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REVISITING LOCKHART:  
A CASE FOR A CONDITIONAL OPERATOR

by

ERIC J. TSAI

A master's thesis submitted to the Graduate Faculty in Linguistics in partial fulfillment of the requirements for the degree of Master of Arts, The City University of New York

2018

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A Case for a Conditional Operator

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Eric J. Tsai

This manuscript has been read and accepted for the Graduate Faculty in Linguistics  
in satisfaction of the thesis requirement for the degree of Master of Arts.

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## ABSTRACT

Revisiting Lockhart: A Case for a Conditional Operator

by

Eric J. Tsai

Advisor: Sam Al Khatib

This thesis presents a case for a binary modal conditional operator compatible with both circumstantial and epistemic modal bases. Certain contexts involving *might* conditionals require *might* to take wide-scope over a conditional proposition. A restrictor-view analysis of conditionals is unable to derive both the intuitive meaning of the *might* conditional and the necessary conditional proposition without positing a covert circumstantial necessity modal. However, based on observations of the temporal orientation of conditionals, such a modal lacks independent motivation. On the other hand, a binary modal conditional operator not only provides the necessary conditional proposition but is also able to derive the intuitive meaning of the *might* conditional while accounting for the observed modal environments of conditional antecedents and conditional consequents.

## Acknowledgements

I would like to thank my advisor, Sam Al Khatib, who shepherded this project along for much longer than it should have been necessary. Without the generosity of his time, his insights, and his sincere consideration for what I had to say, this project would have remained an unpacked node in my head.

But mostly, I'd like to thank my wife, Audrey Christensen-Tsai, for her formidable patience in dealing with my extended absences (mental, emotional, and physical) over the past two and a half years as she not only watched over my own health but over all things August as well. I can honestly say that she literally did the final bit of legwork to see this project through.



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## 1 Introduction

The dominant analysis of conditionals follows Lewis (1975) and Kratzer (1981, 2012) in viewing conditionals as restricted quantification structures rather than as the output of a binary connective operator. Under this restrictor view, the *if*-clause restricts a quantifier in the consequent of a conditional. If there is no overt quantifier, the consequent is assumed to be implicitly modalized by a covert epistemic necessity modal similar in semantics to epistemic *must*. The proposal of a covert modal raises the possibility that some explicitly modalized conditionals are multi-modal. In fact, it is well documented (Zvolenszky, 2002; Geurts, 2004; Condoravdi & Lauer, 2016) that certain readings of modalized conditionals require such structures. On the other hand, it has also been shown (von Stechow & Heim, 2011; Khoo, 2011; Kratzer, 2012) that certain readings of modalized conditionals are incompatible with such structures. These last cases have proven intractable for an operator view of *if* since, under such an analysis, all modalized conditionals are multi-modal.

The goal of this thesis is to provide a case for a strict implication account (i.e., operator view) of *if* as a binary modal operator which might prove resilient to arguments that certain readings of modalized conditionals are incompatible with the operator view. In SECTION 2, we revisit the arguments provided by von Stechow & Heim (2011) against such an account. These arguments are based on readings of conditionals with an overt *might* in the consequent. In SECTION 3, we introduce a particular context (IFTC sequence) in which such *might* conditionals require a wide-scope structure incompatible with the restrictor view of *if*-clauses but compatible with the operator view. We also consider possible counterarguments which a defender of the restrictor view might raise against the necessity of such a structure. In SECTION 4, we show that an attempt to expand the restrictor view to capture the intuitive readings of *might* conditionals as well as the readings of IFTC sequences is incompatible with observations of the modal environments of conditionals. On the other hand, the operator view is not only compatible with these observations but also accounts for the modal environments of conditional antecedents which the restrictor view does not do. In SECTION 5, we explore potential issues involving overgeneration caused by various scope

configurations under the operator view and suggest directions for future research. In SECTION 6, we explore a possible connection between the availability of wide-scope readings and tense. In SECTION 7, we provide a summary of the thesis.

## 2 Lockhart

In arguing for the restrictor view of *if*-clauses, von Fintel & Heim (2011) claim that operator views of conditionals, namely material and strict implication, are unable to capture the intuitive meaning of certain modalized conditionals. We will forgo comment on their arguments against the material implication view and focus instead on their arguments against a strict implication analysis of conditionals in which *if* functions as a binary modal operator. Consider the scenario below.

Scenario: *Mary and Susan are in a car. They are lost and have just driven into a town at the intersection of two highways. Mary is looking at a map (FIGURE 1).*

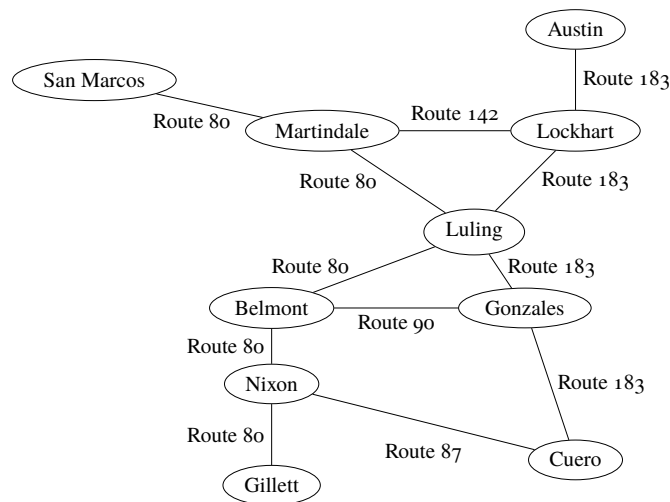


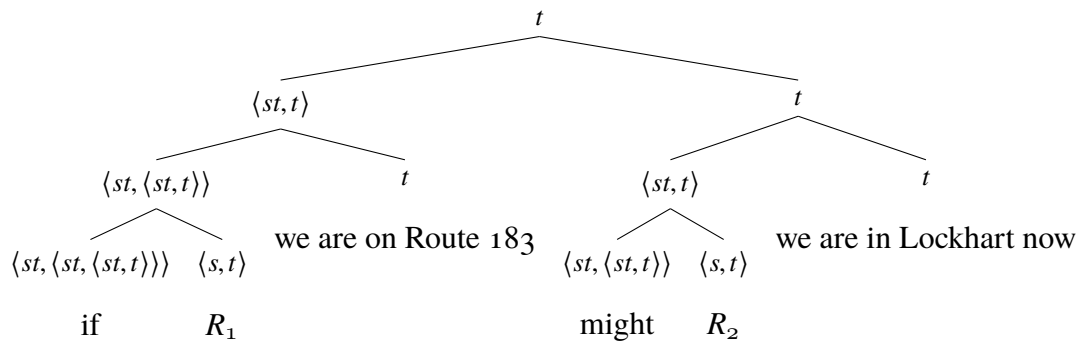
FIGURE 1: Road map of Lockhart and environs

- (1) If we are on Route 183, we might be in Lockhart now.

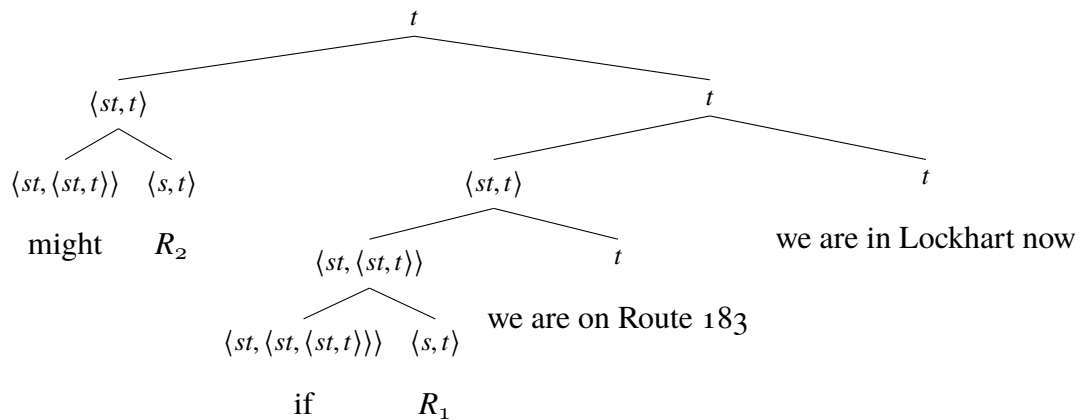
The intended reading of (1) as uttered by Mary in the above scenario is epistemic. The modal base that von Fintel & Heim have in mind for the modal *might* returns worlds compatible with "the

information provided by the map, together with other background knowledge" (p. 52). A strict implication analysis of the conditional in (1) introduces an additional modal operator, *if*, which von Fintel & Heim also take to have an epistemic flavor. This binary modal operator is parameterized with an accessibility relation and takes two propositions as arguments, both of which may also be modalized. The two possible scope configurations between *if* and *might* in (1) are indicated by the LFs in (2a) and (2b) where  $R_1$  and  $R_2$  represent the contextually supplied accessibility relations taken here as arguments. According to von Fintel & Heim, neither configuration is able to derive the intuitive meaning of (1).

(2) a.



b.



Their argument against the LF in (2a) goes something like this. Due to Mary's epistemic state of being lost, a world,  $w_1$ , in which she and Susan are on Route 183 and a world,  $w_2$ , in which they are on Route 80 are both epistemically accessible via the relation  $R_1$  from the actual world,  $w^*$ . However, the antecedent of (2a) restricts this domain to worlds in which Susan and Mary are truthfully on Route 183, filtering out worlds like  $w_2$  and leaving only worlds like  $w_1$ . Each of these

remaining worlds must, via the relation  $R_2$ , have some epistemically accessible world in which Susan and Mary are in Lockhart. But because Mary is presumably as lost in  $w_1$  (a Route-183 world) as she is in  $w_2$  (a Route-80 world), any epistemic possibility of being in Lockhart in  $w_1$  should be epistemically possible in  $w_2$  as well. Therefore, given the LF in (2a), if (1) is true in the actual world then (3) is predicted to also be true, contrary to our intuitions.

(3) # If we are on Route 80, we might be in Lockhart now.

While this argument is convincing, their dismissal of the wide-scope reading of *might* in (2b) is less so.

. . . with the modal having widest scope . . . we would derive the claim that it is compatible with what Mary knows that from being on 183 it follows (according to what she knows) that they are in Lockhart. Clearly, that is not what [(1)] means. Mary doesn't consider it possible that if they are on 183, she knows that they are in Lockhart. After all, she's well aware that she doesn't know where they are.

(von Fintel & Heim, 2011:55)

Crucial to their argument is the epistemic flavor of the conditional modal *if* under the scope of *might*. While arguments have been made in support of the restrictor view for bare indicative conditionals being implicitly modalized by an epistemic necessity modal, a strict implication operator view need not make that same assumption. Assuming that the modal flavor of the embedded bare conditional is circumstantial, the derived claim resulting from (2b) can be restated as:

It is compatible with what Mary knows that from being on 183 it follows (according to the facts) that they are in Lockhart.

This seems to match the meaning of (1) where, based on the information provided by the map, Mary does indeed consider it *possible* that if they are on 183, they are *necessarily* in Lockhart. In addition, a wide-scope interpretation of *might* also derives the intuition regarding the falseness of

(3) since Mary also knows, based on the map, that Lockhart is nowhere near Route 80. By only considering an epistemic accessibility relation for a conditional modal operator analysis of *if*, von Fintel & Heim overlook possible wide-scope derivations of (1) and (3) which, in fact, do adhere to our intuitions.

### 3 If that's the case ...

Setting aside for now the plausibility of a circumstantial modal base for the embedded bare conditional, there are certain contexts where a simple restrictor-view analysis of conditionals is unable to derive the intuitive reading of a *might* conditional like (1). Instead, these *might* conditionals seem to require a structure such as (2b). The particular context and dialogue sequence we are interested in involves an initiating *might* conditional followed by another conditional whose antecedent contains the phrase *that's the case* as schematized in (4):

- (4) IFTTC SEQUENCE
- a. If  $p$ , then *might*  $q$ .
  - b. Well, if that's the case, then  $r$ .

What restrictions exist, if any, on the antecedent of *that* in *that's the case*? Consider the following "simplified" IFTTC sequences where the initiating utterance is a bare *might* rather than a conditionalized *might*.

- (5) a. Jules *might* be at the party.  
b. Well, if that's the case, then Jim *might* be there.
- (6) a. Jules *might* be at the party.  
b. Well, if that's the case, then Jim *will* be there.

Given a scenario where Jules and Jim are inseparable, both continuations seem felicitous. In (5b) the referent of *that* appears to be the entire modalized utterance in (5a). In (6b) the referent

appears to be the modal prejacent in (6a). Both syntactic constituents and their subconstituents seem to be valid referents. However, non-constituents seem to be unavailable.

- (7) a. Either Kathe or Jules will be at the party.
- b. Well, if that's the case, then Jim might be there.
  
- (8) a. Either Kathe or Jules will be at the party.
- b. # Well, if that's the case, then Jim will be there.

Given the same scenario as above, the disjunction does not allow one of the disjuncts to be considered individually. The demonstrative *that* in the continuation in (8b) cannot refer to the proposition, *Jules will be at the party*. We therefore take the antecedent of *that* in the phrase *that's the case* to necessarily be a syntactic constituent.

Returning to the scenario in (1), consider the possibility that Mary is not entirely lost but knows that they are in a town on Route 142. This knowledge, coupled with the information provided by the map in FIGURE 1, reproduced below, would allow her to truthfully utter either of the conditionals in (9) or the pair without contradiction.

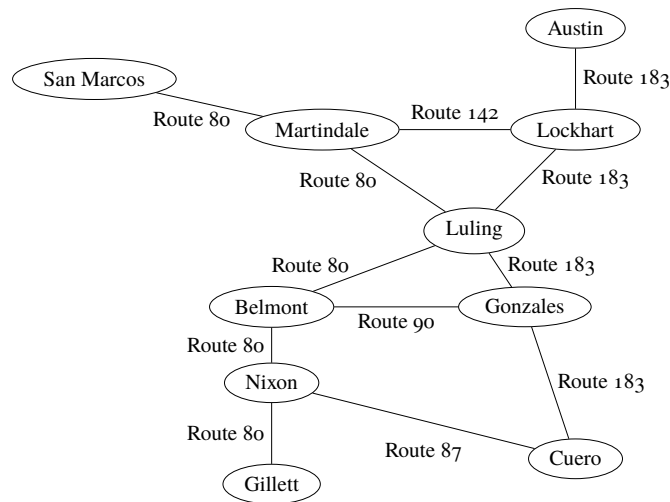


FIGURE 1: Road map of Lockhart and environs

- (9) a. If we are on Route 183, we are in Lockhart now.
- b. If we are on Route 80, we are in Martindale now.

Likewise, if she knows that they are in a town along Route 87, she could truthfully utter either of the conditionals in (10) or the pair without contradiction.

- (10) a. If we are on Route 183, we are in Cuero now.  
b. If we are on Route 80, we are in Nixon now.

But what she cannot ever truthfully utter are the pair (9a) and (10b) and the pair (9b) and (10a) since both of those pairs are incompatible with the information provided by the map. Now, assuming again that Mary is indeed lost, consider two possible continuations of the IFTTC sequence in (11) which has (1) as the initiating utterance.

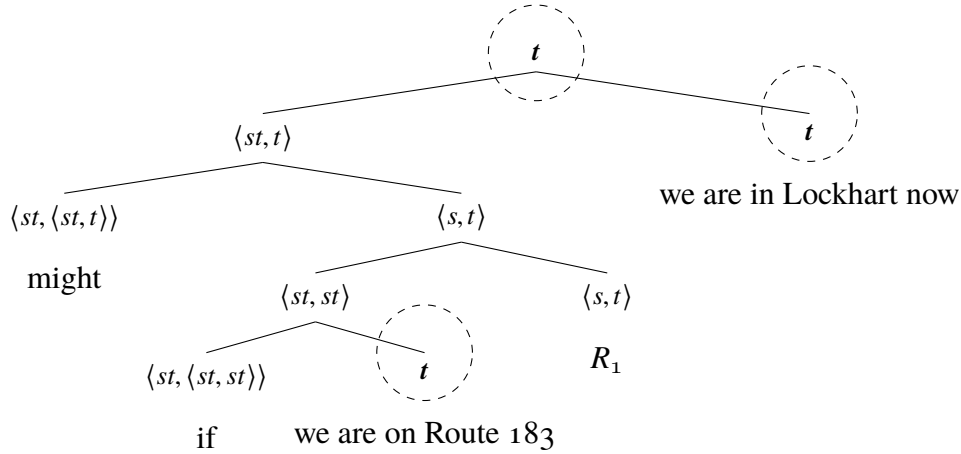
- (11) Mary: If we are on Route 183, we might be in Lockhart now.  
a. # Susan: Well, if that's the case, then, if we are on Route 80 we're in Nixon.  
b. Susan: Well, if that's the case, then, if we are on Route 80 we're in Martindale.

While the continuation (11a) sounds odd, the continuation (11b) seems okay. However, the restrictor view fails to predict this asymmetry. Under the restrictor view, conditionals are modal statements with an explicit domain restrictor provided by the antecedent. In the case of bare conditionals as in (11a) and (11b), the restricted modal is taken to be a covert epistemic necessity modal ( $\Box$ ). Furthermore, stacked *if*-clauses provide multiple restrictions to a single modal (Kratzer, 2012). Therefore the bare conditionals (11a) and (11b), with their stacked *if*-clauses, reduce to the modal statements below where the restriction  $\varphi_{\text{TRC}}$  provided by the phrase *that's the case* refers to a proposition represented by a syntactic constituent.

- (11) a.  $\Box_{[80, \varphi_{\text{TRC}}]} \textit{Nixon}$   
b.  $\Box_{[80, \varphi_{\text{TRC}}]} \textit{Martindale}$

Now, consider a restrictor-view LF for (1) in which the operator *if* imposes the explicit domain restriction.

(12)



The LF in (12) provides the three circled candidates for the restriction  $\varphi_{TTC}$  in (11a) and (11b).

(13) Possible candidates for  $\varphi_{TTC}$  provided by (12)

- a.  $\diamond_{[183]}Lock$
- b.  $183$
- c.  $Lock$

Substituting the explicitly restricted modal (13a) for both continuations, as in (14a) and (14b), fails to predict any asymmetry.

- (14) a.  $\# \square_{[80, \diamond_{[183]}Lock]}Nixon$
- b.  $\# \square_{[80, \diamond_{[183]}Lock]}Martindale$

The substituted *might* conditional is true regardless of whether Mary and Susan are on Route 142, Route 87, or even Route 90. In fact, due to Mary’s epistemic state of being lost, Mary’s utterance is true regardless of where they are. A world in which they are on Route 90 and Route 80 is epistemically accessible from the actual world and meets both restrictions, but it is a world in which Mary and Susan are neither in Nixon nor in Martindale. Therefore the universal claims in (14a) and (14b) are predicted to both be false. Substituting the modal prejacent (13c) for both continuations, as in (15a) and (15b), also fails to predict any asymmetry since both conditionals turn out to be vacuously true due to the contradictory restriction of being both in Lockhart and on Route 80.

- (15) a.  $\square_{[80, Lock]}Nixon$



b.  $\Box_{[80,Lock]}Martindale$

Substituting the antecedent (13b) of the preceding conditional for both continuations, as in (16a) and (16b), fails to entail being in either Nixon or in Martindale.

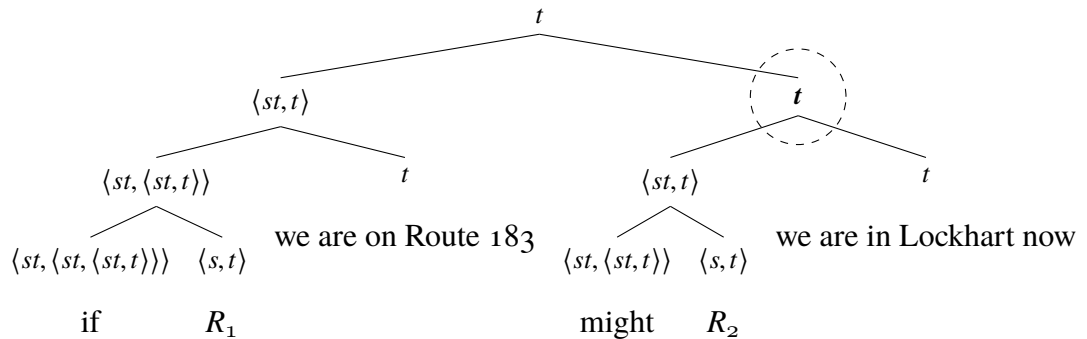
(16) a.  $\# \Box_{[80,183]}Nixon$

b.  $\# \Box_{[80,183]}Martindale$

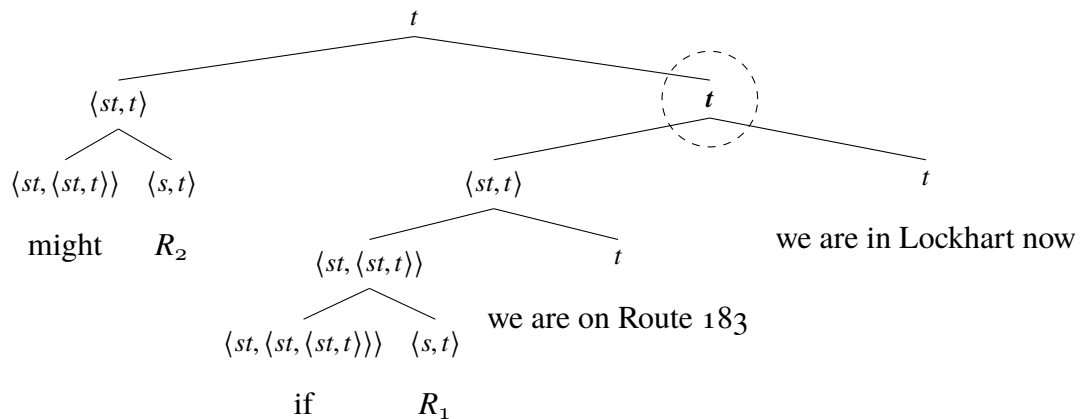
In fact, the restriction of being both on Route 80 and Route 183 entails that Mary and Susan are instead in Luling. Available antecedents under the restrictor view are therefore unable to derive the asymmetry presented in (11).

A strict implication operator view of (11), however, provides additional reference possibilities unavailable under a restrictor view analysis. Consider the possible operator-view LFs (2a) and (2b), repeated below.

(2) a.



b.



The LF in (2a) additionally provides the bare modal, as in (17a), and the LF in (2b) additionally provides, as the prejacent of *might*, the bare conditional, as in (17b).

(17) *Additional candidates for  $\varphi_{\text{TTC}}$  provided by (2a) and (2b)*

- a.  $\diamond \text{Lock}$
- b.  $\square_{[183]} \text{Lock}$

Similar to the case in (14a) and (14b) with the entire modalized conditional, substituting the bare modal in (17a) for  $\varphi_{\text{TTC}}$ , as in (18a) and (18b), derives no asymmetry.

- (18) a.  $\# \square_{[80, \diamond \text{Lock}]} \text{Nixon}$
- b.  $\# \square_{[80, \diamond \text{Lock}]} \text{Martindale}$

The bare modal, just like the explicitly restricted modal, is too weak to entail that from being on Route 80 it follows that Mary and Susan are in a specific location. However, substituting the bare conditional in (17b) for  $\varphi_{\text{TTC}}$ , as in (19a) and (19b), does derive the asymmetry.

- (19) a.  $\# \square_{[80, \square_{[183]} \text{Lock}]} \text{Nixon}$
- b.  $\square_{[80, \square_{[183]} \text{Lock}]} \text{Martindale}$

The truth of the substituted bare conditional in (17b) requires that the accessible worlds quantified over by the modal are worlds in which Mary and Susan are somewhere on Route 142. However, being on Route 142 and on Route 80 is incompatible with being in Nixon, thus deriving the falseness of (19a). In fact, being on Route 142 and on Route 80 entails being in Martindale, thus deriving the truth of (19b). Therefore, deriving the asymmetry between (11a) and (11b) seems to require an interpretation where the anaphor in the continuation is anaphoric to a preceding (bare) conditional proposition. A restrictor view of the initiating *might* conditional in (11) fails to provide the necessary referent.

A defender of the restrictor view might argue against the necessity of conditional propositions in (11) by appealing to the same mechanism of "restriction at a distance" employed by Kratzer (2012) in her argument against the necessity of conditional propositions in examples such as (20).

- (20) If a wolf entered the house, he might have eaten the little girl with the red cap. In fact, that's rather likely.

The demonstrative *that* which is the prejacent of the modal operator *rather likely* in the second sentence of (20) seems to refer to the bare conditional proposition *if a wolf entered the house, he ate the little girl with the red cap*. However, Kratzer argues that the same interpretation can be derived if the demonstrative *that* simply refers to the consequent of the preceding conditional (i.e., the prejacent of the modal *might*) and the modal operator *rather likely* is restricted at a distance by the antecedent of the preceding conditional. These two anaphoric links result in the reconstructed equivalent of (20) in (21).

- (21) If a wolf entered the house, he might have eaten the little girl with the red cap. In fact, if a wolf entered the house, he rather likely ate the little girl with the red cap.

Recruiting this argument for a restrictor-view analysis of the asymmetry in (11), repeated below, requires not only the two anaphoric links argued for in (20) but an additional anaphoric link to an epistemic necessity modal since the demonstrative *that* in the continuations (11a) and (11b) is not overtly modalized as it is in (20).

- (11) Mary: If we are on Route 183, we might be in Lockhart now.  
a. # Susan: Well, if that's the case, then, if we are on Route 80 we're in Nixon.  
b. Susan: Well, if that's the case, then, if we are on Route 80 we're in Martindale.

However, the sequence contains no referable necessity modal since the initiating *might* conditional, in concordance with the restrictor view, is assumed to not contain a covert necessity modal. Therefore, the epistemic necessity modal necessary to reconstruct the bare conditional via "restriction at a distance" must be inserted outright, requiring no anaphoric link and no overt restriction, or must have already existed covertly. If that is the case, then any proposition as well as any propositional anaphor could presumably be covertly modalized and implicitly conditionalized at a distance. However, von Stechow & Gillies (2010) offer the following contrast.

- (22) a. Richard I: If he didn't tell Harry, he told Tom.  
 b. Richard II: I'm not sure that's true.  
 c. Richard I: No, really. I know he told one of them.
- (23) a. Richard I: If he didn't tell Harry, he told Tom.  
 b. Richard II: I'm not sure (it's true that) he told Tom.  
 c. # Richard I: No, really. I know he told one of them.

In (22b), the demonstrative *that* refers to the entire conditional utterance of (22a), i.e., Richard II is not sure if the conditional uttered by Richard I is true. However, if propositions can be covertly modalized and then restricted at a distance, then the bare conditional in (23a) can be reconstructed from the proposition *he told Tom* in (23b). Richard I's response should therefore be just as felicitous in (23) as it is in (22). The fact that the bare conditionals themselves in (22) and (23) have covert modals as opposed to an overt modal as in the *might* conditional in (11) is inconsequential to this point. Regardless of whether (23b) is analyzed as containing a covert anaphor that is anaphoric to the covert modal in (23a) or as containing a covert modal outright, as is necessary for the continuations in (11), the continuation of (23c) is still infelicitous. Appealing to an inserted covert modal in the continuations in (11) in order to employ Kratzer's "restriction at a distance" strategy requires an explanation for why such a modal is not available in (23b).

Furthermore, von Stechow & Gillies (2010) offer an additional contrast which seems to complicate the basis for Kratzer's remote restriction assumption in (20) which stems from examples such as (24).

- (24) If a wolf entered the house, he must have eaten grandma, since she was bedridden. He might have eaten the girl with the red cap, too. In fact, that's rather likely. The poor little thing wouldn't have been able to defend herself.

The *if*-clause in (24) seems not only to restrict the modal (*must*) in its own clause but also to remotely restrict each of the modals (*might*, *rather likely*, *would*) in the subsequent clauses. However, in the

contrasting exchanges offered by von Fintel and Gillies below, the *if*-clause in (26a) does not seem to be able to restrict the modal in (26b).

- (25) a. Richard I: If he didn't tell Harry, he told Tom.  
b. Richard II: That may be true.  
c. Richard I: No, really. I know he told one of them.
- (26) a. Richard I: If he didn't tell Harry, he told Tom.  
b. Richard II: Maybe (it's true that) he told Tom.  
c. # Richard I: No, really. I know he told one of them.

Appealing to the remote restriction of modals by the *if*-clauses in (20) and (24) requires an explanation for why such a restriction is not possible in (26). A restrictor-view analysis of (11) therefore relies on two mechanisms, (1) implicitly restricted covert modalization and (2) restriction at a distance, whose constraints need to be explored further.

At this point, the astute reader might point out the problem posed by (24) for the operator view. While both the *if*-clause restriction and the modal prejacent inherited by *rather likely* in (20) originate from the same conditional, the inherited referents for *rather likely* in (24) originate from different sentences. Therefore, the desired conditional proposition in (24), unlike in (20), cannot possibly be a syntactic constituent. With regards to the intractability of (24) for the operator view, the broader mechanism of implicit conditionalization of modals via modal subordination may be applicable. As Geurts (1999) notes, "modal subordination occurs whenever a modal expression sets up an antecedent for another modal expression" (p. 187). Explicit *if*-clauses are not the only restrictors of subordinated modals.

- (27) A thief might break into the house. He would take the silver.

In (27), the prejacent of the modal *might*, rather than an *if*-clause, conditionalizes the subsequent modal by serving as an implicit antecedent. The second sentence is therefore interpreted as the conditional *if a thief breaks into the house, he would take the silver*. Insofar as an *if*-clause is

part of a modal expression, modal subordination, under Guerts's characterization, should be able to accommodate implicit conditionalization by either the antecedent proposition or the consequent proposition of a conditional. Furthermore, whatever mechanism underlies modal subordination does not necessarily involve *restriction* of subordinate modals; only "(setting) up an antecedent for another modal expression". Such a mechanism should be compatible with any theory of conditionals insofar as modal expressions with antecedents are analyzed as conditionals. An explanation for how the operator *rather likely* in (24) is ultimately conditionalized (i.e., how the interpreted conditional is constructed) is therefore not necessarily one that the operator view, or any view of conditionals, needs to provide.

What we hoped to show in this section is that the restrictor view is incapable of deriving the asymmetry in (11), repeated below, without appealing to (i) the availability of covertly and/or anaphorically restricted covert necessity modals and (ii) the ability for *if*-clauses to restrict operators at a distance.

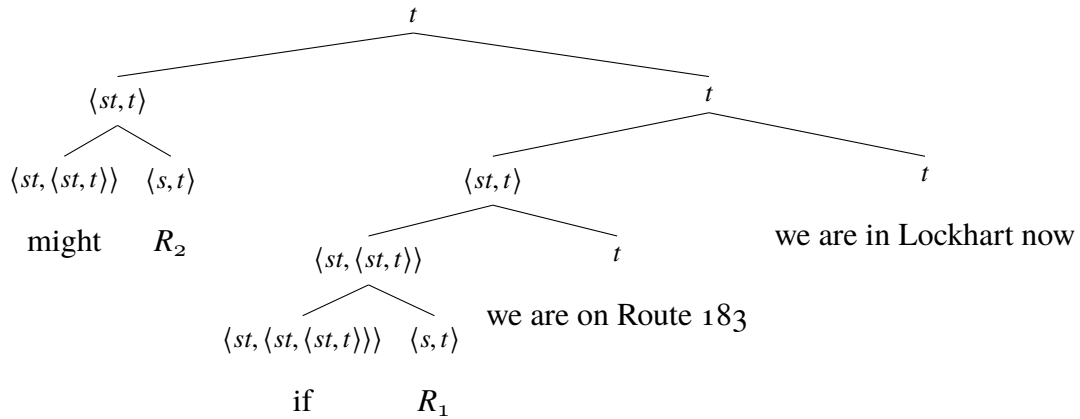
- (11) Mary: If we are on Route 183, we might be in Lockhart now.
- a. # Susan: Well, if that's the case, then, if we are on Route 80 we're in Nixon.
  - b. Susan: Well, if that's the case, then, if we are on Route 80 we're in Martindale.

We then provided examples refuting both (i) and (ii). We also raised the possibility that the apparent mechanism of remote restriction by *if*-clauses falls within the framework of a more general concept of modal subordination.

## 4 Temporal Orientation of Conditionals

In SECTION 3, we showed that in certain scenarios, *might* conditionals in IFTTC sequences require the structure in (2b), repeated below, with *might* taking wide scope over a conditional proposition.

(2b)



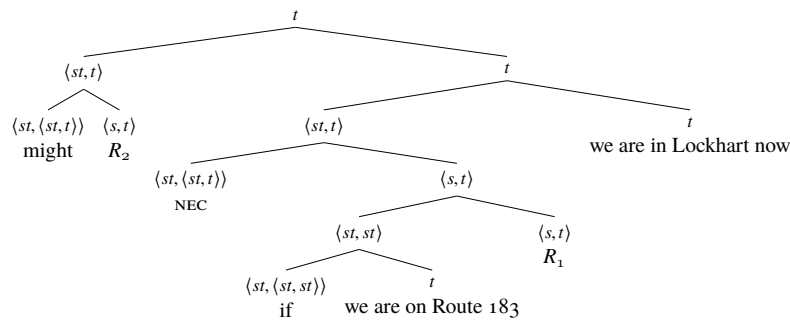
While the restrictor view can accommodate such a structure by recruiting the covert epistemic necessity modal posited for bare conditionals, von Fintel & Heim (2011) argue that such a doubly-modalized structure fails to capture the intuitive meaning of *might* conditionals, such as (1), repeated below.<sup>1</sup>

(1) If we are on Route 183, we might be in Lockhart now.

However, as mentioned in SECTION 2, a circumstantial reading of the embedded conditional proposition *does* seem to capture the intuitive meaning. But in order to derive such a reading, the restrictor view would either need to posit an additional covert circumstantial modal for cases such as (1) or posit a covert necessity operator that is compatible with both epistemic and circumstantial modal bases. In the remainder of this section we show that consequents of bare conditionals are infelicitous with readings compatible with circumstantial modal bases and thus both of the above

<sup>1</sup>The corresponding restrictor-view structure of (2b) is given below in (2b') where NEC represents the covert necessity modal.

(2b')



options for updating the implicit modalization of bare conditionals under the restrictor view are unsatisfactory.

As Copley (2008) observes, conditional antecedents and consequents are subject to different and independent modal environments. The environment of conditional antecedents distributes similarly to that of modal operators which, as Klecha (2016) argues, are compatible with not only doxastic/epistemic modal bases but also circumstantial modal bases. On the other hand, the environment of bare conditional consequents distributes similarly to environments which are either non-modal or are solely epistemic. Consider the case of the simple present in English.

As seen in (28), the non-modalized simple present in English is felicitous with a stative or derived stative predicate with present orientation (PO) as in (28a, c, e, g). Eventive predicates, however, are never felicitous with present orientation. A predicate with future orientation (FO) is felicitous only with a futurate, i.e., settled, or habitual (F/H) reading of the future eventuality as in (28b, f, j). Although we will give no formal description of the notion of *settledness*, an eventuality can be settled if it is planned or scheduled or if it is somehow pre-determined by past, present, and indefeasible laws. If a F/H reading is unavailable due to the nature of the predicate as in (28d, h, j), the simple present is infelicitous.

(28) **NON-MODAL**

STATIVE

- a. John is at the office currently. (PO)
- b. John is at the office tomorrow. (F/H only)
- c. John is sick currently. (PO)
- d. # John is sick tomorrow. (FO)

DERIVED STATIVE

- e. John is seeing the dean currently. (PO)
- f. John is seeing the dean tomorrow. (F/H only)
- g. It is raining currently. (PO)



h. # It is raining tomorrow. (FO)

EVENTIVE

i. # John sees the dean currently. (PO)

j. John sees the dean tomorrow. (F/H only)

k. # It rains currently. (PO)

l. # It rains tomorrow. (FO)

Modal environments distribute somewhat differently depending on the interpretation of the modal operator. Deontic interpretations allow for future orientation of the modal prejacent while epistemic interpretations only allow for F/H readings of future-oriented prejacent.

(29) **MODAL**

STATIVE

a. John has to be at the office currently. (deontic/epistemic PO)

b. John has to be at the office tomorrow. (deontic FO or deontic/epistemic F/H)

c. John has to be sick currently. (deontic/epistemic PO)

d. John has to be sick tomorrow. (deontic FO)

DERIVED STATIVE

e. John has to be seeing the dean currently. (deontic/epistemic PO)

f. John has to be seeing the dean tomorrow. (deontic FO or deontic/epistemic F/H)

g. It has to be raining currently. (deontic/epistemic PO)

h. It has to be raining tomorrow. (deontic FO)

EVENTIVE

i. # John has to see the dean currently. (PO)

j. John has to see the dean tomorrow. (deontic FO or deontic/epistemic F/H)

k. # It has to rain currently. (PO)

l. It has to rain tomorrow. (deontic FO)

As noted by Klecha (2016), the available readings of embedded simple present vary depending on the embedding verb. The available readings of simple present under attitude verbs like *think* distribute similarly to the available readings under epistemic interpretations of modals. Readings under attitude verbs like *hope* match those under both deontic and epistemic interpretations of modals.

(30) **THINK-TYPE VERBS**

STATIVE

- a. John thinks Mary is at the office currently. (PO)
- b. John thinks Mary is at the office tomorrow. (F/H only)
- c. John thinks Mary is sick currently. (PO)
- d. # John thinks Mary is sick tomorrow. (FO)

DERIVED STATIVE

- e. John thinks he is seeing the dean currently. (PO)
- f. John thinks he is seeing the dean tomorrow. (F/H only)
- g. John thinks it is raining currently. (PO)
- h. # John thinks it is raining tomorrow. (FO)

EVENTIVE

- i. # John thinks he sees the dean currently. (PO)
- j. John thinks he sees the dean tomorrow. (F/H only)
- k. # John thinks it rains currently. (PO)
- l. # John thinks it rains tomorrow. (FO)

(31) **HOPE-TYPE VERBS**

STATIVE

- a. John hopes Mary is at the office currently. (PO)
- b. John hopes Mary is at the office tomorrow. (FO or F/H)

- c. John hopes he is sick currently. (PO)
- d. John hopes he is sick tomorrow. (FO)

DERIVED STATIVE

- e. John hopes he is seeing the dean currently. (PO)
- f. John hopes he is seeing the dean tomorrow. (FO or F/H)
- g. John hopes it is raining currently. (PO)
- h. John hopes it is raining tomorrow. (FO)

EVENTIVE

- i. # John hopes he sees the dean currently. (PO)
- j. John hopes he sees the dean tomorrow. (FO or F/H)
- k. # John hopes it rains currently. (PO)
- l. John hopes it rains tomorrow. (FO)

Furthermore, as noted by Copley (2008), the antecedent and the consequent of a conditional do not necessarily share the same modal interpretation. In the case of the simple present, conditional antecedents distribute similarly to *hope*-type verbs. It is therefore not implausible that, given their access to the full range of possible temporal orientations, conditional antecedents and *hope*-type verbs are compatible with both doxastic/epistemic and circumstantial modal bases.

(32) ANTECEDENTS

STATIVE

- a. If John is at the office currently. . . (PO)
- b. If John is at the office tomorrow. . . (FO or F/H)
- c. If John is sick currently. . . (PO)
- d. If John is sick tomorrow. . . (FO)

DERIVED STATIVE

- e. If John is seeing the dean currently. . . (PO)

- f. If John is seeing the dean tomorrow. . . (FO or F/H)
- g. If it is raining currently. . . (PO)
- h. If it is raining tomorrow. . . (FO)

EVENTIVE

- i. # If John sees the dean currently. . . (PO)
- j. If John sees the dean tomorrow. . . (FO or F/H)
- k. # If it rains currently. . . (PO)
- l. If it rains tomorrow. . . (FO)

Bare conditional consequents, however, distribute with *think*-type verbs and non-modal environments, while modalized consequents seem to distribute according to the constraints imposed on the particular modal operator.

(33) **BARE CONSEQUENTS**

If Mary is sick currently, then. . .

STATIVE

- a. John is at the office currently. (PO)
- b. John is at the office tomorrow. (F/H only)
- c. John is sick currently. (PO)
- d. # John is sick tomorrow. (FO)

DERIVED STATIVE

- e. John is seeing the dean currently. (PO)
- f. John is seeing the dean tomorrow. (F/H only)
- g. It is raining currently. (PO)
- h. # It is raining tomorrow. (FO)

EVENTIVE

- i. # John sees the dean currently. (PO)

- j. John sees the dean tomorrow. (F/H only)
- k. # It rains currently. (PO)
- l. # It rains tomorrow. (FO)

(34) **MODALIZED CONSEQUENTS**

If Mary is sick currently, then. . .

STATIVE

- a. John has to be at the office currently. (deontic/epistemic PO)
- b. John has to be at the office tomorrow. (deontic FO or epistemic F/H)
- c. John has to be sick currently. (deontic/epistemic PO)
- d. John has to be sick tomorrow. (deontic FO)

DERIVED STATIVE

- e. John has to be seeing the dean currently. (deontic/epistemic PO)
- f. John has to be seeing the dean tomorrow. (deontic FO or epistemic F/H)
- g. It has to be raining currently. (deontic/epistemic PO)
- h. It has to be raining tomorrow. (deontic FO)

EVENTIVE

- i. # John has to see the dean currently. (PO)
- j. John has to see the dean tomorrow. (deontic FO or epistemic F/H)
- k. # It has to rain currently. (PO)
- l. It has to rain tomorrow. (deontic FO)

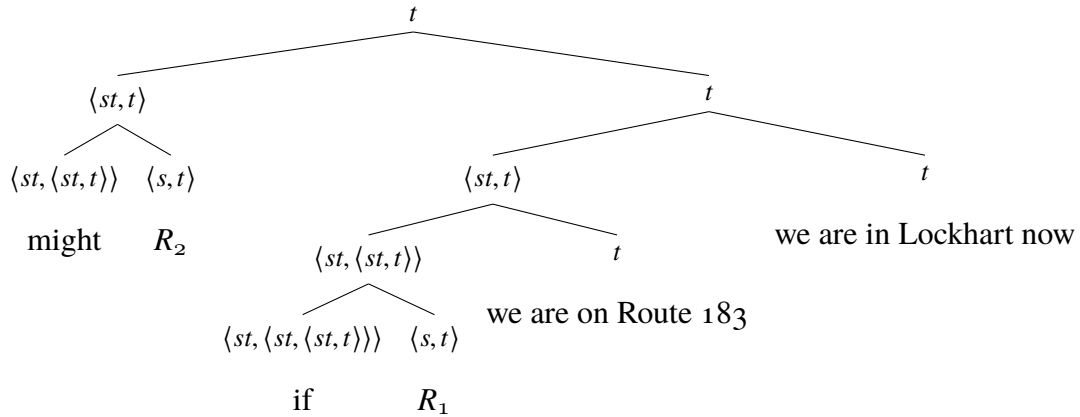
Bare conditional consequents, if taken to be implicitly modalized as claimed under the restrictor view, seem to be incompatible with readings associated with a circumstantial modal base. Thus, there seems to be no independent evidence for a covert circumstantial necessity modal required by the restrictor view to derive both the intuitive reading of (1) and the asymmetry in (11).

- (1) If we are on Route 183, we might be in Lockhart now.

- (11) Mary: If we are on Route 183, we might be in Lockhart now.
- a. # Susan: Well, if that's the case, then, if we are on Route 80 we're in Nixon.
- b. Susan: Well, if that's the case, then, if we are on Route 80 we're in Martindale.

On the other hand, an analysis of *if* as a binary modal operator that patterns similarly to *hope*-type attitude verbs provides the compatibility with a circumstantial modal base that is required for the embedded conditional proposition in (2b), repeated below, to capture the intuitive reading of (1).

(2b)



The binary modal operator analysis also provides the independence between conditional antecedents and consequents observed by Copley (2008). Under such an analysis, the modal operator *if* governs the modal environment of the antecedent (its first argument) while the modal environment, if any, of the consequent (its second argument) is equivalent to its reading at the matrix level.<sup>2</sup> In (35) below, the circumstantial modal base of *if* in the antecedent does not extend to the consequent, i.e., a future-oriented eventive is licensed in the antecedent but not in the consequent.

- (35) a. # If it drops below freezing, then it snows tomorrow.

Similarly, a future-oriented eventive licensed by an epistemic *might* in the consequent of a narrow-scope reading of a *might* conditional is no longer licensed once the modal takes wide-scope over

<sup>2</sup>This is not to say that bare conditional consequents cannot be covertly modalized. Indeed, consequents can have generic or futurate and habitual readings. So, whatever covert operation is assumed to function on such sentences at the matrix level would function similarly on such sentences in conditional consequents.

a bare conditional. A *might* conditional with a future-orientated eventive consequent is therefore predicted to be incompatible with the structure in (2b) since the bare consequent of the embedded conditional is incompatible with future-orientated eventives. Consider the IFTC sequence below.

- (36) a. If it drops below freezing, then it might snow tomorrow.  
b. # Well, if that's the case, then, if it's above freezing, it will rain.

The inference required for the nested conditional in the continuation in (36b) to be true, namely that there will be precipitation tomorrow, is not inferable from the preceding *might* conditional since the embedded bare conditional which would provide that inference is itself infelicitous. However, a nested conditional with the inference made explicit is felicitous.

- (37) a. If there's precipitation tomorrow, then, if it's above freezing, it will rain.

What we hoped to show in this section is that a covert circumstantial necessity modal required by the restrictor view to derive the intuitive reading of (1) and the asymmetry in (11) lacks independent motivation since a circumstantial modal base is incompatible with the observed modal environments of bare conditional consequents. In addition, the restrictor view makes no prediction whatsoever about the modal environments of conditional antecedents whereas a binary modal operator analysis of *if* not only accounts for the observed temporal orientation of conditionals but does so with a structure which captures the intuitive reading of (1) and the asymmetry in (11).

## 5 Operator View

We have argued that in certain scenarios, discourses involving *might* conditionals require a wide-scope reading of *might* over a bare conditional with a circumstantial interpretation. We have also argued that the restrictor view is unable to capture these readings since, according to that view, the consequent of a bare conditional is implicitly modalized, and we have provided evidence that consequents of bare conditionals distribute with either non-modal or epistemic modal interpretations but not with circumstantial modal interpretations. On the other hand, we also provided evidence that

conditional antecedents distribute with the readings of modal prejacent under both epistemic and circumstantial interpretations. We therefore propose that *if* is a binary modal operator which, like *must*, is compatible with both epistemic and circumstantial interpretations. The intuitive meaning of (1) and the asymmetry of the IFTTC sequence in (11) can be captured by a wide-scope reading of *might* over a conditional headed by *if* with a circumstantial interpretation. However, in proposing multiple interpretations for *if*, we run the risk of overgeneration. Consider the following possible scope configurations between *might* and either of the two *if* interpretations,  $if_{\text{EPI}}$  and  $if_{\text{CIR}}$ .

(38) *Possible operator-view LF scope configurations for might conditionals*

- a.  $might > if_{\text{EPI}}$
- b.  $might > if_{\text{CIR}}$
- c.  $if_{\text{EPI}} > might$
- d.  $if_{\text{CIR}} > might$

As mentioned in SECTION 2, the argument von Stechow & Heim (2011) provide against the scope configuration in (38a) for the *might* conditional in (1), repeated below, relies on a derived reading which is incompatible with the fact that Mary is lost in that given scenario.

(1) If we are on Route 183, we might be in Lockhart now.

Their argument against the scope configuration in (38c) relies on derived readings, such as the truth of (3), repeated below, which are incompatible with what Mary knows based on the information encoded in her map (FIGURE 1).

(3) If we are on Route 80, we might be in Lockhart now.

Although they do not consider the configuration in (38d), their argument against (38c) also applies to (38d). The configuration in (38b), however, as already discussed, not only derives a claim which seems to capture the intuitive meaning of (1) but also seems to be an available structure given the felicitous continuation in (11b). We summarize these claims in the second column (LOST  $\wedge$  MAP) of TABLE 2 where *n/a* indicates a derived reading incompatible with the



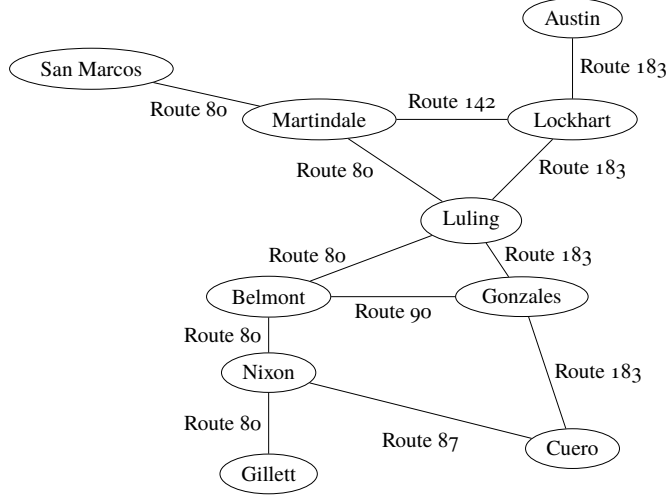


FIGURE 1: Road map of Lockhart and environs

indicated scenario and a check mark (✓) indicates a compatible and available reading. With regards to overgeneration, the cases which are problematic for the operator view are cases where a particular scope configuration derives a reading which is compatible with but yet unavailable in a given scenario. Such cases require some explanation for why such readings are not available.

	LOST $\wedge$ MAP	LOST $\wedge$ $\neg$ MAP	142 $\wedge$ MAP	142 $\wedge$ $\neg$ MAP
(38a) <i>might</i> $>$ <i>if</i> <sub>EPI</sub>	n/a	n/a	too weak	?
(38b) <i>might</i> $>$ <i>if</i> <sub>CIR</sub>	✓	✓	too weak	✓
(38c) <i>if</i> <sub>EPI</sub> $>$ <i>might</i>	n/a	✓	n/a	✓
(38d) <i>if</i> <sub>CIR</sub> $>$ <i>might</i>	n/a	✓	n/a	✓

TABLE 2: Lockhart scope configuration availability

Crucial to the scenario in (1) is the assumption that Mary believes the information encoded in the map. Without this assumption, the scenario becomes compatible with the configurations in (38c) and (38d) which derive the truth of both (1) and (3). These narrow-scope configurations of *might* effectively render the conditional antecedent vacuous and appropriately reflect Mary’s distrust of the map in this updated scenario. The derived claims from the configuration in (38a) remain incompatible since Mary’s epistemic state is still one of being lost. The derived claims from the configuration in (38b) remain compatible and intuitive as long as Mary is open to any map

possibility. We summarize these claims regarding this updated scenario in the third column ( $LOST \wedge \neg MAP$ ) of TABLE 2.

At this point we do not yet have a scenario which is compatible with the reading derived from the configuration in (38a). For such a reading to be true there must be a world,  $w$ , epistemically accessible from the actual world,  $w^*$ , in which every Route-183 world epistemically accessible from  $w$  is also a Lockhart world. Consider a scenario in which Mary knows that they are somewhere on Route 142 and she also knows the map she is looking at is accurate. In this scenario, any epistemically accessible world,  $w$ , is not only a Route-142 world but also a world in which Mary knows they are on Route 142 and also knows the map she is looking at is accurate. Therefore, not just  $w$  but every world accessible from the actual world is a world whose epistemically accessible Route-183 worlds guarantee that Susan and Mary are in Lockhart. The claim derived from (38a) in this scenario is therefore too weak, as is the claim derived from (38b). These derived readings are pragmatically infelicitous. As in the original scenario, the claims derived from (38c) and (38d), such as the truth of (3), are incompatible with Mary's belief in the information encoded in the map. We summarize these claims regarding this updated scenario in the fourth column ( $142 \wedge MAP$ ) of TABLE 2.

Now, consider a scenario in which Mary knows that they are somewhere on Route 142 but she is unsure whether the map she is looking at is accurate. In this scenario, a world,  $w_1$ , where they are on Route 142 and the map is accurate and she knows it, and a world,  $w_2$ , where they are on Route 142 and the same map is not accurate and she knows it are both compatible with her belief state in that actual world,  $w^*$ . Furthermore, the Route-183 worlds compatible with her belief state in  $w_1$  are necessarily Lockhart worlds. However, Route-183 worlds compatible with her belief state in  $w_2$  are not necessarily Lockhart-worlds since, in these worlds, she cannot rely on the map and therefore cannot conclude that being on Route 142 and being on Route 183 entails being in Lockhart. We therefore have a scenario with which the reading derived from the scope configuration in (38a) is not only compatible but in which it is pragmatically felicitous, unlike in the previous scenario in which the reading is too weak. The derived claims from the configuration in (38b) are also

compatible and intuitive as long as Mary is open to any map possibility. The vacuous antecedents rendered by the narrow-scope configurations in (38c) and (38d) are also compatible due to Mary’s distrust of the map. We summarize these claims regarding this updated scenario in the fifth column ( $142 \wedge \neg\text{MAP}$ ) of TABLE 2 but with one reservation. Is the reading provided by the configuration in (38a), although compatible with the above scenario, actually available? Consider the following exchange.

Scenario ( $142 \wedge \neg\text{MAP}$ ): *Mary and Susan are driving in a car. They have just passed a Route 142 sign. Mary pulls out an old crusty atlas dated 1845 from under the seat and turns to a page containing Route 142 (FIGURE 3).*

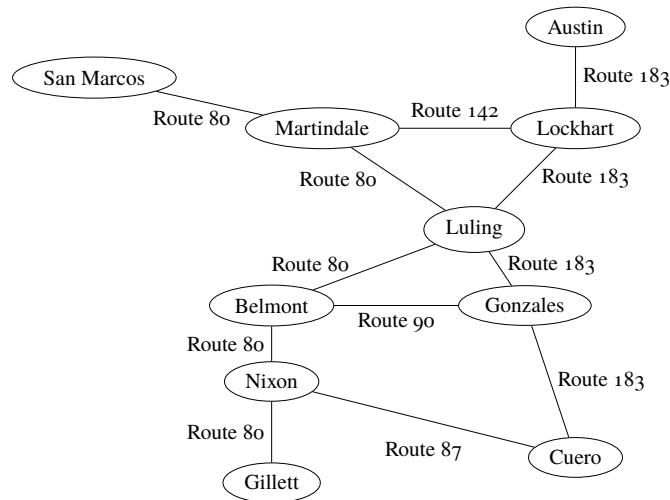


FIGURE 3: Road map of Lockhart and environs dated 1845

- (39) a. Mary: If we are on Route 183, we might be in Lockhart now.  
 b. # Susan: Well, if that’s the case, then you must think that map is accurate.

If the *might* conditional in (39a) is interpreted with the wide-scope configuration in (38a) then the embedded bare conditional *if we are on Route 183, we are in Lockhart now* would have an epistemic accessibility relation based on Mary’s belief that the map is accurate. Based on the truth of that embedded bare conditional, Susan would be justified to think that Mary believes the map is accurate and thus (39b) is predicted to be felicitous provided that the embedded bare conditional

in (39a) is an available referent for *that* in the phrase *that's the case* in (39b). However, the IFTC sequence in (39) suggests that a reading of (39a) based on the configuration in (38a), although compatible with the scenario, is not available, thereby compelling a defender of the operator view to provide an independent constraint or some other explanation for why the reading derived from the configuration in (38a) is unavailable. An issue to maybe consider is what happens to the accessibility relations of modal statements in anaphoric relationships.

Finally, consider Mary's response in (40c) to the felicitous IFTC sequence in (11) repeated here as (40a-b).

- (40) a. Mary: If we are on Route 183, then we might be in Lockhart now.  
b. Susan: Well, if that's the case, then, if we are on Route 80 we are in Martindale.  
c. Mary: That's not what I meant. I just meant that Lockhart is on Route 183.

Mary's clarification seems to suggest an intended reading derived from a restrictor-view analysis of the *might* conditional, rather than one which provides the conditional proposition (*if we are on Route 183, we are in Lockhart now*) necessary for Susan's utterance to be true. Nevertheless, Susan's utterance, based on her misunderstanding of (40a), is still true in this scenario and requires a wide-scope reading of (40a) for it to be so. Neither the restrictor view nor the operator view is able to derive both Mary's intended reading and Susan's misunderstanding of (40a). However, by adopting a *shifty* conditional operator along the lines of Gillies (2010), the readings derived from the scope configurations in (38c) and (38d) which were previously incompatible with the scenario in (11/40a-b) would not only be compatible but would also capture Mary's intended meaning. Therefore, unlike the restrictor view and the straightforward operator view, the *shifty* operator view captures the ambiguity between the two possible readings of (40a), i.e., Mary's narrow-scope intended reading and Susan's wide-scope misunderstood reading.

What we hoped to address in this section is the issue of overgeneration resulting from the various scope configurations between the modals *might* and *if* in *might* conditionals under the operator view. One configuration in particular, the wide-scope reading of *might* over epistemic *if*,

seems unavailable in the scenarios we explored. We leave it to further research to determine what constraints might govern these cases. On the other hand, the operator view seems to undergenerate available readings which turn out to be derivable given a *shifty* conditional operator. Again, we leave it to further research to determine the exact nature of such *shiftiness* and whether the modal operator *if* is necessarily shifty or whether its shiftiness can be cancelled in any way.

## 6 Luling

Let's revisit our friends Mary and Susan who, after realizing that their fuel gauge is broken, have just passed a sign indicating that they are leaving Luling. Given an updated map (FIGURE 4), consider the IFTTC sequence in (41).

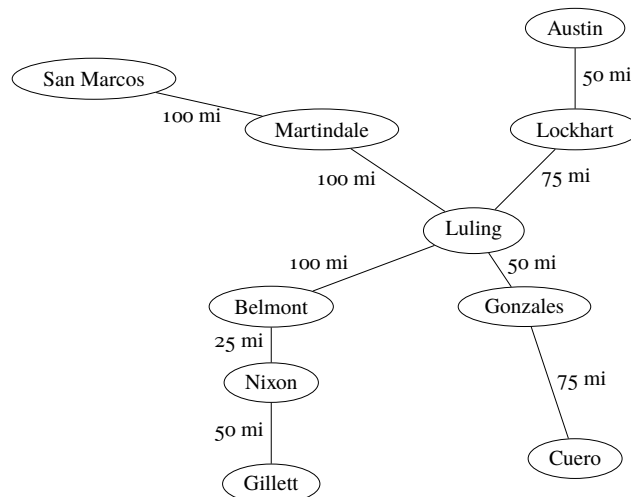


FIGURE 4: Distance map of Lockhart and environs

- (41) Mary: If we pass Gonzales, then we might run out of gas in Cuero.
- a. Susan: If that's the case, then, if we pass Belmont we'll run out of gas in Nixon.
  - b. # Susan: If that's the case, then, if we pass Belmont we'll run out of gas in Gillett.

A circumstantial interpretation of the conditional operator in (41) is compatible with a future-oriented reading of its antecedent. Given that Mary and Susan consider it possible, as far as they currently know, that they have enough fuel for another 125 miles, a wide-scope reading of *might*

over the conditional proposition is compatible with the scenario and, as predicted, the continuation (41a) is felicitous. Suppose now that Mary and Susan have run out of gas but they're not sure where. Consider the following IFTTC sequence.

- (42) Mary: If we passed Gonzales, then we might have run out of gas in Cuero.
- a. Susan: If that's the case, then, if we passed Belmont we ran out of gas in Nixon.
  - b. # Susan: If that's the case, then, if we passed Belmont we ran out of gas in Gillett.

As in the previous scenario, given that Mary and Susan consider it possible, as far as they currently know, that when they left Luling they had enough fuel for another 125 miles, a wide-scope reading of *might* over the conditional proposition is compatible with the updated scenario. As predicted, the continuation (42a) is felicitous. However, the continuation in (42b) is infelicitous suggesting that a wide-scope reading based on the possibility of them having enough fuel for another 75 miles after passing the first town outside of Luling, although also compatible with the situation, is not possible. Finally consider the following IFTTC sequence uttered between Mary and Susan after reaching the first town outside of Luling but before running out of gas.

- (43) Mary: If we (just) passed Gonzales, then we might run out of gas in Cuero.
- a. ? Susan: If that's the case, then, if we (just) passed Belmont we'll run out of gas in Nixon.
  - b. ? Susan: If that's the case, then, if we (just) passed Belmont we'll run out of gas in Gillett.

Our judgements regarding the continuations in (43) are that both are infelicitous or at least equally degraded, suggesting that unlike the previous two scenarios, a wide-scope reading of *might* over the conditional proposition is either unavailable, or, if available, then the 75-mile inference is as equally accessible as the 125-mile inference.

While more work needs to be done investigating the variability of judgements regarding these IFTTC sequences, what we hoped to highlight with the three scenarios in this section are possible

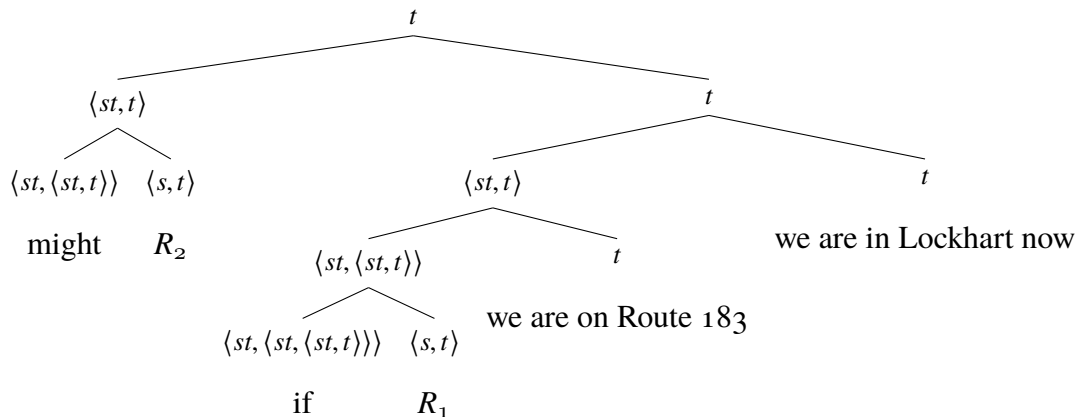
interactions between tense and modal interpretations. Given that wide-scope readings of these *might* conditionals require a circumstantial modal base for *if*, the degraded continuations in (43) suggest that the necessary inferences are unavailable or at least difficult to attain. The 125-mile inference which is compatible with all three scenarios is available in (41) and (42) and unavailable or degraded in (43). The 75-mile inference which is compatible with the sequences with past antecedents, (42) and (43), seems to be unavailable, or if available in (43), comparatively degraded to the 125-mile inference. Determining whether tense truly plays a role in these judgements requires further research.

## 7 Conclusion

- (11) Mary: If we are on Route 183, we might be in Lockhart now.
- a. # Susan: Well, if that's the case, then, if we are on Route 80 we're in Nixon.
  - b. Susan: Well, if that's the case, then, if we are on Route 80 we're in Martindale.

We provided evidence that certain contexts such as (11) involving *might* conditionals require *might* to take wide-scope over a bare conditional proposition, as in the structure in (2b), in order to provide the appropriate referent for subsequent pronouns.

(2b)



Mechanisms under the restrictor view to provide the necessary referent while bypassing such a structure require (i) the availability of a covertly and/or anaphorically restricted covert necessity

modal and (ii) restriction at a distance by a preceding *if*-clause. We then provided examples refuting both (i) and (ii). Expanding the restrictor view with a covert circumstantial necessity modal in order to provide the structure required to derive the asymmetry in (11) as well as capture the intuitive reading of (1) lacks independent motivation since the consequents of bare conditionals pattern with non-modal and epistemic modal interpretations but not with circumstantial modal interpretations.

(1) If we are on Route 183, we might be in Lockhart now.

On the other hand, the antecedents of conditionals pattern with both epistemic and circumstantial interpretations. We argued that an operator view of *if* analyzed as a binary modal operator compatible with both epistemic and circumstantial modal bases not only is compatible with the observed temporal orientation of conditionals but also affords the structure required to derive the intuitive meaning of (1) as well as the asymmetry in (11). However, such an analysis raises concerns about overgeneration. We provided a scenario where the operator view derives a compatible reading which appears to be unavailable. We also provided a scenario where the operator view is unable to derive an available reading. We leave it to further research to investigate what constraints might mitigate against overgeneration as well as how incorporating *shiftiness* might account for missing readings with the goal of utilizing this operator view to account for readings of modalized conditionals unaccounted for under other operator view analyses.



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