exactly the same thing.

(1)   If Matt had gone to the parade, David might have gone to the parade.

(53)   If Matt had gone to the parade, maybe David would have gone to the parade.

My theory of 'might' counterfactuals predicts this equivalence. Duality does not.

Let me conclude with two further observations supporting the theory that counterfactual 'might (have)' means maybe would (have). Both observations con-

den it in the attic'.)

cern a contrast between 'might have' and 'could have'. First, notice that while 'could have' can be paired with 'wouldn't have', 'might have' cannot.

(83) #David might have hidden the treasure in the attic. But he wouldn't have.

(84)   David could have hidden the treasure in the attic. But he wouldn't have.

(83) is very bad, but (84) is acceptable.[26] The contrast between (83) and (84) parallels the more familiar contrast between (85) and (86).

(85) #David may hide the treasure in the attic. But he won't.

(86)   David could hide the treasure in the attic. But he won't.

The natural explanation of the contrast between (85) and (86) is that while (85) is a Moorean contradiction, (86) is not. (To say that David could hide the treasure in the attic is not to say that maybe he will.) It seems to me that there is pressure to give the same explanation of the contrast between (83) and (84). My theory does just this. It says that (83) is a Moorean contradiction, but (84) is not. (To say David could have hidden the treasure in the kitchen is not to say that, maybe, he would have.)

Second, observe that while 'could have' occurs naturally under epistemic 'maybe', 'might have' does not. Consider:

(87)   If David had gone to the party, maybe he could have met Sarah.

(87) is a natural expression of uncertainty about what could have happened at the party. But now consider:

(88) ? If David had gone to the party, maybe he might have met Sarah.

(88) sounds considerably less natural to my ears. If counterfactual 'might (have)' means maybe would have, we can easily account for the oddness of (88): it is equivalent to the redundant (89).

(89) ? If David had gone to the party, maybe he would have maybe met Sarah.

3.5 'Might' as Past of 'May'

My account of counterfactual 'might' assumes that, in certain modern English uses, 'might' is the past tense form of the modal 'may'.[27] Historically, 'might' did

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[26]Thanks to David Boylan for discussion.

[27]An anonymous referee observes that in German 'could' counterfactuals use the present subjunctive, and 'could have' counterfactuals use the past subjunctive, not the simple past or the past perfect. I do not think that this undermines my suggestion that in English, counterfactual 'might' is a past tense form (and that 'might have' is the past perfect). As Iatridou (2000) observes, the morphological makeup of counterfactuals varies across languages. Some languages,

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indeed serve as the past tense form of 'may', much like 'should', 'would', and 'could' were past tense forms of 'shall', 'will', and 'can', respectively.[28] While it is evident that 'would' and 'could' are still used today as past tense forms of 'will' and 'can', the question remains: does 'might' also persist as a past tense form of 'may' in certain grammatical constructions?

One argument that it does is that, in certain environments in which the past tense form of a modal verb must be used, we find that 'might' can also be used. Take counterfactuals. Observe that while (90) is acceptable, (91) is not.

(90)   If I were a millionaire, I would buy a house in Hawaii.

(91)   ? If I were a millionaire, I will buy a house in Hawaii.

Likewise, (92) is fine, but (93) is not.

(92)   If I had caught the train, I could have made it to the meeting.

(93)   ? If I had caught the train, I can have made it to the meeting.

Of course, the consequent of a counterfactual can be headed by 'might'.

(94)   If I were a millionaire, I might buy a house in Hawaii.

(95)   If I had caught the train, I might have made it to the meeting.

Importantly, 'may' cannot be used in place of 'might' in either of these sentences.

(96)   ? If I were a millionaire, I may buy a house in Hawaii.

(97)   ? If I had caught the train, I may have made it to the meeting.

If the consequent of a counterfactual is headed by a modal verb, the modal must be in its past tense form. That 'might' can occur in this environment suggests that, in these instances, 'might' is also a past tense form—the past tense form of 'may'.

There are other uses of 'might' in which it appears to be the past tense form of 'may'. Consider this example in which 'may' is used as a synonym for 'can'.[29]

(98)   I always leave the dumpster unlocked so that it may be emptied.

To form the past of (98), we use 'might'.

(99)   I always left the dumpster unlocked so that it might be emptied.

Or consider (100), in which 'will' and 'may' are used to talk about habitual actions.

(100)   These days he will often show up late. He may send a few emails and take a few calls, and then he will take off early.

If we want to talk about past habitual actions, we use 'would' instead of 'will' and 'might' instead of 'may'.

(101)   In those days, he would often show late up late. He might send a few emails and take a few calls, and then he would take off early.

3.6   Epistemic 'Might'

This paper has been about the counterfactual use of 'might'. There is also an epistemic use of 'might'. I believe that these are indeed different uses. Before concluding, let me pause to solidify the case for this claim, and to say a little more about how the two uses are related.

On its epistemic use, 'might' is synonymous with 'may'. Consider:

(102)   a.   Do you know where Matt is going this weekend?
        b.   He might be going to the wedding.
        c.   He may be going to the wedding.

(102-b) and (102-c) seem to say exactly the same thing. Similarly, consider:

(103)   a.   Do you know where John is?
        b.   He might have already left.
        c.   He may have already left.

Once again, (103-b) and (103-c) seem to say exactly the same thing.

I argued in §2 that 'may' means maybe will. The same goes for 'might' on its epistemic interpretation. Consider:[30]

(105)   Matt might go to the wedding.

(106)   John might miss his flight.

(105) is interpreted as saying that it is now epistemically possible that Matt will go to the wedding at some future time. That is, (105) is heard as equivalent to:

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[30]Note that, like 'may', epistemic 'might' does not always have future orientation. Consider:

(104)   Sarah might be sleeping in the other room.

(104) has present perspective and present orientation: it says that is possible, right now, that Sarah is sleeping, right now, in the other room. I account for this in the same way as I accounted for the parallel observation about 'may'.

(107)   Maybe, Matt will go to the wedding.

Likewise, (106) is interpreted as saying that it is now epistemically possible that John will miss his flight at a future time. That is, (106) is heard as equivalent to:

(108)   Maybe, John will miss his flight.

When 'might' is used counterfactually, it is not interchangeable with 'may' or with 'maybe will'. We saw that it is not interchangeable with 'may' in the previous section. Recall:

(94)   If I were a millionaire, I might buy a house in Hawaii.

(95)   If I had caught the train, I might have made it to the meeting.

We saw that 'may' cannot be used in place of 'might' in either (94) or (95).

(96)   ? If I were a millionaire, I may buy a house in Hawaii.

(97)   ? If I had caught the train, I may have made it to the meeting.

Moreover, we clearly cannot use 'maybe will' in place of 'might' in either sentence.

(109)   ? If I were a millionaire, maybe I will buy a house in Hawaii.

(110)   ? If I had caught the train, maybe I will have made it to the meeting.

Instead, we must use 'maybe would'.

(111)   If I were a millionaire, maybe I would buy a house in Hawaii.

(112)   If I had caught the train, maybe I would have made it to the meeting.

Similar things can be said about unembedded occurrences of counterfactual 'might'. A child runs across the street into traffic when the signal is red. Luckily, she reaches the other side. I exclaim:

(113)   She might have been killed!

I cannot use 'may' in place of 'might' in (113).

(114)   ? She may have been killed!

Unlike (113), the default interpretation of (114) is clearly epistemic: (114) says that it is compatible with my knowledge that the child was killed. Since I know she is alive, I must use (113) instead of (114).

In summary, we have at least two uses of the modal 'might': an epistemic use on which it is roughly synonymous with 'may' and 'maybe will' and a counterfactual use on which it is roughly synonymous with 'maybe would'.

How do these two uses of 'might' relate to each other? Following Stowell's (2004) analysis of 'could', I conjecture that 'might' is lexically ambiguous: counterfactual 'might' is a past tense form of 'may', whereas epistemic 'might' is not.

Let me explain. Bybee (1995) observes that certain modals that were historically used to express past root modalities (such as past ability, past obligation, and past permission) have acquired present tense epistemic uses. The modals 'should' and 'could' are two examples: 'should' is historically the past of 'shall' and 'could' is historically the past of 'can'. Today, 'should' and 'could' have both root and epistemic uses. But, as Stowell observes, only the root uses have past interpretations. When 'should' and 'could' are used epistemically, they always express present epistemic modality.

Consider 'could'. In (115) and (116), 'can' is used to express ability and permission, respectively.

(115)   Carl can't move his arm.

(116)   Max can't go out after dark.

We use 'could' to express past ability and past permission.

(117)   Carl couldn't move his arm.

(118)   Max couldn't go out after dark.

In (117), 'could' expresses the past of 'can' in (115): at some time in the past, Carl was not able to move his arm. The same goes for (118): at some time in the past, Max was not permitted to go out after dark.

In contrast to these root uses of 'could', Stowell observes that when 'could' is used epistemically, it does not have a past-shifted interpretation. Consider:

(119)   Jack's wife can't be very rich.

(120)   Jack's wife couldn't be very rich.

In (119), 'can' expresses present epistemic possibility: it's not possible, given what we know, for Jack's wife to be very rich. But unlike (117) and (118), (120) also has a present perspective interpretation: (120) tells us about the speaker's present epistemic state, not her past epistemic state. (The temporal orientation of the modal is also the present time. We must use 'couldn't have' if we want to express past orientation: 'Jack's wife couldn't have been very rich.')

Stowell says that, unlike the abilitative and deontic uses of 'could' in (117) and (118), epistemic 'could' is not a past tense form of 'can'. I think that the same is true of 'might'. Like 'could', 'might' was historically a past tense form—a past tense form of 'may'. I think that this historical past tense meaning has survived

in some contemporary uses of 'might'. The counterfactual use is one example, and as I said in §3.5, I think there are others. Moreover, like epistemic 'could', epistemic 'might' does not express past epistemic possibility. Consider (102), repeated below.

(102)   a. Do you know where Matt is going this weekend?
            b. He might be going to the wedding.
            c. He may be going to the wedding.

(102-b) talks about what is epistemically possible now. It cannot be used to talk about past epistemic possibility.[31] This suggests that 'might' is lexically ambiguous: on its counterfactual interpretation, 'might' is the past of 'may', but on its epistemic interpretation, it is not.

4 Conclusion

I have offered a new theory of the counterfactual interpretation of the modal 'might' on which 'might' has roughly the same meaning as 'maybe, would'. And I showed that, when coupled with a plausible semantics for 'maybe' and for 'if' clauses, the theory secures the Epistemic Thesis.

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[31]See Stowell (2004) and Hacquard (2006) for defense of the claim that epistemic modals always seem to scope over tense. See von Fintel & Gillies (2007) and Boylan (2020) for a dissenting view.

Appendix

In this appendix, I prove the Epistemic Thesis.

(121) $[\![\text{Maybe, } [\text{if A, } [\text{Past}_i\,[\text{Woll}_j\text{B}]]]]\!]^{g,m,f,c}(w) = [\![\text{If A, } [\text{Past}_i\,[\text{May}_j\text{B}]]]\!]^{g,m,f,c}(w)$

For readability, I let $\mathbf{A} = [\![\text{A}]\!]^{g,m,f,c}$ and $\mathbf{B} = [\![\text{B}]\!]^{g,m+\mathbf{A},f,c}$.

Proof.

$[\![\text{Maybe, } [\text{if A, } [\text{Past}_i\,[\text{Woll}_j\text{B}]]]]\!]^{g,m,f,c}(w)$

$= [\![\text{Maybe}]\!]^{g,m,f,c}([\![\text{If A, } [\text{Past}_i[\text{Woll}_j\text{B}]]]\!]^{g,m,f,c})(w)$

$= [\![\text{Maybe}]\!]^{g,m,f,c}([\![\text{Past}_i[\text{Woll}_j\text{B}]]\!]^{g,m+\mathbf{A},f,c})(w)$

$= [\lambda\mathbf{A}_{\langle s,t\rangle}\lambda w.\exists v \in \mathsf{E}_c(w), \mathbf{A}(v)]([\![\text{Past}_i[\text{Woll}_j\text{B}]]\!]^{g,m+\mathbf{A},f,c})(w)$

$= [\lambda w.\exists v \in \mathsf{E}_c(w), [\![\text{Past}_i[\text{Woll}_j\text{B}]]\!]^{g,m+\mathbf{A},f,c}(v)](w)$

$= [\lambda w.\exists v \in \mathsf{E}_c(w), [\![\text{Woll}_j]\!]^{g,m+\mathbf{A},f,c}(\mathbf{B})(g(i))(v)](w)$

$= [\lambda w.\exists v \in \mathsf{E}_c(w), [\lambda\mathbf{C}_{\langle i,st\rangle}\lambda t\lambda u_s.\mathbf{C}(\mathsf{f}(m+\mathbf{A}(u,t),u))(g(j))](\mathbf{B})(g(i))(v)](w)$

$= [\lambda w.\exists v \in \mathsf{E}_c(w), [\lambda t\lambda u_s.\mathbf{B}(\mathsf{f}(m+\mathbf{A}(u,t),u))(g(j)](g(i))(v)](w)$

$= [\lambda w.\exists v \in \mathsf{E}_c(w), \mathbf{B}(\mathsf{f}(m+\mathbf{A}(v,g(i)),v))(g(j))](w)$

$= [\lambda t\lambda w.\exists v \in \mathsf{E}_c(w), \mathbf{B}(\mathsf{f}(m+\mathbf{A}(v,t),v))(g(j))](g(i))(w)$

$= [\lambda\mathbf{C}_{\langle i,st\rangle}\lambda t\lambda w.\exists v \in \mathsf{E}_c(w), \mathbf{C}(\mathsf{f}(m+\mathbf{A}(v,t),v))(g(j))](\mathbf{B})(g(i))(w)$

$= [\![\text{May}_j]\!]^{g,m+\mathbf{A},f,c}(\mathbf{B})(g(i))(w)$

$= [\![\text{May}_j]\!]^{g,m+\mathbf{A},f,c}(\mathbf{B})([\![\text{Past}_i]\!]^{g,m+\mathbf{A},f,c})(w)$

$= [\![\text{Past}_i\,[\text{May}_j\text{B}]]\!]^{g,m+\mathbf{A},f,c}(w)$

$= [\![\text{If A, } [\text{Past}_i\,[\text{May}_j\text{B}]]]\!]^{g,m,f,c}(w)$

$\square$

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