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Backtracking and have to: Maintaining a Unified Analysis of Conditionals

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Backtracking and *have to*: Maintaining a Unified Analysis of Conditionals

A dissertation submitted in partial satisfaction

of the requirements for the degree

Doctor of Philosophy in Linguistics

by

Kaeli Shannon Ward

2014

Backtracking and *have to*: Maintaining a Unified Analysis of Conditionals

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Doctor of Philosophy in Linguistics

University of California, Los Angeles, 2014

Professor Yael Sharvit, Chair

This dissertation investigates the properties, meaning, and licensors of backtracking counterfactuals. In particular, backtracking has long been seen as problem for a unified account of counterfactuals as backtracking counterfactuals are counterfactuals whose antecedent time temporally follows the consequent time. Such a conditional is a problem for any account of counterfactuals that relies on similarity in the past and not the future to calculate which possible worlds are most similar. As such, backtracking counterfactuals have largely been avoided in analyses of conditionality.

Recent efforts have been successfully made to include some backtracking data into a wider theory of counterfactuality (Arregui 2005, Schulz 2007) but even these accounts do not encompass the full range of backtracking data. In Chapter Two of this dissertation, I will present the background assumptions for why backtracking is problematic as well as present backtracking data that Arregui accounts for, as this data must be accounted for in any theory of backtracking.

The focus of Chapter Three is new data. I present new instances of backtracking counterfactuals that challenge the current theories of backtracking. Furthermore, I present data from non-backtracking counterfactual conditionals that show that, contrary to the implicit assumptions of earlier theories, backtracking is not magically saved by an extra layer of

modality. There are several strategies that make backtracking possible, and in each, no part of the denotation of the counterfactual is specific to a backtracking construction. I demonstrate this with data from forwardtracking (standard) counterfactuals, as well as non-counterfactual conditionals.

Chapter Four presents the formalism of existing accounts of backtracking as well as accounts of counterfactuals and conditionals more broadly. I examine the shortcomings of Arregui's account of backtracking for the data presented in Chapter Three and explore the tools from other areas of linguistics and counterfactual research that will guide my analysis, most importantly ordering sources, focus alternatives, and aktionsart classes. Chapter Fives applies these tools to present an updated analysis of backtracking counterfactuals. I will also account for an adversity reading that arises in some non-backtracking counterfactual conditionals.

The dissertation of Kaeli Shannon Ward is approved.

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CHAPTER 1

Introduction

1.1 The issues, broadly

If I finish a draft of this chapter, I'll come join you guys for dinner. Conditional statements are a daily part of human language, and we have no trouble understanding what they mean. In this case I am communicating that I have not finished my work yet, but in every conceivable future in which I do, I will come out to dinner. Despite this intuitive understanding and their relative pervasiveness, a full understanding of the meaning of conditional statements evades us. Our lack of formal understanding does not stem from lack of effort: Diodorus Cronus, who died around 284 BCE, is credited with the origins of the criteria for a sound conditional (Sedley, 2013). Rather, conditional data is incredibly complex, and any analysis that hopes to account for all of conditionality needs to account for a wide range of empirical facts. In this dissertation, I will add to the list of empirical data to be accounted for, as well as provide an account of the data that I present such that it can fit within a wider analysis of conditionality.

I will be entertaining analyses of conditionals, generally, and counterfactuals more specifically from a wide range of sources. I build my analysis on a foundation laid by Lewis and Stalnaker, adapted by Arregui, and honed with tools from Kratzer and Ogihara (Lewis, 1973, 1979; Stalnaker, 1981, 1984; Arregui, 2005, 2008a; Kratzer, 1986, 1991; Ogihara, 2000). All of these theories are built on the same basic principle on which Lewis and Stalnaker based their analyses of *would* counterfactuals: in uttering a *would* counterfactual, the speaker is asking the listener to entertain all of the relevant, most similar ways things could have been

different from the way things actually are, given a specific premise (the antecedent). Let us call the way things could be/have been *possible worlds*, and the way things are *the actual world*, and then counterfactuals (and conditionals more generally) are asking us to consider how things could go, could have gone, will go, or would have gone in possible worlds. I will be concerned only with conditionals whose consequent is headed by *will* or *would*, with a greater focus on *would* conditionals.

This dissertation is concerned foremost with backtracking counterfactuals, which have been causing linguistic distress since at least 1979 (Lewis, 1979). A backtracking counterfactual is one whose consequent time precedes its antecedent time. The following is the famous example that Lewis uses to introduce backtracking; in Lewis 1979 it is attributed to Downing (1959), and many of my examples are based on it. I've highlighted the relevant conditional and provided the alternate structure that I am primarily interested in.

(1)   Jim and Jack quarreled yesterday, and Jack is still hopping mad. We conclude that if Jim asked Jack for help today, Jack would not help him. But wait: Jim is a prideful fellow. He never would ask for help after such a quarrel; **if Jim were to ask Jack for help today, there would have to have been no quarrel yesterday.** In that case Jack would be his usual generous self. So if Jim asked Jack for help today, Jack would help him after all.

    a. If Jim had asked Jack for help today, there would have to have been no quarrel yesterday.

(1a) is called a backtracking counterfactual because the time of the antecedent, namely *today* is **after** the time of the consequent, *yesterday.* This is the definition of backtracking that I will be using throughout this dissertation, but it is important to note that this is a weaker definition than others – a stronger view of backtracking is that a conditional is only backtracking if it asserts a backward causal chain. I will not be delving into concerns of

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causality at all in this dissertation, but I will argue that I have cases that show that the causal explanation is not sufficient to account for the facts that I will present.

Returning to my definition of backtracking, I can contrast a backtracking counterfactual with a standard counterfactual, because in a standard counterfactual, like (2), the time of the antecedent precedes the time of the consequent:

(2)   If Jim had not fought with Jack yesterday, he would have asked for help today.

The keen reader may have noticed that the consequent structures for (1a) and (2) are different: (1a) has an extra layer of modality, which Lewis called *special syntax*. I emphasize the difference in (3):

(3)   a.   **Backtracking**: If Jim had asked Jack for help today, there *would have to have* been no quarrel yesterday.
        b.   **Standard**: If Jim had not fought with Jack yesterday, he *would have* asked for help today.

The standard judgment in the literature, which the data I present in this dissertation will challenge, is that backtracking is impossible without this special syntax, so examples like (4) are expected to always be infelicitous:

(4)   If Jim had asked Jack for help today, there *would have* been no quarrel yesterday.

These are expected to be infelicitous given the idea that the past is fixed relative to the present, and the future is open. That is, the way things can be in the future is not decided yet, but the way things were is fixed. Therefore, it is theoretically complicated to have the way things are in the past depend counterfactually on the way things are later. Given this widespread idea, special syntax has been the focus of analyses of backtracking. The idea,

generally, is that there is something exceptional about this construction that licenses an otherwise impossible conditional. I will be challenging this claim.

Backtracking conditionals were originally discriminated against because when considering conditionals as reflections of causal relationships, it appears to be true that causality, at least, runs in only one direction – in the same direction as time. It is common in the philosophical literature to view causality and conditionality as closely tied (Lewis, 1973, 1979; Jackson, 1977). So to say that something in the future (consequent) depends causally on something in the past (antecedent) is sensible, but to say that something in the past (consequent) depends causally on something in the future of it (antecedent) does not. Lewis calls this the "contrast between counterfactual dependence in one direction of time and counterfactual independence in the other direction" (p. 456). Such a concern ventures into the considerations of causality that I will not be addressing in this dissertation, and so I will leave this part of the backtracking problem alone. However, it is worth noting that regardless of the facts of the temporal and causal relationship, this dissertation is full of examples where backtracking counterfactuals are successfully used.

Causality aside, backtracking poses a serious problem for Lewis's account of counterfactuals. If the past cannot rely counterfactually on the present, then there should be no way to assert how present changes affect past actions. Backtracking is an even bigger problem for any theory that specifically prioritizes the past when it comes to similarity. In loose terms, if the truth values of a *would* counterfactual, that is, a counterfactual headed by *would* in the consequent, are computed using a relation that assesses similarity to the actual world **in the past** of the antecedent, then we have a problem with the following counterfactual. Assume that (5) is true, and that it is being uttered in the evening:

(5)   If it had not rained this morning, then it would have been hotter this afternoon.[1]

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[1]Note that this case is not particularly problematic for theories of overall similarity (Lewis, 1979). I am using it simply to illustrate the idea of how past similarity approaches work.

According to a past similarity approach to counterfactuals, to assess the truth of this coun-terfactual, one examines all possible worlds in which it did not rain this morning, and which are as similar to the actual world as possible before that. That is, we don't consider worlds where there is some inexplicable weather anomaly, or worlds where yesterday was different than it actually was. We hold everything as is and evaluate only with respect to the small change indicated by the antecedent. Everything before the antecedent time is held fixed. But naturally, what follows the antecedent time can vary. In particular, I am claiming that in all of these not-rain worlds, it is hotter this afternoon. This is clearly different than how things are in the actual world. So similarity is computed relative to the past.

The following diagram shows this pictorially. I will be using these diagrams, which are inspired entirely by those in Arregui 2005, throughout the dissertation to make the worlds under consideration more clear. $w_@$ represents the actual world, and what I'm showing is a slice of the history for $w_@$, with, as expected, past extending out to the left, and future to the right. In Lewis 1979, Lewis entertains a view in which for counterfactuals of the form *If α then β*, we go to the point on the timeline of the actual world at which α holds, hold fixed everything before α, and then anything after α can be different from the actual world, so long as it follows the natural course of things. And this variation zone is where β exists, temporally.

(6)
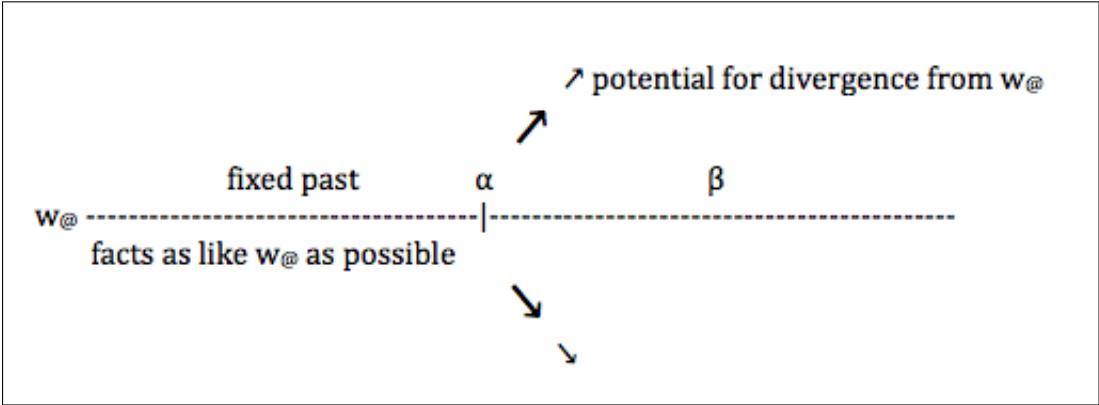
Lewis ultimately rejects this theory, but it is entertained and upheld in various forms by other philosophers (e.g. Jackson 1977). Furthermore, Arregui (2005, whose analysis I will be following) agrees with the spirit of this analysis and argues that the past similarity is what matters for the computation of *would* counterfactuals. However, while the analysis just outlined works excellently for standard counterfactuals, backtracking counterfactuals are problematic precisely because they are asserting that things differ from the actual world in the **past** of the antecedent. Therefore, a visual representation of a backtracker would be as follows, and the problem is that β is in the fixed past. Therefore, it should not be allowed to diverge from the actual world facts, but in (1a), the speaker is clearly asserting that the past he/she is considering is different from how the past actually was.

(7)
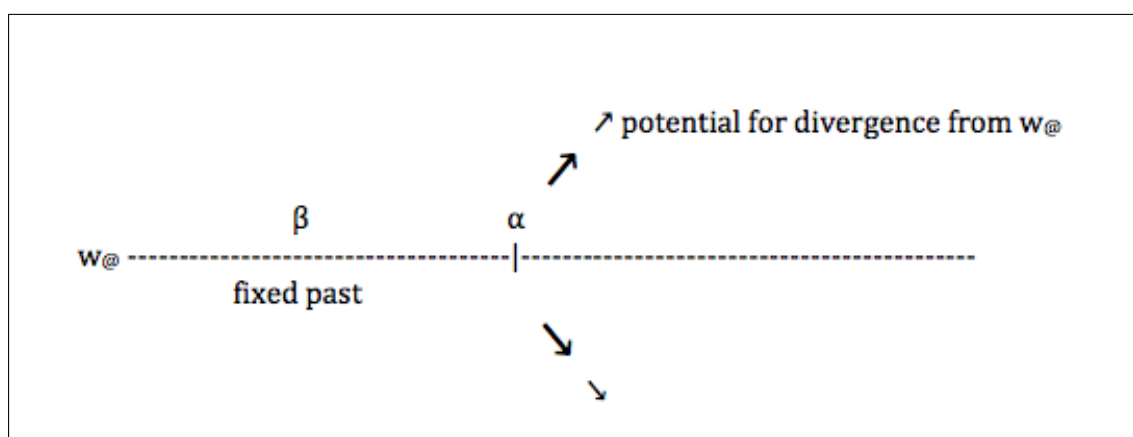
This problem is part of why backtracking was largely avoided in the analyses of conditionals for decades. More recently, however, efforts have been made to account for backtracking, and they follow the precedent laid out by Lewis that backtracking is licit only so long as there is special syntax, or extra modality, to rescue it. In this dissertation, I will be adding new backtracking data that shows that this special syntax is not the only answer to backtracking problems. Therefore, I will outline the "problem" of the account for backtracking that relies solely on *have to*, after which I will show a few data points that prove that this is not the

only route, and I will briefly outline how I will account for the new data as well as what implications arise from my data.

1.2   The issues, more specifically

While there are other accounts of backtracking available (Bennett 1984), I will focus on the analysis presented in Arregui (2005). Arregui successfully accounts for the fundamental backtracking data that any analysis of backtracking must deal with, namely that backtracking can sometimes be rescued by way of special syntax.[2] This is an example taken from her dissertation:

(8)   a.   ?/* If the leaves had been red last autumn, it would have rained a lot the previous summer.

       b.   If the leaves had been red last autumn, it would have to have rained a lot the previous summer.[3](p. 88)

In this example, we see that a backtracking counterfactual – backtracking because the previous summer (consequent) precedes last autumn temporally (antecedent) – can be rescued with the use of special syntax. However, Arregui observes that this is not always the case. Sometimes there are backtracking counterfactuals that cannot be rescued by special syntax.

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[2]Arregui also addresses cases called analytical backtracking counterfactuals – backtracking counterfactuals in which the antecedent and consequent are world-independently related by definitional or analytical truths – in which special syntax is not needed, but I will defer from discussing these until Chapter **Old Analyses**.

[3]A detail that I will not address until Chapter **Analysis** is that for some speakers, the consequent for a special syntax backtracker must also have yet another *have* in it:

(i)   If the leaves had been red last autumn, it would have **had** to have rained a lot the previous summer.

Some speakers prefer the consequent structure in (8b), others prefer (i), and still others accept both. I will be using the syntax as in (8b) throughout this dissertation because it is the standard judgement used in the literature, but I will postulate causes for the alternate syntax in (i) in Chapter **Analysis**.

(9)   She loves desserts in general, but she doesn't like chocolate. She didn't even touch the chocolate mousse.

   a. *If she had eaten dessert today, the cook would have made a peach pie yesterday.

   b. *If she had eaten dessert today, the cook would have to have made a peach pie yesterday. (p. 92)

Both of the counterfactuals in (9) are marked as unacceptable, even though (9b) has the special syntax that is meant to rescue a backtracking counterfactual. Arregui did not include the judgements in the example, but mentions them in the text immediately following; I agree with the judgements given. Neither of these conditionals is acceptable because, to the reader's knowledge, there is no rule that if chocolate mousse is not made, peach pie is the only available alternative. In fact, to the extent that (9b) is acceptable, the reader must be accommodating some kind of principle that the cook only knows how to make peach pie or chocolate mousse. This intuition – that in order for a special syntax backtracking counterfactual to be successfully used there must be a rule which in essence says *If not chocolate mousse, then peach pie* – is at the core of Arregui's analysis. She makes the following generalization:

(10)   Backtracking counterfactuals with special syntax can be judged true if some (salient) law establishes a relation between antecedent and consequent.

The inverse is also generalized, as follows:

(11)   Cases in which special syntax does not help with backtracking counterfactuals are cases in which there is no (salient) law or regularity to be invoked by *have*.

Essentially, there is a two way street: to use a special syntax backtracker, there must be a principle that links the antecedent and consequent, and if there isn't one, then backtracking is impossible even with special syntax. From this, Arregui builds an analysis of backtracking

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that both accounts for the possibility of their existence at all, that is, contradicting Lewis's views that backtracking is special and/or not part of a standard counterfactual theory, and also for the fact that rules are what save backtracking by way of *have to*.

To allow backtracking as a formal possibility within the realm of counterfactual analyses, Arregui introduces the idea that counterparts, created by Lewis to deal with issues of transworld individual identity, can also be applied to times and events. Informally, x an individual, event, or slice of time, exists only in one world, and it is a part of that world. However, there can possibly exist an x', a counterpart of x, which is something of the appropriate type that could, as far as we can tell given the context, be the same as x. Let's take a concrete example. I exist only in this, the actual world.

(12)   If I had had red hair, I would have auditioned to play Ariel in *The Little Mermaid* on Broadway.

In this counterfactual, we are entertaining individuals that, as far as we can tell, are me, in another world. And importantly, the antecedent has included the information that these "me's" must have red hair. So even though I have brown hair in the actual world, we can look at individuals that count as me in other possible worlds that have red hair. The point of this is to show that when I say "as far as we can tell could be the same individual" there does not need to be perfect identity. This same idea can be generalized to events and histories – slices of time in a world's history that includes all of the facts and events in that slice of time. In all of these counterpart relations, context will provide the extent to which the actual x and its counterpart x' must match.

As counterparts need not be identical to count as similar, counterparts to the past are an excellent way to update a past-similarity counterfactual framework so that we can maintain similarity without ruling out backtracking altogether. I will be explicit with the formalism of this change in Chapter 2, but for now this is sufficient to show how backtracking is possible. Take the following diagram as an example of how this update works:

(13)

```
                    ¬β                ¬α
  w@ ----------------------------------|------------------------------------
      ↑
      | counterpart of
      |                 β                α
  w₁ |----------------------------------|------------------------------------
```
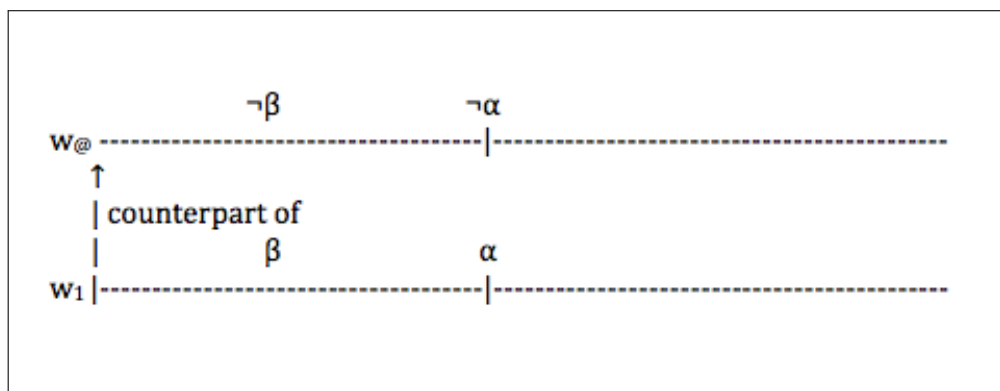
In the actual world, neither the antecedent nor consequent is true, but we can look at a world that is a counterpart to the actual world in which α is true, and then, since counterparts require similarity without identity, we can see if β is true in the past of α in this counterpart.

The second piece of the puzzle naturally is the addition of the special syntax modal. As Arregui said in her generalization, the modal *have to* needs a rule to appeal to. As such, the analysis is that *have to* is a rule-based modal, and that its function in backtracking is to rule out worlds that count as counterparts that do not follow the salient rules of the context. Allow me to use (8) as a concrete example. In (8a), repeated here, the counterfactual is bad because there will be closest counterpart worlds in which it rained a lot the previous summer, but there will also be counterpart worlds in which it didn't. Red leaves are not world-independently correlated with summer rain. In particular, if rainy worlds are close enough, then less rainy worlds, which are presumably closer to the world of evaluation, will be close enough.

(8)   a.   ?/* If the leaves had been red last autumn, it would have rained a lot the previous
              summer.

In (8b), repeated below, though, the extra modal *have to* adds a rule that says that there are only red leaves if there was rain, effectively eliminating the close enough worlds where it

wasn't rainy enough. So *have to* can be thought of, informally, as a world-excluder. It gets rid of previously accessible worlds in which salient contextual rules are not followed.

(8)   b.   If the leaves had been red last autumn, it would have to have rained a lot the previous summer.

I will account for the data in (8) and (9) in great detail in Chapter 2.

I present Arregui's analysis because I agree with it for the data that she is accounting for. However, this dissertation strives to show several major differences of opinion with the spirit of this analysis. As I will show in the next section, backtracking does not always need special syntax to be licensed. Furthermore, there is absolutely nothing special about the various backtracking licensors. There are four possible licensers of backtracking that I'm aware of so far, and each behaves in backtracking exactly as it does everywhere else in the grammar of English. Therefore, backtracking is a phenomenon that, like so many others in language, is only possible when all of the right ingredients converge, but there is nothing specific to backtracking about any of these ingredients.

1.3   New data, and where this dissertation is going

As Arregui showed, backtracking is possible when there is a salient law in the context that can be used by *have to*. I have not given her data, but Arregui also shows that backtracking is possible when the relation between the antecedent and consequent are world independent. Here, I will present two additional options, showing that backtracking is not inextricably linked to the modal *have to*.

(14)   Assume that it rained yesterday morning, and we were supposed to go for a hike
        yesterday but couldn't because of the mud.

   a.   If it had rained TODAY, we would have gone on a hike yesterday.

   b.   *If it had rained TODAY, we would have to have gone on a hike yesterday.

The small caps represents stress or focus. By focusing the adverb *today*, backtracking is licensed without special syntax. Furthermore, the special syntax version of the focused counterfactual is unacceptable. This shows two important points. Firstly, it is possible to backtrack by other means. Secondly, not only is *have to* not the only "rescuer", but it is also not always a possible element of backtracking rescue. In this scenario, special syntax and the focused element are not licit together.

I will account for the first half of this equation using a focus operator (loosely following the ideas in Ogihara 2000 and using tools from Rooth 1985, 1992) that allows the ordering source of the modal *would* to have access to the information implicit in the focused element. I claim that (14a) implicitly states that if it had rained today *instead of yesterday*, then we would have gone on a hike.

In slightly more detail, I will be assuming a Kratzer style analysis (Kratzer 1981, 1991) in which modals have a modal base which provides accessible worlds and an ordering source that ranks the worlds as better according to some set of premises. Only the best worlds among the ranked worlds in the modal base are used for the evaluation of the counterfactual. The innovation I'm proposing is that Rooth's focus operator C can be the ordering source for *would* in conditionals. The tree is as follows, where I'm representing the modal base f and ordering source C overtly in the syntax only as a presentation tool. I will be making no claims about whether such a rich syntax is necessary.

(15)
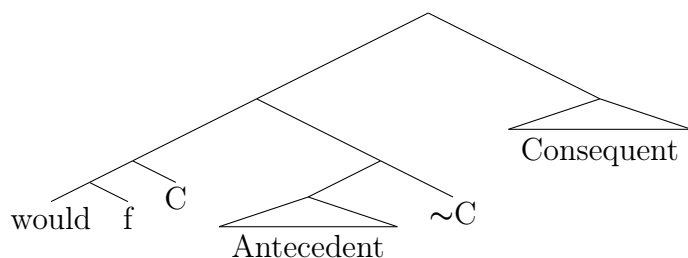
C, then, makes the focus alternatives salient and provides an ordering that ranks worlds as better if they make the antecedent, and none of the antecedent's alternatives, true. Concretely, in (14), the focus operator ranks worlds where it rains today and not yesterday as better than worlds where it rains both today and yesterday. So, in short, C is providing the same function that *have to* provides: excluding close enough accessible worlds that do not make the consequent true. The unacceptability of (14b) falls out neatly from the assumptions about *have to*: there is no rule in the context that *have to* can use, and so any attempt to use it will cause issues. Naturally, I will tackle this more formally, in Chapter 5. Note that while causal-chain backtracking proponents may not find these focus backtrackers to be a compelling set of backtrackers because there is not a causal chain that is being traversed in reverse, but there still needs to be an account for why and when focus can make my definition of backtracking work, as well as why *have to* cannot co-occur in this case.

The second type of backtracking data involves stative verbs in the antecedent of backtracking counterfactuals. In the following example, there is a stative antecedent, and unlike any examples presented so far, both the special syntax counterfactual and the normal syntax counterfactual are good. This type of backtracker is a particular problem for proponents of the causality-only definition of backtracking: there is backtracking without a modal *have to* that **is** moving backward along the causal chain.

(16)   There was an earthquake last week in LA, and people are worried about the conditions of their valuables in a bank's safe deposit box. The bank has an impeccable record for safe-keeping delicate things, so anything broken would have to be the result of the massive earthquake. Ryan went in this morning to check on a Ming vase, and is relieved to see it unbroken. The bank manager Mike says of the situation:

    a.   We're truly a safe facility. If your vase had been broken this morning, the earthquake would have broken it last week.

    b.   We're truly a safe facility. If your vase had been broken this morning, the earthquake would have to have broken it last week.

In this example, the backtracking counterfactual is acceptable with and without special syntax, which is unexpected if we think, given the data so far, that either special syntax or focus can license backtracking. I will claim that it is the properties inherent to the verb that allow backtracking to be possible without special syntax. Being stative entails having some kind of non-instantaneous duration, and I claim that stative backtracking antecedents are good without special syntax because they can license a reading where the state of the antecedent extends back to the time of the consequent, reducing the counterfactual to something that looks far more like a standard counterfactual.

Informally, the analysis is as follows. When a speaker successfully uses a non-*have to* backtracker with a stative verb in the antecedent, he or she is implicitly assuming that the state of the antecedent extends back to the time of the consequent event. It is often easy with inceptive verbs like the one given in (16), where the event of the consequent, breaking, is the beginning of the state in the antecedent, being broken. Thus, in this case, the state of being broken is assumed to extend back to the breaking time, essentially eliminating the backtracking status by eliminating any epistemically accessible worlds where the vase was broken at any time except the consequent time. Using the diagrams from earlier, I can present this analysis pictorially.

(17)
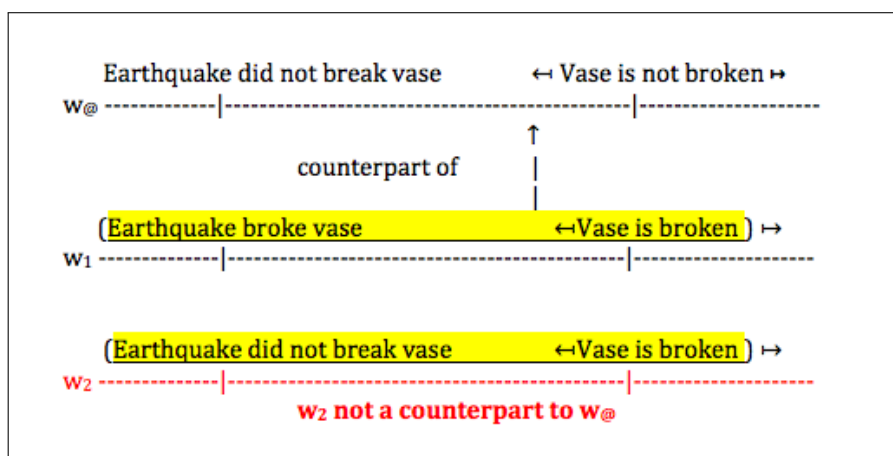
Worlds like w_2 will not be entertained because the state of the vase being broken extends back to the earthquake breaking it, and so any worlds that do not meet this assumption will not be counterpart worlds. I will present this analysis in more detail in Chapter 5.

The third main goal of this dissertation is to deal with backtracking licensers outside the context of backtracking, that is, what are the roles of *have to* and *instead of* focus in non-backtracking counterfactual conditionals, like standard counterfactuals or non-counterfactual conditionals. The following two examples show a regular scenario in (18) and one that lends itself to a focus-type counterfactual in (19). Notice that the two have exactly the same judgments regarding the use of special syntax, irrespective of the *instead of* reading.

(18)   Brad had a concert invitation for Thursday night and a paper due Friday. He is a really good student, but had a really busy day on Friday with meetings all day, so he declined the concert invite. Scott knows about all this, so when Janet, knowing only about the paper but not the busy day, asks why Brad didn't go to the concert, Scott says:

a.   If Brad had attended the concert Thursday, he would have to have written his paper on Friday.

b.   *If Brad had attended the concert Thursday, he would have written his paper on Friday.

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(19) Eric had a paper due Friday and a concert invitation for either Thursday or Friday night. His friends were all going on Thursday. He is a good student, but had a really busy day on Friday with meetings all day, so he decided to go to the Friday night concert. Gracie knows about all this, so when Victor asks why Eric didn't go to the concert Thursday, Gracie says:

    a.   If Eric had attended the concert THURSDAY, he would have to have written his paper on Friday.

    b.   *If Eric had attended the concert THURSDAY, he would have written his paper on Friday.

The only difference between these two scenarios and ensuing counterfactuals is that (19) licenses the *intead of* focus reading, while (18) doesn't. Notice, though, that the pattern of counterfactuals is identical for the two scenarios. This shows that there is no fundamental disagreement between the denotations of *have to* and an *instead of* focus operator. Furthermore, both the modal and focus appear to have the same meanings in non-backtracking examples like (18) and (19) as they did in backtracking, like (8) and (14). *Have to* still uses laws or rules in the context; in this case, the rule is that papers are handed in on time. Notice that this seems to be a deontic use of *have to*. And focus still causes a contrast which makes salient the covert *instead of* clause. Therefore, there is nothing particular about either of these grammatical pieces that makes them specific to backtracking.

Clearly, not all non-backtracking counterfactuals require special syntax, so allow me to present another example of a non-backtracking counterfactual.

(20)   Will had a paper due on Friday and a concert invitation for Thursday night. Will decided not to attend the concert, and Elizabeth is wondering why. Knowing about the paper, but also knowing that he is a good student, Elizabeth says:

   a. */? If Will had attended the concert Thursday, he would have to have written his paper on Friday.

   b. If Will had attended the concert Thursday, he would have written his paper Friday.

From Elizabeth's perspective, and from all that we know in this scenario, there is no reason why Will would be unable to complete his paper on Friday. Therefore a standard counterfactual is expected. What might be unexpected is the badness of (20a). If we consider just the salient rules of the scenario, it is true that Will *has to* write his paper by/on Friday. Therefore, if *have to* only uses salient rules in the context, there is no obvious reason why (20a) should be bad with the scenario in (20). I will claim that this contrast is tied to a generalized version of a scalar-type *some, but not all* implicature along with what I call an "adversity reading" in non-backtracking *have to* conditionals.

Whenever there is a *have to* in a conditional that is not a backtracking counterfactual, there is an implicature that the consequent is somehow negative for the subject of the conditional. Consider the following sans scenario:

(21)   If Will had attended the concert Thursday, he would have to have written his paper on Friday.

This conditional carries an implicature that writing the paper Friday is undesirable. I will claim that this implicature is due partly to the fact that the deontic modal *have to* is inherently viewed with an adversity reading. I will further claim that its appropriate usage can be explained by a Gricean-style implicature that arises due to the entailment patterns between deontic *have to* and its regular syntax counterpart. Put informally, if someone can

or will do something, there is no reason to say that they have to do it (unless you want the hearer to draw the implicature that it is negative). I will cover this analysis in detail in Chapter 5.

With the overview completed, before moving on to the body of this dissertation, I will outline its structure. In Chapter 2 I will ground my data within the wider context of theories of conditionality (and more specific theories of counterfactuality). I will also present in more detail the data and generalizations that Arregui accounts for, as any good theory of backtracking must account for these facts as well.

Chapter 3 will present the novel data that I've outlined in this introduction in more detail. Moreover, it will examine how these data points are of interest to a theory of backtracking as well as a unified theory of conditionals. Chapter 4 presents Arregui's formal account and investigates what new data it can and cannot account for. I should make it clear now: I agree with Arregui's analysis for the basic backtracking data, and I build my theory on hers. However, her account is lacking important data and therefore is also missing the generalizations about the new data points. In Chapter 4 I will also present tools from other accounts of conditionals that I will be using to build my analysis.

Finally, Chapter 5 presents the analysis of the data presented in Chapter 3 using the tools laid out in Chapter 4. I will build an extended analysis of backtrackers, and I will also show how both *have to* and *instead of* focus contexts are used outside of backtrackers such that each has a single denotation. I will also account for where the adversity reading arises from, as well as why statives license both special syntax and regular syntax backtrackers. My aim throughout is to show that a single, unified account of conditionality is possible, regardless of the seeming differences and difficulties that backtrackers present.

CHAPTER 2

Background Research

Before presenting my new data, I will show previous generalizations about backtracking counterfactuals – the spark that lit this dissertation. I will also give a general background to how these fit into the broader context of conditionals and the theory thereof. Much of my presentation will center on the information in Arregui (2005), as this is the primary source of linguistic analysis of backtracking.

2.1 The Beginning

As Arregui (2005) did, I will start by following a Lewis/Stalnaker (Lewis 1973, Stalnaker 1968) approach, using possible worlds, where *would* is denoted as a type of quantification over possible worlds. However, unlike these analyses, Arregui is of the mind that:

> An important assumption, that will be upheld throughout this work, is that what looks like tense and aspect morphology in would-conditionals really is tense and aspect morphology. (p. 3)

I will be following the same assumption. That is, when past tense morphology is evident in a construction, there is semantic past tense somewhere in it. Sometimes, multiple past tense morphology markers can be traced back to a single semantic past tense, but there nonetheless must be at least one. So while Lewis/Stalnaker present one version of the possible worlds view of counterfactuals, I will be following Arregui into a more compositional view of the material, which means that different choices of tense and aspect matter for the interpretation of the conditionals we will be looking at.

One of the puzzles to be addressed, then, is why in a counterfactual like *If Jack were here, Jill would be talking to him*, there is a past tense in the antecedent that clearly does not refer to a past event. Jack's presence is being discussed as it pertains to the present moment: the antecedent could easily be replaced with *If Jack were here **now*** without changing the meaning. Similarly in *If James arrived tomorrow, he would meet Katie*, the past tense is on a verb whose event argument is clearly a future event, as indicated by the future adverbial *tomorrow*. So as we move forward in our analyses of the *would* counterfactuals that we are concerned with, it is best to keep in mind that the past tense morphology may not be marking past tense in the standard fashion – i.e. it is not indicating that the event marked past took place before now in the actual world. Many authors have made proposals about what the antecedent past is doing in counterfactuals (Iatridou 2000, Ippolito 2003, Schulz 2007, among many others), but I will defer this discussion for now.

Notice, though, that I said *may not* be marking standard past. Whether past in the antecedent must or can mean *before the speech time* unfortunately depends on the type of conditional. Contrast, for example, the following two conditionals.

(1) If Thor upset Odin last night, then Odin must have left the party early.

(2) If Thor upset Odin tomorrow, it would cause a major rift in their relationship.

In (1), the past tense is a true past tense. We are drawing a conclusion from a premise that the upsetting happened in the past. In (2), the past tense is not a "true" past tense, in the sense that it is not describing a past event; it is hypothesizing about how a possible future upsetting event would impact the world. The same is true of past perfect morphology (*had V'd*), as the next three examples show (for an interesting analysis of examples like (5), see Ippolito (2003) and her later work):

(3)   If Clark had left the party already at 1:00am, then Peter left by 2:30 at the latest.

        (leaving is in the past)

(4)   If Diana had been here now, Bruce would not have told such an awful joke.

        (being here is in the present)

(5)   Natasha went missing last week, but if she had attended the rally with Clint tomorrow, they would have caused quite a stir.

        (attending is in the future)

Clearly tense is doing more than the layperson would give it credit for, and I will go into Arregui's analysis of how these facts work out for a backtracking counterfactual in detail in Chapter 4. For now, I will continue to cover conditional basics.

Lewis and Stalnaker are both concerned with conditionals. For the sake of exposition, assume that *If α then β* stands in for any given counterfactual conditional. Abstracting away from the details of any one analysis, in a general possible world analysis, the denotation for such a counterfactual would look something like the following.

(6)   *If α then β* is true in a world w_0 iff

        For all worlds w most similar to w_0 accessible by an accessibility relation R in which α is true, β is also true.

This much is agreed upon by Lewis and Stalnaker as an analysis of counterfactual conditionals, but the two disagree on whether this account works for all conditionals (Stalnaker) or *just* counterfactual conditionals (Lewis). Arregui is in neither category, but is instead concerning herself only with *would* conditionals and ignoring other modal options. She also avoids making claims about how her conditionals fit into the subjunctive/indicative split, which I will discuss in some detail when I present her analysis. My objective is different still, in aiming to account for the role of *have to* as a second modal in conditionals, and to show

how *have to*'s behavior is unified across these situations. That difference aside, I will also be looking only at conditionals headed by *would* or *will*.

In addition to the previously mentioned diagreement, Lewis and Stalnaker also have different theories about many aspects of counterfactuals. Regardless, their theories are typically lumped together into what is called a Lewis/Stalnaker type approach, and many theories have evolved out of theirs. I will leave a succint description of their systems to another author and instead outline only the assumptions that I will be using.

Lewis and Stalnaker agree that the worlds that matter for the evaluation of the conditional are worlds in which the antecedent is true that differ minimally from the world of evaluation. As a side note, I will call the world of evaluation "the actual world" when working with unembedded modality.

In terms of worlds that count as the quantificational domain of the modal, I will be allowing for a set of contextually determined closest antecedent worlds, as do Arregui and many other authors on conditionality. The intuition for such a view is that there can be ties in similarity. Since no world except the world of evaluation can possibly be exactly like the world of evaluation, the rest of the accessible worlds will be more or less like the world of evaluation, and so if two worlds are each off by one equally important fact or example, there is no reason to judge one closer than the other. Many authors have agreed with the idea of set of closest worlds: see Stalnaker (1984), Pollock (1976), von Fintel (2012), and citations therein for more details.

While Lewis, Arregui and I take the same stance regarding the fact that there isn't necessarily a single most similar world, that is, there can be more than one world relevant to the evaluation of the truth of the conditional, Lewis goes in a different direction by rejecting the Limit Assumption. The Limit Assumption, stated informally, says that there is a smallest antecedent permitting sphere, or in even simpler terms, that there is a set of closest or most similar worlds.

(7)   It is the assumption that as we take smaller and smaller antecedent-permitting spheres, containing antecedent worlds closer and closer to i, we eventually reach a limit: the smaller antecedent permitting sphere, and in it the closest antecedent worlds.

(Lewis 1973:20)

Lewis's proposal does not make the Limit Assumption valid. He considers this a desirable outcome because he wants it to be possible for there to be an infinity of smaller spheres around the world of evaluation, so that there isn't necessarily a 'smallest sphere around w'. The example Lewis gives to back up his reasoning is the counterfactual with the antecedent *If the line had been longer than one inch, ...* As Xeno's Paradox could tell you, there there is no closest world where the line is longer than one inch. This is because no matter how close to 1" you are, there is always something closer. Therefore there can be no set of closest worlds. Regardless of the arguments on either side for the Limit Assumption, for the sake of formal simplicity and clarity of presentation, I will be following many authors by accepting it.

Notice that neither Lewis nor Stalnaker is concerned with compositionality. So my goal is to arrive at these intuitions by way of the meanings of the parts of a conditional, in particular in this case, *woll*, as I am only investigating *would* and *will* conditionals in this dissertation. Following Lewis (1975) and Kratzer (1977, 1981, 1991), modal verbs relate sets of possible worlds. The first is identified (in part) by the antecedent, and the second by the consequent. Therefore, taking a conditional like *If John came, Mary would leave*, the structure assumed is the following:

(8)

modal   antecedent clause   consequent clause
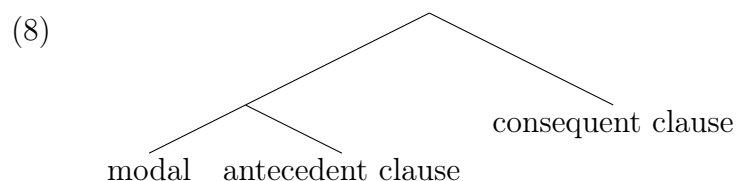
In short, when there is a conditional whose consequent is headed by a modal verb, I am assuming that the modal takes the if-clause as its first argument, and the resulting denotation takes the consequent clause as its argument. This presents a fairly clear problem assuming a straightforward mapping from the syntax onto the compositionality of the semantics. In the overt syntax, the if-clause comes first and the modal, *would*, is inside the consequent clause. However, various ways to deal with this problem have been proposed that one could adopt, should one choose to take such a route. Arregui cites von Fintel (1995) as addressing the problem using hidden domain variables, von Fintel (2001) as doing so dynamically with context change semantics,[1] and Heim (1982) and Chierchia (2000) taking other approaches as well.

For tense and aspect, the structure assumed is the following:

(9)

```
            TP
           /  \
       tense   AspP
              /   \
          aspect   VP
```
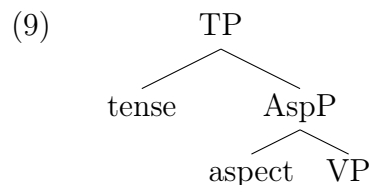
I will be assuming a referential theory of tense, which takes takes tense to be parallel to pronouns in having either a deictic (referent determined in the actual world) or variable (referent determined by coreference) interpretation, as originally argued for by Partee (1973), with additions by Kratzer (1998). Following Kratzer, past and present tense morphology (in English), when deictic, refers to a contextually salient past time/present time.

(10) a. $\llbracket \textbf{present} \rrbracket^C$ = a contextually salient time that includes the speech time

  b. $\llbracket \textbf{past} \rrbracket^C$ = a contextually salient time that precedes the speech time

  (Kratzer 1998)

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[1]Note that I am taking a static approach to the semantics in this dissertation, but I do not do so because it could not be done in a dynamic approach. I see no reason why the analysis I present could not be accomplished in the reader's favorite dynamic system.

When tense is interpreted variably, that is, when it is treated as a semantic variable that gets its referent from some other semantic object in the context, it is sometimes called "zero tense". Zero tense is unspecified for morphological features, and bears the same morphological features of the nearest c-commanding tense. The reflected tense morphology is semantically vacuous. To be more concrete, take the following example.

(11)   Mel said that she needed the keys to the car.

This example has two clauses, one with the matrix verb *said* and the second with the embedded verb *needed*. As there are two TPs, there are two tenses. This sentence has two possible interpretations. In one, the interpretation of this uses both pasts as true semantic pasts – in the past with respect to the utterance time, Mel said something, and what she said then was that at a time before *her* speech time, she needed the keys. In the second interpretation, the past tense in the lower clause does not actually mean in the past of Mel's utterance time. It has no semantic content at all, and it gets its morphological form and temporal reference from its c-commanding tense. So what it means is that at a time before the utterance time, Mel said "I need the keys to the car." The latter is an example of zero tense. The embedded tense appears with past tense morphology, but it is semantically null. Formally, zero tense is represented as follows.

(12) $[\![\varnothing_\mathbf{i}]\!]^g = g(\mathbf{i}) = t_i$ (Kratzer 1998)

As explored above, zero tenses can be bound tenses, which is what I will, following Arregui, interpret the tense morphology of the antecedent in *would*-conditionals as. Zero tense is an important part of the upcoming analysis, so there will be much more on this in Chapter **Old Analyses**.

What I've presented so far is an introduction to my assumptions about conditionals broadly, based on existing theories of tense and conditionals. In the next section, I will present an overview to the literature's earliest thoughts on backtracking counterfactuals,

since they are often treated differently than the rest of the conditionals I will be talking about.

2.2   Time's Arrow

With respect to backtracking counterfactuals, there has been some disagreement in the literature as to how important they are to a unified theory of tense in counterfactuals. Lewis (1979) argues that backtrackers are only accessible with special syntax. "Special syntax" is the term the literature (beginning with Lewis, as far as I know, and used again in Arregui 2005) uses to describe backtracking counterfactuals with a modal *have to* in the consequent.

(13)   If the police had arrived at the scene, someone would *have to* have called them.

(13) is an example of a backtracker with special syntax. As I've highlighted with italics, there is a necessary extra modal in the consequent for this kind of backtracker. Lewis claims that because of this extra modal, backtracking counterfactuals are separate from regular, forwardtracking counterfactuals. Essentially, his claim is that the extra modal is proof of special licensing conditions, and therefore they can and should be left out of a standard theory of counterfactuals. He also sees backtrackers as problematic largely because he considers counterfactuals to be somehow connected to causality or the natural flow of time:

> The way the future is depends counterfactually on the way the present is. If the present were different, the future would be different... Likewise the present depends counterfactually on the past...Not so in reverse. Seldom, if ever, can we find a clearly true counterfactual about how the past would be different if the present were somehow different... It is at best doubtful whether the past depends counterfactually on the present, whether the present depends on the future, and

in general whether the way things are earlier depends on the way things will be later. (page 1)

Lewis goes on to acknowledge, though, that there are times when "we can persuade ourselves" that since present or future things have causes in the past, if things in present/future were different, then the past would have had to have been different to make the present so. He goes on to give Downing's original example, shown in (1) in Chapter 1. The claim, though, is that when listeners allow this kind of backtracking counterfactual, they are slipping into an accommodating sort of reasoning for the sake of conversation, and that they can just as (or more) easily slip back into standard counterfactual reasoning. Lewis is claiming that a special kind of reasoning holds in backtracking counterfactuals. It is simply a "special resolution of vagueness." In mentioning vagueness, Lewis is referring to the fact that in imagining that Caesar were the leader of Korea, we can claim either that he would have used atomic bombs or that he would have used catapults. The scenario is vague and can be resolved in several ways. Backtrackers require a special kind of resolution to vagueness, and as such, are to Lewis outside an analysis of standard resolution counterfactuals.

Lewis claims that if taken out of context, a backtracking counterfactual will not be clearly true or false, and he uses this as an argument against their use in an analysis of standard counterfactuals. However, this is the case for conditionals in general, and so I do not find this a compelling argument against the normality or productivity of backtrackers. Take the following standard, non-backtracking conditional, and try to determine whether it is true or false.

(14)   If Jane meets Loki tomorrow, she will give him a piece of her mind.

Clearly, with no sense of context, this forward conditional cannot be judged true or false any more or less than a backtracker can be. The same can be said of any given counterfactual out of context, as the following shows. Again, we do not have a backtracker, but context is necessary for the evaluation of the truth of the counterfactual.

(15)   If MJ had met Norman last week, she would have liked him immensely.

It is possible that some speakers have difficulty with processing backtracking counterfactuals, and so they would be inclined to judge them false or weird without a context. This processing problem is distinct from the truth or falsity of a backtracker though. Furthermore, just as one can construct analytical standard counterfactuals that can be judged true or false without context, there are backtrackers that can be judged straightforwardly true without any call to context as well. The following backtracker is one that Arregui claims can be judged true without context and does not need special syntax.

(16)   If she had a twin sister, her mother would have had at least two children.
         (Arregui Ch 3 ex 12b)

No so-called "charitable resolution" is needed to determine the truth of (16).

Lewis argues finally that backtrackers are ignorable within a standard theory of counterfactuals since they usually proceed only with "syntactic peculiarity," which I have defined as *special syntax* in Chapter 1 (I will rename this construction later). The claim is that when the unmarked *have V'd* (17a) is used in the consequent of a backtracker, it is worse or more difficult to interpret that the special syntax version *have to have V'd* (17b). The following examples are a minimal pair of regular versus special syntax backtrackers.

(17)   a.   If Yvaine had met Tristan tomorrow, the witches would have won yesterday.
         b.   If Yvaine had met Tristan tomorrow, the witches would have to have won yesterday.

While Arregui takes up this argument to a lesser degree, as I will discuss in the next section, I will claim that both (17a) and (17b) are perfectly acceptable, albeit in different contexts.

With the above arguments in place, Lewis continues on to account for other counterfactuals without worrying about accounting for backtrackers as well.

Notice that Lewis is making two separate claims here. First, backtrackers are only, or are more readily, felicitous with special syntax. Second, because of this special status and presumed ties to context sensitivity, they do not need to be accounted for in a standard theory of counterfactuals. The second claim does not necessarily follow from the first. Regardless of the special syntax claim, backtracking counterfactuals are still conditionals. Special syntax backtracking counterfactuals are a combination of a counterfactual with standard morphology and a modal, both of which can be accounted for in standard semantic theory. Therefore, any complete theory of conditionality should aim to account for them. Moreover, I will argue explicitly against the the claim that backtracking is only possible with special syntax, showing how regular syntax backtrackers are licit when given proper conditions. As for the second, while it is true that some backtrackers require special syntax to be licensed, I will show that this same *have to* shows up in a variety of conditionals, and I will endeavor here to show that a unified analysis of counterfactuals is possible, so there is no cause to set aside backtrackers.

2.3   Data from Arregui (2005)

Arregui's dissertation presents a new take on counterfactuals, but it still uses similarity in the past as the way to determine the accessible worlds for the assessment of the counterfactual. As such, she seemingly has the same problems with backtracking counterfactuals as Lewis had. A major difference between the two of them is that while Lewis said that special syntax saves backtrackers, and hence they are outside of the phenomena he accounts for, Arregui strives to have a unified semantics of counterfactuals. In this section, I will present only her data, but I will present her analysis in Chapter 4. Arregui's data is necessary for my account of *have to* in counterfactuals because it sets up the data that any account of backtracking and *would* counterfactuals needs to explain. I agree with her primary judgements, and plan to add to them in Chapter 3.

Arregui is drawn to backtrackers because they inform our understanding of the role of past tense and modals in the semantics of counterfactuals. Like Lewis, Arregui is a special syntax proponent: "backtracking counterfactuals are usually helped by a special, characteristic syntactic structure." (page 81). She does agree, though, that this is not always the case. Her goals are to see how backtrackers are different from other counterfactuals and to analyze the semantics of the special *have to* construction such that it composes with her new analysis of *would* to arrive at a special backtracking meaning.

Arregui defines backtrackers as "conditionals that explicitly claim that if a certain hypothesis held at time t (past, present or future), something different would have happened at some earlier time t' " (page 84). She breaks backtrackers into three categories – backtracking counterfactuals that are judged true without special syntax, those judged true only with special syntax, and those judged false either way – and arrives at a generalization for each.

The following examples show backtrackers that Arregui considers acceptable[2] without the special syntactic configuration, that is, they do not need *have to* in the consequent to be a felicitous counterfactual.

(18)   a.   If he were a bachelor, he wouldn't have married.

   b.   If she had a twin sister, her mother would have had at least two children.

   c.   If she had sold a horse, she would have owned a horse.[3](Arregui's ex 12)

This type of counterfactual is called an **analytical** counterfactual. A particularly compelling case that all speakers accept is the following:

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[2]There is a complexity which Arregui glosses over, as will I in many places. At some times, the judgements will vary with respect to felicity, at other times, truth or falsity, and at still other times, it will be unclear which. I will endeavor to express which I mean in any given situation.

[3]Native speakers that I have consulted do not find analyticals to be the most natural of Arregui's examples. If any are to be rejected, it is always the analyticals. In particular, people do no accept (18c).

(19)   She's 27 now, but if she were 30, she would have been born three years earlier.

What makes analyticals a separate and special case of conditionals is the fact that they are primarily definitional: the truth of the antecedent seemingly guarantees the truth of the consequent world-independently. It is possible, then, that the counterfactuals can all be judged straightforwardly true given the definitions of the words they are made of. The generalization is given as follows:

(20)   **Generalization 1**: Backtracking counterfactuals with *regular* syntax can be judged straightforwardly true if the relation between antecedent and consequent is analytic/logically necessary. (A13)

The following examples fall into this same category: there is an analytical or logical truth, or definitional requirement, holding between the content of the antecedent and consequent.

(21)   a.   If she were a semi-finalist, she would have won the quarter-finals.
        b.   If she were president, she would have won the last elections.
        c.   If you had been a surgeon, you would have gone to medical school. (A14)

It follows from the definitions of semi-finalist, president, and surgeon that winning the quarter finals, winning the most recent elections, and going to medical school hold respectively. Note that some of these definitions are more tightly correlated between antecedent and consequent than others. At least in the case of president, it could be that the president died and the vice president is taking over. I would imagine that Arregui would want to discount this case as not the norm, and hence not applicable, but I think this makes it clear that we still need most similar worlds in some relevant way, even if it is calculated differently than for non-analyticals.

As an aside, notice that Arregui puts Bennet's example of backtracking, (22), as another analytical backtracker:

(22)   If Stevenson were President in February 1953, he would have been elected in November 1952.[4]

However, this must be world-dependent! It cannot be a fact of all possible worlds that 1952 was an election year, or that elections are held in November. So while it might be possible to assert that being president in the US is definitionally dependent upon being elected, the rest of the information in this sentence is definitely world-dependent. Therefore, this sentence will either need to be accounted for by a different generalization, or Generalization One will need to be updated to be more encompassing.

Notice that analytical backtrackers are not actually problematic for a Lewis/Stalnaker approach. If we take overall similarity as the rubric for choosing most similar worlds, we must still not violate any major laws of the world. I would argue that definitional, analytical, and logical laws are exactly the kind that cannot be broken, and so a Lewis/Stalnaker approach would correctly predict the necessary past changes. Nonetheless, these are backtrackers and therefore should still be accounted for in any complete analysis of backtracking.

Arregui contrasts the genuinely analytical examples presented so far with conditionals where the antecedent and consequent are related by laws of nature (induction), rather than laws of analytical truth (deduction). Since laws of nature are not without exception, these backtrackers are claimed to be infelicitous with regular syntax.

(23)   ?If the leaves had been red last autumn, it would have rained a lot the previous summer. (Arregui's judgement, ex 18a)

(24)   If the leaves had been red last autumn, it would **have to** have rained a lot the previous summer. (A18b)

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[4]Some speakers dislike *were* in the antecedent of this counterfactual. The same point can be made with the following more widely acceptable counterfactual.

(i)   If Stevenson had been President in February 1953, he would have been elected in November 1952.

It is claimed that the regular syntax example (23) is bad, or at least worse than its special syntax counterpart (24), because it expresses generalizations about the actual world.

It is no longer true that in every possible world, the truth of the antecedent is perfectly correlated with the truth of the consequent. Therefore, this data point cannot fall under the first category of conditional that Arregui generalized over, those true without special syntax. Thus the first generalization does not account for it; however, it can be shifted into a second type of backtracker, as examined below.

Arregui's second category of backtrackers are those that are acceptable only with the help of the special syntax shown in bold in (24). When (23) is contrasted directly with (24), the judgment is that the special syntax version, (24), is better.

Allow me to note an area of difficulty: (23) might be judged infelicitous by some and false by others. In Arregui's generalizations, the conditionals are referred to as judged straightforwardly true, but this is not, from my understanding of the phenomenon, what Arregui means. For example, *If she were a doctor, she would not have attended medical school* is an analytical backtracker, and is felicitous, but can be judged straightforwardly false. Therefore, while Arregui or I discuss truth or falsity of a backtracking, felicity of the construction is the more important judgement.

Other examples of the phenomenon that world dependent laws make *have to* BTCFs felicitous are as follows (with Arregui's judgments shown):

(25)   She is a very strict vegetarian. If she had eaten pudding, she would have broken her diet.

a.   ?? No, if she had eaten pudding, it would have been made without gelatin.[5]

b.   No, if she had eaten pudding, it would **have to** have been made without gelatin. (A21)

(26)   It's lucky the guard didn't push the alarm button. It would have been a false alarm.

     a.   ?Actually, he is a very intelligent man. If he had pushed the button, something serious would have happened.

     b.   Actually, he is a very intelligent man. If he had pushed the button, something serious would **have to** have happened. (A22)

On the basis of these examples, Arregui arrives at the following generalization, with the ensuing quote as justification. This generalization does not replace Generalization 1; Generalization 1 is about BTCFs that are good without special syntax. Generalization 1 is about BTCFs that are good only *with* special syntax. As before, the generalization is given in terms of truth, but my understanding is that when Arregui says "can be judged true," she means that the counterfactual's felicity allows a truth judgement.

(27)   **Generalization 2**: Backtracking counterfactuals with special syntax can be judged true if some (salient) law establishes a relation between antecedent and consequent. (A24)

> The generalization seems to be that the special syntax helps if there is a (salient) law that establishes a necessary connection between the antecedent and consequent. The presence of the modal *have* makes it clear that we are interested in cases that respect the law. The presence of the modal indicates that the law should count as relevant, and affects the kind of worlds that are relevant antecedent worlds. (page 91)

What is different about Generalization Two as compared to Generalization One is that even though the generalization refers to a law, it refers to a world-dependent law as opposed to an analytical law as in Generalization One. What can also be gleaned, hidden in her reasoning for Generalization Two, is that *have to* is responsible for the law-like abidance in

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[5]This judgment isn't given explicitly in the example, but in the text she claims this is "very odd, maybe even false" (page 90).

backtrackers that are judged true with special syntax. Therefore, I would predict that one can infer a law from special syntax. This seems to be borne out in native speaker judgments. If an interlocuter who does not know Allie hears *If Allie had eaten the pudding, it would have to have been made without gelatin*, he or she will conclude that there is some kind of generalization against Allie eating gelatin, either she is a vegetarian or allergic or something similar. This shows that the use of *have to* in backtrackers both requires and implies a salient law in the context linking the antecedent and consequent. As such, Arregui's eventual analysis will involve a denotation for *have* that compositionally arrives at the meaning required for backtracking counterfactuals to be felicitous.

There are two apparent exceptions to this generalization that must be excluded from consideration. One I will call a **reasoning** backtracker; here I will turn (25) into an example of a reasoning backtracker.

(28)   We don't know if Norma ate the pudding at the party this afternoon, but we do know that Norma is a vegetarian.

a.   If Norma had eaten the pudding, it would have been made without gelatin.

I call this a reasoning backtracker because we are using the possibility of the antecedent to reason back to how things must have been before. This is notably different from backtracking counterfactuals in that the antecedent is still possible. This can be shown by having a continuation of the conditional that makes the antecedent true. I will show this for (28), and then further show that such a continuation for a true backtracking counterfactual (as in (25)) is infelicitous.

(29)   a.   **Reasoning**

A: If Norma had eaten the pudding, it would have been made without gelatin.

B: Oh, she did eat the pudding! It must have been made without gelatin then.

b.   **BTCF**

A: If she had eaten the pudding, it would have to have been made without gelatin.

B: # And she did eat the pudding! It must have been made without gelatin.

Therefore, I will not count reasoning backtrackers as true BTCFs because they are not actually counterfactual. Instead, they are adding a live possibility to the worlds under consideration and then concluding how the actual world is or could have been. When learning the truth of the antecedent, the consequent is taken as true. In BTCFs, it is not possible to learn the truth of the antecedent, as they are known to be false.

A second type of backtracking issue has to do with the famous firing squad example from the causality literature (used in both Schulz 2007 and Hopkins and Pearl 2003, although the origins of the example is given in neither).

(30)   There is a court, an officer, two riflemen and a prisoner. If the court orders execution then the officer will give a signal to the riflemen. If the officer gives the signal to the riflemen, then the riflemen will shoot. If a rifleman shoots, then the prisoner will die. The court orders the execution, the officer gives the signal, the riflemen both shoot, and the prisoner dies.

a.   (Even) If rifleman A hadn't shot, the prisoner would have died.

b.   No. If rifleman A hadn't shot, then the court wouldn't have ordered the execution, the officer wouldn't have given the signal and the prisoner would still be alive.

The problem example here is (30b). We have a backtracking counterfactual because the rifleman's shooting occurs after the court's giving orders. The apparently problem is that this backtracking counterfactual is acceptable without special syntax. I claim, however, that this is not a typical backtracking counterfactual. Firstly, when (30b) is uttered, it is intuitively clear that the speaker is not being cooperative. Therefore, it is working outside the standard usage of a counterfactual. Secondly, to the extent that (30b) is considered true, it is clear that the speaker is intending to make the fact that a rifleman would always shoot if an order were given an inviolable law. That is, when (30b) is acceptable, it only is so under an analytical backtracker interpretation, in which case it is accounted for by Generalization One.

The previous two examples show possible exceptions to or problems for the generalizations given so far. However, as I've shown, neither holds up as a genuine problem for the account provided in this dissertation. Therefore, I will not be addressing them again, except to show for one of my novel data points that it is not a reasoning counterfactual.

Returning to Arregui's data, the final generalization that Arregui makes is about are BTCFs that are judged false with or without the help of special syntax, as exemplified in the following example:

(31)   She loves desserts in general, but she doesn't like chocolate. She didn't even touch the chocolate mousse.

a. #If she had eaten dessert today, the cook would have made a peach pie yesterday.

b. #If she had eaten dessert today, the cook would have to have made a peach pie yesterday. (A27)

The claim here is that there is no law indicating that when chocolate mousse isn't served, peach pie necessarily is. The following, according to Arregui's take on the data, suffers from a similar problem, that is, a lack of natural law binding the antecedent and consequent together:

(32)   The bridge wasn't completed, and the driver came to a sudden stop.

   a. #If the driver had kept going, the bridge would have been completed.

   b. #If the driver had kept going, the bridge would have to have been completed.
      (A25)

Given these data points, Arregui considers a couple of potential options, and then lands at the generalization given below:

(33)   **Generalization 3**: Cases in which special syntax does not help with backtracking counterfactuals are cases in which there is no (salient) law or regularity to be invoked by *have*. (A31)

Using the three generalizations above, Arregui moves on to an analysis of the facts presented. Before accepting her updated analysis as necessary for a theory of conditionality, allow me to show how previous analyses in general do not account for the backtracking data presented. Let's take a past-similarity approach, as hypothesized and ultimately rejected in Lewis (1979), to be concrete, since it illustrates a very clear case. I will briefly outline the proposed analysis and show how it fails for backtracking.

   Such an analysis of counterfactuals is based on past similarity. Here is a concrete example of a non-BTCF that Lewis accounts for (which I will bring up again in Chapter 4). Recall that this is not a BTCF because the time of the antecedent is *before* the time of the consequent.

(34)   If Nixon had pressed the button, there would have been a nuclear holocaust.

A first pass at counterfactuals arrives at an analysis that says that if in all worlds most similar to the actual world in which Nixon pushed the button, there is a nuclear holocaust, then the counterfactual is true. Several authors (notably Bennett (1984), Fine (1975)) challenged this idea of similarity with the following argument: Now consider the following problem. Imagine that Nixon does indeed push the button, but at some previous time the wire connecting the

button to the the warheads had been cut. Then, there is no nuclear holocaust. As the real world did not have a nuclear holocaust either, this is an ostensibly more similar world overall, and yet this world would make the counterfactual false, and speakers judge the counterfactual true.

Therefore, Lewis came up with a system of rules that governed similarity. One possible approach that he entertains would be to say that similarity is computed *only* relative to the time before the antecedent time. Therefore, a world in which the wire was cut before the button pushing but in which there is no nuclear holocaust is actually less like the actual world: presumably in the actual world the wire was not cut, and so cutting the wire at a time before button pushing makes a world less like a non-wire cutting world. Therefore, all closest worlds will be ones in which button pushing does in fact mean nuclear holocaust since the button is working, and the counterfactual will be judged true, as desired.

There are many interesting details to the analysis that Lewis eventually adopts; for example, there may not be any after the antecedent (in this case, somehow the signal fails between the button and the warheads), but the one rule I've already covered is sufficient to show the problem Lewis has with backtracking. Take the following backtracker (based on Arregui's special syntax examples):

(35)   If Isabel had pressed the button, there would have to have been a robbery.

With the appropriate context, this backtracker can judged true, even though the consequent time is strictly before the antecedent time. That is, if we hold fixed all of the actual world facts at all times before the antecedent time, in all of the closest accessible worlds there was no robbery, and so the counterfactual will have to be judged false. So clearly any account that prioritizes past to the extent that it must be fixed will not be able to account for backtracking data. Therefore, Arregui, who does still want to prioritize the past over the future when it comes to computing similarity, creates a new system that is less strict on the past similarity requirement.

I will wait to present Arregui's full analysis until chapter Chapter 4, since my novel data presents problems for Arregui's theory, which I will build off of. Once I have presented the new data and explained the problems it poses, I will explore Arregui's analysis as well as several other analyses of counterfactuals that I will use to adapt a new analysis of backtrackers, and *have to* conditionals in general.

In this chapter I outlined my assumptions for the interpretation of conditionals. I use a referential theory of tense and a possible world approach that assumes that the modal *would* takes first the antecedent and then the consequent as its arguments. I've shown the basic backtracking data that any theory needs to account for: analyticals can backtrack without special syntax, and non-analyticals can use special syntax as a rescue for backtracking as long as there is a salient law in the context that *have to* can use. I'm explicitly arguing against Lewis's claim that backtracking does not need to be accounted for in a general theory of counterfactuals. In Chapter 3 I will show novel data which proves that even if I were to exclude special syntax backtrackers from my account, there are non-analytical backtrackers that are possible without special syntax. In particular, I will highlight backtracking counterfactuals with special focus in the antecedent and backtracking counterfactuals with stative verbs in the antecedent. Lastly, I will show that while these tools – special syntax, focus, and statives – can be used to rescue backtracking counterfactuals, they have systematic properties outside backtracking counterfactuals that indicate that their role is not special or different in these contructions.

CHAPTER 3

The New Data

3.1   Introduction to the Data

Before I delve into what is new and interesting about the data of this chapter, I will cover and clarify some issues regarding formatting and terminology. As is clear by now, there are two kinds of conditionals, most generally, that I am interested in, exemplified in (1a) and (1b).

(1)   a.   If Katie and James had spoken today, they *would have to have* made up yesterday.

        b.   If Katie and James had spoken today, they **would have** made up yesterday.

First, notice that I've highlighted the difference between the two conditionals, using italics for one and bold facing for the other. I will do this systematically throughout the chapter to keep the two as clearly distinct as possible. Italics will always mark the conditional with the extra modal *have to* layer, and bold will mark the conditional without it. The difference between these two types of conditionals is strictly morphological, whereas the difference between a backtracking counterfactual and a standard counterfactuals is a matter of the relative times of the antecedent and consequent.

Next, I'd like to tackle a terminological issue. As I've noted, the syntactic structure used in (1a) has been called "special syntax" in previous literature on backtracking. The term originates, to my knowledge, with Lewis (1979). From my perspective, Lewis used the term loosely, and by it only meant to say that the extra modal layer makes this kind of conditional "special" in a way that makes it outside the bounds of the accountability of his

theory of time and conditionality (which, as the reader knows, is a claim I disagree with). When discussing backtracking conditionals, other authors (e.g. Arregui 2005) in linguistics have run with the term *special syntax* as the way to talk about the syntax of conditionals like (1a). While there is nothing inherently wrong with this choice, I am deciding herein to rename the phenomenon. I do so firstly because the syntax we see above is not some kind of syntactically magical phenomenon that can solve any problem, and secondly because the word "special" is not very usefully descriptive. Henceforth I will refer to all conditionals, both counterfactual and other, with an extra layer of *have to* modality in the consequent as **extra modal conditionals** (EMCs) and their syntax as EMC syntax. For ease of description, I will call conditionals without such an extra layer **normal conditionals** (NCs), and say that they have normal conditional syntax, NC syntax. For each the examples in the rest of the chapter, I will be showing how EMCs and NCs behave differently with respect to identical scenarios.

Before diving into the particulars, it may be helpful to introduce, without much background, the taxonomy of conditionals in my system to reduce confusion as I move forward with the data. The following tree is illustrative of the distinctions I will be drawing.

(2)

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                          Conditionals
                        /              \
               Counterfactuals        Possibitionals
                /          \          (Antecedent is still a possibility)
        Backtracking   Forwardtracking          /          \
                        (Standard)       Backtracking   Forwardtracking
```
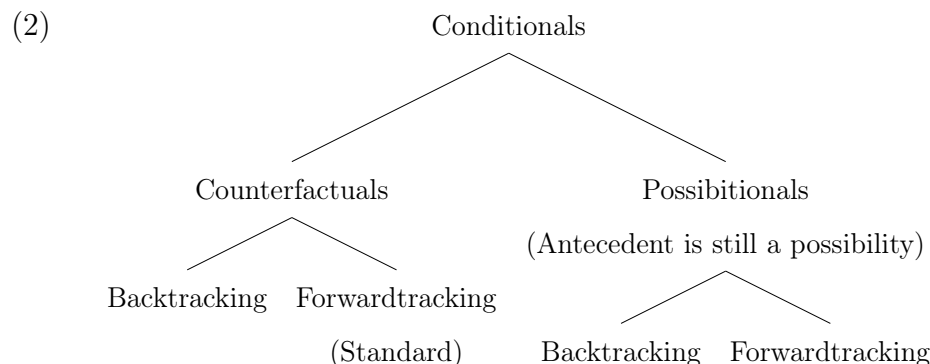
I am using this partition of conditionality because my data shows that conditionals pattern along these lines. At the moment, I will not explain in detail what these distinctions mean, but as the reader continues through the data, this tree may be helpful in placing each data point within the theory. In short, conditionals come in two varieties. Those in

which the antecedent is known to be false, which I will call counterfactuals,[1] and those in which the antecedent is still possible – I call these possibitionals. There will be more later on exactly what possibitionals encompass. Among both counterfactuals and possibitionals, a conditional can be back- or forwardtracking. Backtracking universally means that the antecedent time is after the consequent time, and forwardtracking means that the antecedent time is before the consequent time. Further distinctions will be drawn along the way, but these basic distinctions will be referred to throughout (and defined better as the dissertation progresses, as I motivate each).

Now, I will present my novel data, and a widespread generalization to keep in mind is that EMC and NC syntax conditionals primarily exhibit complementary distribution throughout the various scenarios I will present. My goal in Chapter 5 will be to provide an explanation both for why there is typically complementary distribution and also for why there occasionally fails to be complementary distribution between NC and EMC conditionals for a given scenario.

3.2   Backtracking Counterfactuals

I start my discussion of *have to* in conditionals with previously discussed data. I agree with Arregui (2005) on the following contrast, adapted from an example which Lewis (1979) cites as originating in Downey (1959):

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[1]I am aware that many think that the antecedent of a counterfactual does not need to be false. However, I am intentionally dealing only with cases in which the antecedent is, in fact, false, so that I can make this clean distinction. I also do so because future less vivids, which are usually considered the other category of subjunctive conditionals, pattern like indicatives rather than like my definition of counterfactuals.

(3)   Perry would never ask Julie for help after a fight, even if he needed it, because he is far too proud. They had a fight last night, and now that he needs help, he won't ask.

    a.   If Perry had asked Julie for help today, there *would have to have* been no fight yesterday.

    b.   *If Perry had asked Julie for help today, there **would have** been no fight yesterday.[2]

The conditionals in (3) are known as **backtracking counterfactuals** (BTCF) (introduced in Chapter 1). To review, these conditionals qualify as backtracking because the time of the antecedent is strictly after the time of the consequent. The critical point in these examples is that the NC in (3b) is judged unacceptable with the context given in (3). In the next section I will go in depth into the argument of how this plays out, but for now let it suffice to say that the extra layer of modality is required to be able to access past worlds in the way relevant to judging (3a) true. There are further restrictions on what kind of relation must hold between the antecedent and consequent for a felicitous use of EMCs for backtracking, but I will leave elucidation until the next section as well.

It has been claimed (Arregui 2005) that with the exception of analytical counterfactuals (4), which were defined in Chapter 2 and will be discussed farther in §3.6, all backtrackers must be EMCs to be felicitous.

(4)   If she had a twin sister (now), her mother would (have to) have had at least two children. (Arregui 2005, ch 3 ex 12b)

This is considered an analytical counterfactual because the truth is world-independent. By definition, having a twin requires the birth of two children. I agree with the judgement on

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[2] I will be marking "bad" counterfactuals with (*), even though they were marked with (#) in the previous chapter. I will be generalizing across infelicity and falsehood since the judgements are not always clear. Therefore, my theory can be taken at minimum as accounting for the difference between true on one hand and not-true on the other, where not-true encompasses both false and infelicitous.

this particular analytical counterfactual, and I will present an analysis that accounts for it and the rest of the analyticals in Chapter 4.

However it is not that case that NC syntax backtracking is only possible for analytical backtrackers. I have new data which shows that other kinds of backtracking are possible without EMC syntax.

(5)   Katie and James fought yesterday because James asked Katie for help while she was trying to write. Today she isn't writing, and so would have been happy to help.

    a. *If James had asked Katie for help TODAY, there *would have to have* been no fight yesterday.

    b. If James had asked Katie for help TODAY, there **would have** been no fight yesterday.

This example is clearly a BTCF since the adverbials in the antecedent and consequent fix the event time of the antecedent as after the event time of the consequent. This example shows that not only are backtrackers possible with NC syntax,[3] but also that there are times when backtracking and EMC syntax are not compatible.

What is different about this example is that the focus stress[4] (indicated with small caps) together with the context sets up what I call an ***instead of*** reading. Essentially, with the context and stress as indicated, the reader can only interpret the counterfactual in (5b) as meaning *If James had asked Katie for help today (instead of yesterday), there...* which is why I call this an *instead of* reading. The intuition behind why this kind of counterfactual works is that hypothesizing about what could have happened today instead of yesterday affects our interpretation of what would have happened then yesterday. Throughout, I will be calling

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[3]Some may find my use of the term NC syntax misleading if focus is represented in the syntax. In that case, this would clearly be considered a focus conditional, rather than a normal conditional. I only mean here to draw a distinction between a conditional having an extra modal layer in the consequent or not having it. Anything that does not have an extra *have to* is called NC syntax. Also, as I will show in Chapter 5, focus conditionals do have the same syntax as all over NC conditionals.

[4]Also called focal stress (Ogihara, 2000).

conditionals with this set up – where the focus on the antecedent requires an interpretation of the antecedent happening instead of a possible focus alternative – *instead of* conditionals, and I will call scenarios that make this reading salient *instead of* contexts.

What is notable about this example, and other *instead of* BTCFS is that the felicity judgements are opposite those seen in what I will call **regular scenario** BTCFs – BTCFs without an *instead of* insterpretation. In a regular BTCF, EMC syntax conditionals are acceptable and NC syntax conditionals are unacceptable. In an *instead of* BTCF, NC syntax is acceptable and EMC syntax is not. This data shows that when the antecedent has focus stress which leads to an interpretation with a covert *instead of* clause negating the actual world event under discussion (in this case, negating the fact that help was asked for yesterday), EMC syntax is not acceptable. This at least weakly points to the possibility that the covert *instead of*, or the focus reading in general, is incompatible with with EMC syntax (5a) in a backtracking counterfactual. Only the NC syntax conditional is acceptable (5b).

Interestingly, it is possible to set up an parallel context which permits both EMC back-trackers and NC backtrackers. However, as the reader will notice, the EMC and NC syntax conditionals in (6) have different interpretations, and their intonations are necessarily different, with (6b) requiring stress on *today*.

(6)   Katie and James fought yesterday because James asked Katie for help while she was trying to write. Today she isn't writing, and so would have been and still would be happy to help. However, James is too proud to ask for help after a fight, so even though he still needs it, he won't ask for help today.

  a.   If James had asked Katie for help today/(*TODAY), there would have to have been no fight yesterday.

  b.   If James had asked Katie for help TODAY/(*today), there would have been no fight yesterday.

What is different about this example is that we have set up the context to allow for both the interpretation that was salient in (3) and the one that was salient in (5). Therefore, each successful conditional from (3) and (5) is also successful here, but similarly, each failed conditional still fails. This is because each conditional means something different and picks up different pieces of information from the context. In (6a), the piece of the context that it is using for its evaluation is the fact that James would never ask for help after a fight. In (6b), the piece of salient information is that Katie is not busy today, and so asking for help today instead of yesterday would have resulted in yesterday's fight not happening.

For the sake of clarity, for the rest of this chapter, I will avoid examples such as these, because they muddy the waters by making multiple readings accessible instead of highlighting just one that makes the contrasts I'm trying to make clear. However, as I will show in Chapter 5, the fact that there are multiple options available for (6) falls out nicely from my theory.

An important feature of the *instead of* backtrackers is that the antecedent clause's focus alternative is something in the past that is relevant to the evaluation of the consequent. Therefore, backtracking is possible with an *instead of* backtracker where the focus is on an element that is not the temporal adverb. As long as this focus choice, as shown in (7) also affects the interpretation of past such that different worlds are accessible, NC syntax is still available.

(7)   Every fifth year graduate student has to teach once during the semester, and the sign up for teaching dates was a long time ago. Therefore, last week, Maria had to teach because she was signed up, even thought she had no time then and has plenty this week. Her teaching went poorly. Phil got to teach this week, and it went well, but last week he wasn't busy, so it also would have gone well.

   a.   *If MARIA had taught this week, last week's teaching *would have to have* been better.

   b.   If MARIA had taught this week, last week's teaching **would have** been better.

This shows that focusing another constituent in the sentence is possible as long as the relevant focus alternative is in the past in a way that affects the interpretation of the consequent. In particular, since the context provides that each students present once, if Maria presents this week, then she can't have presented last week, which means that someone else presents last week. This makes it possible for last week's presentation to be better.

As this chapter already is and will continue to be dense with data generalizations, I will periodically intersperse charts that summarize the main points throughout.

Table 3.1: Summary Table 1

Conditional Type	Regular Scenario	*instead of* Scenario
Backtracking Counterfactual	EMC *NC	*EMC NC

Thus far we have unexplained complementary distribution. A naive first pass at the data would seem to say that *have to* and focus stress that induces the *instead of* reading are incompatible (as shown by the failure of (5a) and the focused attempt in (6a)), and that furthermore, both *have to* and a covert, focus-induced *instead of* clause perform some kind of special function that saves backtracking counterfactuals. However, the data I am about to present on **forwardtracking counterfactuals**[5] – counterfactuals with antecedents that temporally precede the consequents – shows both of these introductory intuitions to be false. Rather, *have to* and *instead of* scenarios are only incompatible under backtracking scenarios, and neither's role is particular to backtracking.

3.3   Forwardtracking Counterfactuals

A forwardtracking counterfactual (FTCF) is what would have been considered a standard counterfactual before backtrackers were considered. Here is the relevant piece of the tree I gave above for the sake of full clarity:

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[5]Recall, I am using counterfactual to mean only that we know the antecedent to be false, which thus far has equated to the antecedent being in the past.

(8)
                        Conditionals

              Counterfactuals   Possibitionals

        Backtracking   Forwardtracking
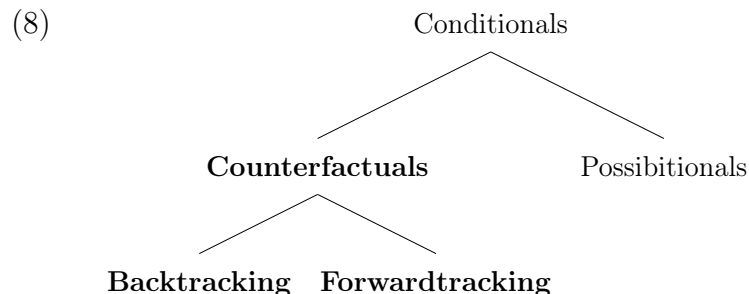
FTCFs are CFs in which the time of the event denoted by the antecedent is before the time of the event denoted by the consequent. Once again, I examine how EMCs and NCs differ with respect to scenarios culminating in FTCFs.

(9)   Brad had a concert invitation for Thursday night and a paper due Friday. He is a really good student, but had a really busy day on Friday with meetings all day, so he declined the concert invitation. Knowing about his paper deadline and that he is a good student, and wishing he had come Thursday, Janet says:

   a.   If Brad had attended the concert Thursday, he *would have to have* written his paper on Friday.

   b.   *If Brad had attended the concert Thursday, he **would have** written his paper on Friday.

This example is clearly a FTCF because the time of the event denoted by the antecedent is sometime on Thursday, which is unambiguously before Friday in this context. Example (9) shows that even with forward tracking, *have to* plays a role in some counterfactuals, showing that *have to* is not simply a rescuer of backtracking. I will claim in Chapter 5 that *have to* is performing the same role in both FTCFs and BTCFs. Of interest here is that, knowing about Brad's busy day, Scott cannot truthfully utter (9b) because it is not true in all closest worlds that Brad writes his paper on Friday. But (9a) is still a felicitous (and true) counterfactual. Intuitively this is because in all worlds where he attends the concert, there is still a paper writing obligation for Friday, whether or not the paper writing would actually

take place. The generalization for the EMCs, then, is that across both BTCFs and FTCFs *have to* appeals to a law in the context, but that this doesn't mean that the proposition that is the argument of *have to* is true in the actual world.

Example (9) shows that EMCs and NCs continue to exhibit complementary distribution behavior with respect to conditionals. For BTCF data, the difference between the acceptability of a NC versus an EMC syntax counterfactual was the presence of the focus that makes salient the *instead of* reading. That is, NC syntax is good when there is an *instead of* context. It is naturally sensible to check if the same is true for FTCFs. Therefore, I will show the data for *instead of* forwardtracker with an as-same-as-possible scenario.

(10)   Eric had a paper due Friday and a concert invitation for either Thursday or Friday night. His friends were all going on Thursday. He is a good student, but had a really busy day on Friday with meetings all day, so he decided to go to the Friday night concert. Gracie knows about all this, so while lamenting his absence, Gracie nonetheless understands and says:

   a.   If Eric had attended the concert Thursday, he *would have to have* written his paper on Friday.

   b.   *If Eric had attended the concert Thursday, he **would have** written his paper on Friday.

Notice that although I have used a context that makes the *instead of* reading salient in (10), the judgements are exactly the same as those in (9); there is not a reversal of felicity of EMC and NC syntax. This is unexpected if, after BTCFs, we think that *instead of*-type focus and *have to* are incompatible. Example (10) shows that both can be felicitously used in the same conditional, as in (10a). Therefore, there is nothing systematically incompatible about covert *instead of* and *have to*. Rather, there is something special about BTCFs which makes this contrast fall out, and FTCFs do not behave like BTCFs with respect to the complementary distribution of covert *instead of* and *have to*. Notably, the *have to* used in

this scenario is deontic – the salient law in this case reflects the requirements handed down from an authority, most probably the professor of Eric's class.

Thus far the data has shown that EMC syntax can be used in forwardtracking counterfactuals, but it is clear that FTCFs can (and typically do) exist without extra modal syntax; recall that a FTCF is just a CF that isn't backtracking, and many such CFs do not use EMC syntax. Example (11) is an example of just such a forwardtracker – again clearly forwardtracking because the antecedent time is Thursday, which precedes the consequent time, Friday.

(11)   Will had a paper due on Friday and a concert invitation for Thursday night. Will decided not to attend the concert, and Elizabeth is wondering why. Knowing about the paper, but also knowing that he is a good student, Elizabeth says:

a. */? If Will had attended the concert Thursday, he *would have to have* written his paper on Friday.

b.   If Will had attended the concert Thursday, he **would have** written his paper Friday.

Example (11) shows that NC forwardtrackers are in fact possible, and that when they are, EMCs are no longer acceptable in the context. As with the pair in (9) and (10), I can also create an *instead of* context, that is, a context with focus that makes salient the reading that the concert is attended Thursday instead of some other time, that has the same acceptability judgements as in (11):

(12) Guy had a paper due Friday and a concert invitation for Thursday or Friday night. His friends all went Thursday. Guy decided to attend the Friday night concert, and Sandy is wondering why. Knowing about his paper deadline and that he is a good student, and wishing he had come Thursday, Sandy says:

a. */? If Guy had attended the concert THURSDAY, he *would have to have* written his paper on Friday.

b. If Guy had attended the concert THURSDAY, he **would have** written his paper Friday.

Once again we have an *instead of* context, (12), whose felicity judgments for both the EMC and the NC syntax conditionals match those of a non-*instead of*, or regular, context, (11). So unlike backtrackers, in all forwardtracking counterfactuals, there is evidence that a conditional with an *instead of* context can be acceptable with or without EMC syntax.

This is a good time to summarize the findings thus far. For the rest of this dissertation, I will refer to the scenarios where the speaker of the conditional under consideration knows that the consequent is unlikely or impossible a **knowing** context, as in (9)-(10). Therefore, in these particular cases, a *knowing* context is one in which the fact that that paper might not get written on Friday is known. I will call the other category of forwardtracker a **not knowing** context, as in (11)-(12). In a *not knowing* context, the speaker of the conditional does not know that the consequent is unlikely or impossible. For this scenario, it means that the speaker of the conditional thinks that that paper will be written on time on Friday.

Conditional Type	Regular Scenario	*instead of* Scenario
Backtracker	*EMC* *NC*	***EMC** **NC**
Forwardtracker *knowing*	*EMC* *NC*	*EMC* *NC*
Forwardtracker *not knowing*	***EMC** **NC**	***EMC** **NC**

Now that the data is getting more complex, I'm coloring all cells that are [EMC, *NC] blue and using *italics*, and all cells that are [*EMC, NC] green with **bold**, to make the patterns clearer.[6] In Table A.5, the apparent distinction to be drawn was that regular and *instead of* scenarios results is complementary distribution of EMC and NC syntax conditionals. As is now clear, this view of the data does not provide the correct distinctions for all conditionals. In fact, it seems that backtrackers are unique in this respect; forwardtracking, both *knowing* and *not knowing*, have both [EMC,*NC] and [*EMC,NC] judgements. That is, *instead of* contexts do not determine acceptability for forwardtracking counterfactuals. Rather, for forwardtracking, the difference between acceptability appears to depend on whether or not the consequent is believed to have been possible or not.

To continue to test the relevant distinctions, I will now present some further data. I will be checking both *knowing* and *not knowing* contexts, as well as both regular and *instead of* contexts. Thus far, I have entertained data only from past counterfactuals, where the antecedent is indisputably known to be false. In the data to be presented in the next section, I will use conditionals whose outcome is not yet determined – that is, the antecedent does not occur strictly in the past.

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[6]For those printing this dissertation, refer to the appendix for more black-and-white friendly charts.

People usually divide conditionals where the antecedent is still a logical possibility into two different types. The first are called non-past indicative, or future more vivid (Iatridou, 2000), conditionals. An example is *If John comes to the party, Mary will leave.* The second kind are what have been called future less vivid conditionals (also Iatridou 2000), or non-past subjunctive conditionals, like *If John came to the party, Mary would leave early.* These two undoubtedly are separate categories in general – the former is indicative, the latter subjunctive. They show different tense morphology on both the modal and the antecedent (the fact that the tense on the modal is the same as the tense in the antecedent is predicted by the theory of tense described in Chapter 2). However, this dissertation has nothing to add about the differences between the two. In fact, future less vivids and future more vivids pattern together with respect to the backtracking, *instead of*, and *knowing* versus *not knowing* facts that I'm interested in, and as such, I will group them together and call such conditionals **possibitionals**, short for possibility conditionals.[7] I want to create a new term for these kinds of conditionals in particular so that I may use the term conditional most generally as a cover term for all counterfactuals and possibitionals and simultaneously remain neutral on differences among possibitionals as they do not impact my generalizations – moreover, all possibitionals behave alike, so there is no motivation to treat any of them separately.

3.4 Possibitionals

Moving on to possibitionals, I will show that possibitionals behave like FTCFs with respect to the *instead of* versus regular scenario contrasts as well as with respect to the *knowing* and *not knowing* contexts. I will also use possibitionals to illustrate a new generalization. I will claim that for all conditionals except BTCFs, EMC syntax has an adversity reading

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[7]I recognize that FMVs, or indicative conditionals, may have little in common with FLVs and counterfactuals, and I am not going to venture into any theory of indicative conditionals. Rather, I show them only to show the parallels with respect to the data I have to present. Therefore, any analysis of indicative possibitionals can be thought of as preliminary, with more work to be done in the future regarding the semantics of indicative with backtracking.

– a reading that indicates that the consequent is somehow negative – which is particularly noticeable in possibitionals. The adversity reading is also present in FTCFs, which I will show after I've presented the possibitional data.

The first example is an example of a regular, *knowing* scenario backtracking possibitional – it does not have focus that lends an *instead of* reading (therefore it is a regular scenario), the speaker of the conditional knows that the consequent is not necessarily achievable (therefore it is a *knowing* scenario), the time of the antecedent, tomorrow, is after the time of the consequent, tonight (and therefore it is backtracking), and the antecedent proposition is still possible in the actual world (therefore it is a possibitional, and not a counterfactual).

(13)   Sofie has all of her friends in town and plans to go out with them tonight, and someone calls her office at the last minute on Friday to ask her to talk at an event on Saturday. Her secretary Jamie, looking at his version of her calendar, says:

    a.   If Sofie gives/gave the talk tomorrow, she *will/would have to* write her speech tonight.

    b.   *If Sofie gives/gave the talk tomorrow, she **will/would** write her speech tonight.

The latter, (13b), is unacceptable since Jamie knows that Sofie's friends are in town, and they are likely to be going out tonight, so Sofie's writing speech tonight is not true in all possible accessible worlds. However, (13a) is considered acceptable (and true) in this scenario. As explained before (13), (13a) is a backtracking possibitional, since the time of the antecedent is after the time of the consequent. I will explore in Chapter 5 the relevance of back- versus forwardtracking in non-counterfactuals. For now I will present the data on both for completeness. As previously stated, (13a) is classified as a *knowing* backtracking possibitional; in this particular case it is because Jamie knows his boss's busy schedule with friends, and therefore knows that the consequent is not necessarily possible in the actual world. If we were to change this example to a *not knowing* backtracking possibitional,

we find that as before with forwardtracking counterfactuals, the judgments of acceptability switch so that EMC is unacceptable and NC is acceptable.

(14)   Someone calls Bella's office at the last minute on Friday to ask her to talk at an event on Saturday. Her secretary Adam, looking at his version of her calendar, sees nothing in particular on for the night and says:

a. *If Bella gives/gave the talk tomorrow, she *will/would have to* write her speech tonight.

b. If Bella gives/gave the talk tomorrow, she **will**/**would** write her speech tonight. (Regular, *not knowing* backtracking possibitional)

This data point also helps to bring out the second generalization – the fact that EMC syntax conditionals outside BTCFs carry an adversity reading. In (14), Adam could use (14a) if he were trying to somehow imply to the person on the phone that he is displeased with the last minute-ness of the call, or possibly to try to get Bella paid more for giving the speech. This is because in non-BTCF conditional environments, by which I mean both FTCFs and all possibitionals, backtracking or forwardtracking, *have to* comes with an **adversity** reading[8] – that is, it implies[9] that the predicate of the consequent somehow negatively impacts the subject of the clause. In (14), if Adam uses the EMC conditional, he is implying to his interlocuter that writing the speech tonight might not happen, and therefore accomplishing it is difficult or undesirable. I will demonstrate the details of the adversity more fully shortly, in §3.5. First, for completeness, I will include two backtracking possibitionals with *instead of* contexts, one *knowing* and one not knowing, to show the full paradigm of backtracking possibitionals.

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[8]Term compliments of Byron Ahn, whose discussion on the matter was most helpful.
[9]I use the term "implies" loosely at the moment and will define what I mean more fully in §3.5.

(15)   MaryKatherine has all of her friends in town, and someone calls her office at the last minute on Friday to ask her to change that date of her talk at an event from Sunday to Saturday. Her secretary Ronin, looking at his version of her calendar, says:

   a.   If MK gives/gave the talk TOMORROW, she *will/would have to* write her speech tonight.

   b.   *If MK gives/gave the talk TOMORROW, she **will/would** write her speech tonight. (*instead of*, *knowing* backtracking possibitional)

(16)   Someone calls Ariel's office at the last minute on Friday to ask her to change that date of her talk at an event from Sunday to Saturday. Her secretary Eric, looking at his version of her calendar, sees nothing in particular on for the night and says:

   a.   *If Ariel gives/gave the talk TOMORROW, she *will/would have to* write her speech tonight.

   b.   If Ariel gives/gave the talk TOMORROW, she **will/would** write her speech tonight. (*instead of*, *not knowing* backtracking possibitional)

As is probably expected at this point, the context that makes the *instead of* reading necessary patterns alike with its non-*instead of*, regular scenario counterpart, and the contrast between when EMC or NC syntax is good depends on what the speaker knows about the possibility of the consequent proposition. The same judgements are true of forwardtracking *knowing* and *not knowing* possibitionals, which I give examples of next, as well as forwardtracking *instead of*-type contexts for both *knowing* and *not knowing* scenarios. All of them have EMC syntax conditionals that are acceptable when the speaker knows that the consequent might not be possible, and the NC syntax conditionals are good when the speaker does not know that anything interferes with the consequent – that is, from the context it is clear that the consequent is possible. I will not show the *instead of* versions of the scenarios since they all pattern alike and I do not want to bog the reader down with tedium.

(17)　Tristan was planning on staying in tonight, since he has to clean his apartment before his landlord visits in two days, and tomorrow is full of other chores. Yvaine, lamenting his absence but understanding why, says:

a.　If Tristan came/comes out tonight, he *would/will have to* clean his apartment tomorrow.

b.　*If Tristan came/comes out tonight, he **would/will** clean his apartment tomorrow.

(*knowing* forwardtracking possibitional)

(18)　James was planning on staying in tonight, since he has to clean his apartment before his landlord visits in two days. Leonard, not knowing that tomorrow is a busy day, claims:

a.　*If James came/comes out tonight, he *would/will have to* clean his apartment tomorrow.

b.　If James came/comes out tonight, he **would/will** clean his apartment tomorrow.

(*not knowing* forwardtracking possibitional)

For ease of digestion, here is another chart to summarize the results so far:

Table 3.3: Summary Table 3

Conditional Type	Regular Scenario	*instead of* Scenario
Backtracking CF	*EMC* *NC*	***EMC** **NC**
Forwardtracking CF *knowing*	*EMC* *NC*	*EMC* *NC*
Forwardtracking CF *not knowing*	***EMC** **NC**	***EMC** **NC**
BT Possibitional *knowing*	*EMC* *NC*	*EMC* *NC*
BT Possibitional *not knowing*	***EMC** **NC**	***EMC** **NC**
FT Possibitional *knowing*	*EMC* *NC*	*EMC* *NC*
FT Possibitional *not knowing*	***EMC** **NC**	***EMC** **NC**

Green = [*EMC, NC]; *Blue* = [EMC, *NC]

As the chart shows, each box (that is, each type of conditional) is either [*EMC,NC] or [EMC,*NC]. However, there are two principal types of conditionals: those that have two rows in the chart (all non-BTCF conditionals), and those that have only one (BTCFs). For BTCFs, the difference between an acceptable EMC syntax conditional and an NC syntax conditional is whether the conditional is uttered in a regular scenario or a scenario that makes an *instead of* backtracker possible. The other pattern – the kind in all non-BTCFs – is that *instead of* conditionals behave no differently than regular scenario, non-*instead of* conditionals. Instead, the difference between an acceptable EMC conditional and an acceptable NC conditional is whether or not the consequent is achievable in the actual world

based on the epistemic state of the speaker. Why might BTCFs behave differently from the rest of the conditional types? As seems clear, backtracking needs some kind of extra help to be acceptable. So far I've shown that it can be rescued in two ways, and the two are incompatible with each other due to the scenarios required to set up either. I will explore this more in Chapter 5. On the other hand, non-BTCFs, that is, everything else, don't need to be licensed in a special way. Therefore, a covert *instead of* clause will just be adding information to the antecedent rather than making the construction possible. Similarly, just as in backtrackers, *have to* still needs a rule in the context to apply. Moreover, though, because of the adversity reading that EMC non-BTCFs get, these are only usable to indicate that the consequent is not actually feasible, or that if it is, it is negative. The adversity reading will be discussed extensively in the next section.

3.5   Adversity

Let me return now to the idea that *have to* comes with an adversity reading in non-BTCFs. I will be showing that *have to* cannot be used in a non-BTCF if the consequent is not interpreted adversely for the subject of the consequent clause. Therefore it also cannot be used if the consequent clause is easily epistemically possible in the actual world, as far as the context provides. Notice that in (9), (10), (13), (15), and (17), that is, all non-BTCF contexts where *have to* is licit, the consequent is perceived as something negative, which can be shown by the infelicity of adding a contextually appropriate version of *which makes him/her happy*:

(19)   a.   ...would have to have written his paper on Friday, #which would have been easy for him (given that Friday is busy).

        b.   ...would have to write her speech tonight, #which she would enjoy doing (even though she wants to be out with friends).

        c.   ...would have to clean his room tomorrow, #which is a desirable outcome for him (even though tomorrow is full of other chores).

This is not just a product of the examples I have chosen; it is a special fact about non-BTCF *have to* conditionals. To prove this, let me alter one of the examples so that the consequent is a stereotypically good thing ((20) is a modification of (9)).

(20)   Brad had a paper due Friday and a concert invitation for Thursday night. He is a really good student, but had a really busy day on Friday with meetings all day, so he declines the concert invitation. Unfortunately for him, Thursday night concert goers all got a ticket for a free coffee on Friday. Janet knows about all this, and says:

   a. *If Brad had attended the concert Thursday, he *would have to have* drunk a free coffee on Friday (and he loves coffee).
   b.   If Brad had attended the concert Thursday, he **would have** drunk a free coffee on Friday (and he loves coffee).

(20a) is unacceptable because if Brad loves coffee, then to say that he *has to* drink it is unacceptable. Notice that even though this is a *knowing* context because Janet knows why he couldn't attend the concert or drink the coffee, the use of *have to* is unacceptable. I demonstrate the fact that using *have to* with a positive outcome is unacceptable again in the following two examples, where the context and verb choices make the judgments even clearer.

(21)   Iro and Zuko are playing a game of Pai Sho, and there's a fun bet riding on it. Aang, watching the game sees that Zuko is one White Lotus, a rare piece, away from winning. He says to Katara:
   a. *If Zuko drew a White Lotus, he *would have to* win.[10]
   b.   If Zuko drew a White Lotus, he **would** win.

(22)   R2D2 and Chewey are playing a game and R2D2 is winning. Chewey, a Wookiee, is getting angry, and Hans advises that it is unwise to upset a Wookiee, and that R2D2 should let him win. Luke notices that, unfortunately, if R2D2 rolls a 6 on the next turn, he will win regardless. Luke says:

   a.   If R2D2 rolled a 6 on his next turn, he *would have to* win.
   b.   If R2D2 rolled a 6 on his next turn, he **would** win.

Before explaining the details, let me note that both the EMC and NC conditionals are good in (22). I will address this point later. Now, more generally regarding (21) and (22), winning is typically perceived as a positive thing for the winner. Therefore, unless there are special circumstances that make winning negative, EMC syntax should be unacceptable in a standard scenario when the consequent event is a winning event. This is what (21) shows. Without any special accommodation or change to the scenario, the ECM syntax conditional, (21a), is bad while the NC syntax conditional, (21b), is good. In contrast, when the scenario builds in the fact that winning is negative – for example, if a Wookiee is going to tear you apart piece by piece – then the EMC syntax is acceptable specifically because it makes the negative outcome salient. Another way to make this is clear is to test the possible continuations of (21) and (22).

(20)   a.   *If Zuko drew a White Lotus, he *would have to* win, #which is what he wants/#which is not what he wants.
   b.   If Zuko drew a White Lotus, he **would** win, which is what he wants/#which is not what he wants.

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[10]Let me remind the reader that I am amking a distinction between acceptable and unacceptable, where unacceptable is an intentionally broad category, as discussed in Chapter 2. In (21a), some speakers find this simply dispreferred, and feel that the EMC syntax version implies that the rules are not being followed properly. This reading is predicted by my theory as well, so I welcome this result.

(21)   a.   If R2D2 rolled a 6 on his next turn, he *would have to* win, #which is what he

           wants/which is not what he wants.

       b.   If R2D2 rolled a 6 on his next turn, he **would** win, #which is what he wants/which

           is not what he wants.

In (21), *which is not what he wants* is not a felicitous continuation for either the EMC or the NC syntax conditional because the context makes it clear that he wants to win. Furthermore, the *which is what he wants* continuation is bad for (22a), the EMC syntax conditional, because *have to* is incompatible with a positive outcome.[11] In (22), the continuation *which is what he wants* is infelicitous for both the EMC and the NC syntax conditionals because the context makes it clear that winning is bad. However, *which is not what he wants* is a good continuation for both the EMC and NC syntax conditionals partly because the scenario sets up such a reading, and also partly because EMC syntax is compatible with a negative outcome.

     This adversity reading for non-BTCFs will fall out from the theory I present in Chapter 5. It is important to note in contrast that there is no adversity reading for EMC syntax BTCFs. Let me repeat just the CF itself from example (3):

(23)   a.   If Perry had asked Julie for help today, there *would have to have* been no fight

           yesterday.

The consequent in this case is sufficient to make the point. There being no fight yesterday is a positive thing for Perry, both because he could then ask for the help he needs today, and also because fighting is typically perceived negatively anyway. Here I test it with some continuations.

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[11]Again, we can tweak the context to make this continuation fine, but in that case *have to* is performing the function of explaining that the rules are not being followed correctly, or that Zuko doesn't know how the game is played. I will address these scenarios in Chapter 5.

(24)   a.   If Perry had asked Julie for help today, there *would have to have* been no fight
             yesterday, which would have been better for him.

Since this continuation shows that a positive outcome is acceptable with an EMC syntax
BTCF, it shows that EMC syntax does not have a necessary adversity reading in BTCFs.
This is to be expected if we think, as I do, that the *have to* in BTCFs is epistemic rather
than deontic. Therefore, the adversity reading is specific to all of the conditionals that
aren't BTCFs, namely FTCFs and possibitionals. This is a nice result, because, as I will
show in the table below, this means that the acceptable EMCs for BTCFs are different
from the EMCs for non-BTCFs, which makes the fact that BTCFs behave differently from
non-BTCFs regarding the *instead of* conditionals is a different contrast than the one that
distinguished *knowing* from *not knowing* FTCFs or possibitionals. I will redraw the table
below to summarize the effects of the new generalization about the adversity reading.

Table 3.4: Summary Table 3

Conditional Type	Regular Scenario	Instead of Scenario
Backtracking CF	EMC *NC	***EMC** **NC**
Forwardtracking CF Knowing	*EMC* **NC*	*EMC* **NC*
Forwardtracking CF Not Knowing	***EMC** **NC**	***EMC** **NC**
BT Possibitional Knowing	*EMC* **NC*	*EMC* **NC*
BT Possibitional Not Knowing	***EMC** **NC**	***EMC** **NC**
FT Possibitional Knowing	*EMC* **NC*	*EMC* **NC*
FT Possibitional Not Knowing	***EMC** **NC**	***EMC** **NC**

Green = [*EMC,NC]; *Blue* = [EMC,*NC], adversity; Grey = [EMC,*NC], non-adversity

Since I've shown that EMC syntax BTCFs are good even if the consequent denotes a non-adverse event, the flip side to investigate is whether *instead of* backtracking CFs are bad with the EMC regardless of the positive or negative nature of the consequent. In (25), I repeat just the NC backtracking CF from (5), and then change the example to have a negative consequent, in order to test if the adversity of the consequent affects the EMC/NC acceptability judgement for *instead of* BTCFs. I will be including contextually appropriate continuations to show that in (25) there can only be a positive consequent while in (26) there can only be an adverse consequent. I will show that both are acceptable with NC syntax.

(25)   If James had asked Katie for help TODAY, there **would have** been no fight yesterday, which would have been great for him/#which would have terrible for him.

(26)   Beca and Jesse fought yesterday because Jesse asked Beca for help while she was trying to write. Afterward, though, they made up and went out to get ice cream! Today she isn't writing, and so would have been happy to help.

   a. *If Jesse had asked Beca for help TODAY, there *would have to have* been no ice cream trip yesterday, #which would have been great for him/which would have terrible for him.

   b. If Jesse had asked Beca for help TODAY, there **would have** been no ice cream trip yesterday, #which would have been great for him/which would have terrible for him.

In (25) there is an example of an *instead of* BTCF with a positive consequent, and the NC syntax CF is acceptable, which is unsurprising since adversity tends to correlate with EMC. However, in (26) both the EMC and the NC conditional have an adverse consequent, but, as discussed in §3.2, only the NC syntax BTCF is good with the focus stress that makes the *instead of* reading necessary. So putting together the data from (24a), (25), and (26), I conclude that the adversity reading does not in any way affect backtracking counterfactuals, and is instead a reading only in the rest of conditionals I've presented above, namely all non-BTCFS – FTCFs and possibitionals. This difference will fall out from the analysis that follows.

I have presented data so far that shows that backtracking is possible without EMC syntax, as in the focus, covert *instead of* BTCFS. I have also shown that both *instead of* and *have to* conditionals are possible outside of BTCFs, and when they do occur in other conditionals, both appear to function the same way as they do in BTCFs: *have to* enforces a salient law, and *instead of* serves to exclude focus alternatives as propositions to entertain. Furthermore, I have shown that there is an adversity reading that arises when EMC syntax is used with any conditional that is not a BTCF.

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Before I can go on to account for these generalizations, I have two more types of data to present. The former are a class of backtracker that I mentioned earlier that Arregui accounts for – analytical backtrackers – which are good with or without special syntax. I present them now because their judgements are the same as those of the second set of data I will present in §3.6, which is new to the literature, to my knowledge. I will show how the aktionsart class of the antecedent verb can affect the acceptability of a BTCF. In particular, if there is a stative verb in the antecedent, a BTCF can be acceptable with or without special syntax.

3.6   Analyticals and Statives

As mentioned above, analyticals are conditionals whose consequents depend logically on their antecedent, such that in every possible world (except the absurd world, if you subscribe to that sort of theory), the consequent follows from the antecedent. What is special about analyticals is that they can arise with NC syntax without the need of the *instead of* reading. Previously, all BTCFs required either EMC syntax or and *instead of* reading, but this is not the case with analyticals, which can arise with NC or EMC syntax with a regular scenario. Below I recount the examples from Arregui (2005), with the notable exception that I've marked one as ungrammatical.[12]

(27)   a.   If he were a bachelor, he wouldn't have married.

         b.   If she had a twin sister, her mother would have had at least two children.

         c.   *If she had sold a horse, she would have owned a horse.

         d.   If she were a semi-finalist, she would have won the quarter-finals.

         e.   If she were president, she would have won the last elections.

         f.   If you had been a surgeon, you would have gone to medical school.

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[12]In general, analyticals are not native speakers' favorite examples, and they improve with the use of EMC syntax – I believe this is because even an analytical law is easier to accept in the context if it is explicitly referenced, which is what *have to* does. Furthermore, I think that (27c) is probably out entirely for myself and other because the relation between the antecedent and consequent verb involves the presupposition that to sell a horse requires owning one, which is not analytical in the same way the others are.

Again, some speakers find the examples in (27) less than ideal, in which case, recall the ages examples, which, to my knowledge, everyone finds acceptable:

(28)   She's 27 now, but if she were 30, she would have been born three years earlier.

The classic example that everyone cites from Bennett (1984) is:

(29)   If Stevenson were President in February 1953, he would have been elected in November 1952.[13]

The examples in (27) qualify as analyticals because by definition, a bachelor has never married, a twin requires two children, and so on for all of the examples above. Recall, though, from Chapter 2 that I do not consider (29) an analytical because years of presidential elections most probably are not world-independent, and as such, (29) should not qualify as an analytical. I will address this data point momentarily.

For now, notice that the examples in (27) are also fine with the EMC syntax:

(30)   a.   If he were a bachelor, we would have to have not married.
         b.   If she had a twin sister, her mother would have to have had at least two children.
         c.   She's 27 now, but if she were 30, she would have to have been born three years earlier.

I will not spell out the EMC versions of the rest of the rest of the analyticals, but it is true that all of them are acceptable. And therein lies the puzzle. Everywhere else I've shown that there is a systematic complementary distribution between the scenarios that license EMC

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[13]Some speakers reject this as a counterfactual, claiming that the antecedent morphology on *were* only allows a future less vivid, or possibitional, reading and instead require the following:

(i)   If Stevenson had been President in February 1953, he would have been elected in November 1952.

I will discuss the differences between (29) and (i) in Chapter 5.

and NC syntax backtrackers, but somehow analyticals behave differently and allow either. Arregui does not address the use of the EMC syntax in analyticals, but she does have an analysis of NC syntax analyticals that I will be adopting in Chapter 5, where I will also explain why the EMC syntax conditional is acceptable as well.

The keenest of readers may have noted by now that all of the examples this far, excepting the analyticals, have eventive verbs in the antecedent. The generalizations on the data that I present with stative verbs in the antecedent of a BTCF are new to the literature, to my knowledge. Just like analyticals, stative backtracking counterfactuals, which I will define only as BCTFs with a stative verb in the antecedent, are grammatical both with EMC and NC syntax counterfactuals. This is why (29), presented above and repeated here, is acceptable with NC syntax even though it is not an analytical backtracker.

(31)   If Stevenson had been President in February 1953, he would have been elected in November 1952.

In the following, I give other examples of the felicity judgements stative BCTFs.

(32)   Jayne has always been an avidly against the Alliance, but he is also easily bought, and the Alliance has been out over the last month undertaking a conversion mission where they pay people to switch sides. There was a scuffle this morning between the Alliance and the Rebels, and Jayne still fought with the rebels. Commenting on this, Mal said:

   a.   If Jayne had been a member of the Alliance this morning, he *would have to have* been recruited in the last month.
   b.   If Jayne had been a member of the Alliance this morning, he **would have** been recruited in the last month.

(33)   Magic has been outlawed in Camelot, and so right now, no one knows how to prac-
        tice it except for the Great Dragon, who learned long before it was illegal. Merlin
        was accused of performing magic this morning, but has since been cleared. In hy-
        pothesizing about Merlin doing magic, it's become clear that that would only be
        possible is if the Great Dragon taught him, and they only just met last week.

        a.   If Merlin had known magic this morning, the Great Dragon *would have to have*
              taught him sometime over the past week.
        b.   If Merlin had known magic this morning, the Great Dragon **would have** taught
              him sometime over the past week.

The previous data points show that when there is a stative verb in the antecedent, like *be*
or *know*, the consequent is acceptable with either the EMC syntax or NC syntax, which is
not predicted by anything shown thus far. I will tackle the problem of stative antecedent
licensing both EMC and NC syntax BTCFS along with all the other issues outlined at the
beginning of this section in Chapter 5.

    Something that needs to be controlled for with my stative examples is to show that they
are not cases of reasoning backtrackers, presented in Chapter 2. I need to show that in (32b)
and (33b) are not special cases of seeming BTCFs in which the antecedent is an apparent
possibility that the speaker is using to figure out how the world could actually be. To show
that this is not the case, I can use the same kind of continuations that I used in Chapter 2
to see if the antecedent is still a possibility.

(34)   A: If Jayne had been a member of the Alliance this morning, he **would have** been
        recruited in the last month.
        B: # And he is in fact a member of the Alliance, so he must have joined last month!

(35)   If Merlin had known magic this morning, the Great Dragon **would have** taught
        him sometime over the past week.
        B: # And he did in fact perform magic, so the Great Dragon must have taught him.

Both of these continuations are infelicitous, so we can rule out a reasoning type resolution for these counterfactuals, and so they are in fact true backtracking counterfactuals that should and will be accounted for as the final data points for my theory.

Let me present one last chart of generalizations, after which I will summarize the major contrasts that need to be accounted for:

Table 3.5: Final Summary Table

Conditional Type	Regular Scenario	Instead of Scenario
Backtracking CF	EMC *NC	***EMC** NC
Forwardtracking CF Knowing	*EMC* **NC*	*EMC* **NC*
Forwardtracking CF Not Knowing	***EMC** NC	***EMC** NC
BT & FT Possibitional Knowing	*EMC* **NC*	*EMC* **NC*
BT & FT Possibitional Not Knowing	***EMC** NC	***EMC** NC
Analytical BTCF	EMC NC	EMC NC
Stative BTCF	EMC NC	EMC NC

Green = [*EMC,NC]; *Blue* = [EMC,*NC], adversity;
Grey = [EMC,*NC], non-adversity; Fuchsia = [EMC, NC]

The contrasts to keep in mind are the following: (1) BTCFs draw a line between counterfactuals good **only** with EMC syntax, and those **only** good with NC syntax (the *instead of* contexts). (2) For all other conditional types, an *instead of* context does not affect the

acceptability of either an EMC or NC syntax conditional as compared to a comparable regular scenario conditional. Instead, NC syntax is good when the consequent is believed to be achievable, whereas the EMC syntax is used to indicate that the obligation indicated by the consequent holds, but that the consequent may not be achievable in the actual world. (3) When EMC syntax is used any conditionals that is not a BTCF, an adversity reading arises. The results of this are two-fold. Firstly, EMC syntax cannot be used in non-BTCFs when the consequent is not adverse, and secondly, EMC syntax can be used to make it apparent that the event denoted by the consequent is a dispreferred event because of the adversity reading that arises, even if the event in question is actually achievable in the actual world. (4) Stative and analytical BTCFs allow both EMC and NC syntax. Analyticals can be accounted for fairly straightforwardly in any similarity based approach, but the statives pose a much more interesting problem.

Therefore, let me establish some of the theoretical desiderata. Firstly, there need to be denotations of *would*, *have to*, and focus stress that allow them to compose to make backtracking possible in their respective scenarios. The denotations of all three need to also be such that they are consistent with the data in non-BTCFs. That is, *have to* and focus stress cannot be inherently incompatible, and both need denotations that arrive at the correct denotations for all non-BTCFs that they are used in. I will propose that *have to* and focus stress both help backtrackers by ordering worlds that meet the context's laws or exclude the context's focus alternatives as better. They perform the same function outside of BTCFS.

Furthermore, there needs to be an account of the adversity reading such that it shows up only in non-BTCFs, and also so that we derive the facts of its acceptable usage as well as its implicatures. I will propose that the *have to* of BTCFs is epistemic, and the *have to* of non-BTCFs is deontic, and the deontic modal EMC syntax conditional is in a generalized entailment relation with its NC syntax equivalent. This entailment relation causes an implicature to arise so that the EMC syntax may only be used when the adversity reading is intended.

Lastly, there needs to be an analysis that takes into account what makes states different from events such that stative verbs in the antecedent of BTCFs allow an NC syntax consequent. I claim that NC syntax BTCFs with stative antecedent are acceptable because when used, the state in the stative antecedent is assumed to extend back to the time of the consequent, essentially eliminating as accessible any worlds in which the consequent is not true, and therefore licensing backtracking sans EMC syntax.

In order to derive the analyses that I have just outlined, I will first present the foundations of my analysis. In the next chapter I will present the analyses that have been presented previously in the literature to deal with pieces of the data I've presented in this chapter, while pointing out where they fall short of explaining the full data set presented here. In particular, I will focus on the analysis found in Arregui (2005), Ogihara (2000), and Rooth (1992). In the following chapter, I will adapt these analyses to fit the full range of data presented in this chapter. Then, I will point out some unresolved problems and additional interesting data points that are less relevant to the data discussed so far.

CHAPTER 4

Existing Analyses and My Formalism

Before I present my analysis of the data presented in the previous chapter, I will show some existing analyses that bear directly on my analysis. In particular, I will present how Arregui builds an analysis for her backtracker data, how Ogihara uses focus alternatives in his analysis of counterfactuals, as well as tools from other sources that will be critical for my adaptation of Arregui's analysis. In particular detail, I will present Arregui's and Ogihara's analyses in their original frameworks, in which modals have accessibility relations, but afterward I will rework their theories so that the modal has a modal base with an ordering source instead (in the same vein as the theories seen in Kratzer (1981)). I will not introduce the Kratzerian framework until after fully presenting the original theories.

As a preview, I will lay out the major claims and assumptions from each theory here. First, here are the major points that will help with the digestion of Arregui's theory. *Woll*, the tenseless form of *will* and *would* is a modal. It has a tense argument which can be valued as past or non-past (present). Tense is referential, as given in Chapter 2, and the morphological tense on the modal is the only semantic tense in a conditional. All other tense in a conditional (namely that on the antecedent and consequent) is zero tense. The assumes syntax is the following:

(1)

```
                         _____
                        /           \
                past tense          /\
                                   /  \
                                  /    \
                                 /\     consequent
                                /  \
                    modal (woll)    antecedent
```
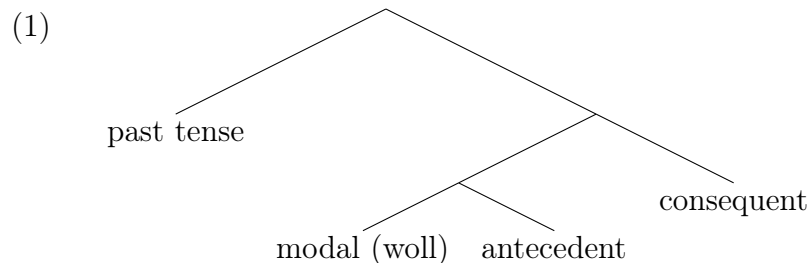
The semantic past tense on the modal is valued as an argument of the similarity relation of the modal: past tense means that similarity is determined with respect to the past in the actual world. Present tense is not spelled out, but my understanding is that it should mean that similarity is computed relative to the present of the actual world.

Arregui also adopts Lewis's (1971) tool: counterparts. The idea is that when we make conditional statements, we talk about how things would be in other possible worlds. However, Lewis's claim is that an individual can only exist in one world, and that the individuals that, as far as we call tell, are the same individual in other worlds are actually counterparts of that individual. According to Arregui, individuals, events, and world histories can have counterparts, where a world history is a slice of time in a world that contains all of the facts and events of that world over that time. So the past, which is considered the history made up of all of the facts of the world before the utterance time, in this world contains the facts that Bill Clinton won the 1992 elections, that World War II started in 1939, and that *Frozen* was the highest grossing animated film in history as of May 2014. This past, along with all of its facts, is used to compute similarity for *would* conditionals. Similarity in Arregui's system is based on a principle of close enough similar worlds, rather than closest similar worlds, which makes it significantly different then the Kratzer/Lewis/Stalnaker approaches.

This summary accounts for the major points that I will hit during Arregui's analysis. Now, I will proceed with explaining each in more detail. The goal of this chapter is to motivate each of my theoretical choices and to make explicit the denotations of my modals so that in Chapter 5 I can show how these choices account for each data point presented in Chapter 3.

4.1 Arregui 2005

As my data and analysis are built on the data and analysis presented in Arregui (2005), I will begin with her analysis. First, I will build the tools needed for her analysis; then I will present her take on backtracking, and finally I will show how it cannot immediately account for the new data I've presented.

4.1.1 Gathering the Tools

In order to understand Arregui's analysis of backtracking and *have to*, the reader needs a background on her analysis of counterfactuals more generally. Arregui's analysis involved a rethinking of the Lewis/Stalnaker (Lewis 1973, Stalnaker 1981) type approach to counterfactuals. In a Lewis/Stalnaker analysis, the denotations of counterfactuals are computed using quantification over possible worlds. In an unembedded counterfactual, this means that possible worlds are calculated by way of similarity to the actual world. A counterfactual is true just in case all closest similar antecedent worlds are also consequent worlds.

The Arreguian adaption of this system is that truth depends not on actual world similarity in general, but rather on actual world similarity relative to the tense on the modal *will/would*. Therefore the counterfactuals that Arregui analyzes (all of which contain *would* in the consequent) are evaluated on similarity to the actual world *past*. That is, how similar is the actual world's past to the past of the possible world under consideration. As discussed earlier, this overall idea fits with various philosophical approaches to counterfactuals in which similarity of the past relative to the antecedent is the important measure when it comes to determining similarity. Arregui will diverge from Lewis in crucial details that will become apparent shortly. Before presenting her arguments for using the past on the modal as a real past that constrains the accessibility relation, I will take a moment to discuss some fall out from this analysis.

This aside is meant to discuss something that Arregui does not specifically address. Past tense is the difference between a *will* and a *would* modal; in standard conditional terminology,

this is the same difference between an indicative and subjunctive conditional.[1] Notice that the past tense on the modal is the same past tense that constrains similarity. The only differences between the two following examples are the tense on the modal (and the ensuing tense changes on the antecedent, to be explained shortly), and the fact that the first is classified as an indicative conditional and the second subjunctive:

(2)   If I drink another 5-hour Energy drink, I will be hyper.

(3)   If I drank another 5-hour Energy drink, I would be hyper.

(3) is an example of what Iatridou (2000) calls a future less vivid conditional, a conditional that uses the subjunctive but hypothesizes about a still viable, if unlikely, future.[2]

Returning to the aside, although Arregui doesn't explicitly explain it as such, my understanding is that her view of the past tense that values the time argument of the modal, the same past the constrains the similarity relation as evaluating similarity with respect to the past, is the realization of subjunctivity. Therefore, in Arregui's theory, the present or past time argument of the modal is the overt realization of the indicative/subjunctive distinction.

While there is certainly a relevant and in many ways important distinction between indicative and subjunctive conditionals, it is not necessary in my theory, or Arregui's, to make a distinction between the terms 'indicative'/'subjunctive' in particular. So long as all tense is behaving uniformly with repect to what it contributes to conditionals, namely as long as past tense constrains accessibility to be evaluated relative to the past history of the actual world and present tense constrains accessibility to be evaluated relative to the present, and I believe it is, then this is not a distinction that she or I need for our analyses.

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[1]I'm not trying to make any claims about indicativity versus subjunctivity, but I'm assuming that readers will be curious about how Arregui handles indiciativity. This is my understanding of what that would be. However, I have no intention of explaining in any more detail the intricacies of the differences between indicative and subjunctive conditionals.

[2]As will become clear in this chapter and the next, FLV conditionals are accounted for in Arregui's analysis as straightforwardly as are past perfect counterfactuals of the sort like *If I **had drunk** another 5-hour Energy drink, I would have been hyper.*

Therefore, aside from noting where my terminology differs from classic terminology, I will no longer be concerned with this distinction, instead favoring a purely morphological approach.

Returning to Arregui's analysis, she argues for the shift to similarity in the past over general similarity for two reasons: better understanding of identifying the quantificational domain of modals in *would*-conditionals and an explanation for the presence of past tense morphology in counterfactuals. This approach will also have consequences for the interpretation of backtracking counterfactuals.

Regarding the first point, Arregui notices that not only do counterfactual conditionals use *would*, a past tense modal, but also that counterfactual conditionals have past tense (or past perfect) expressed as the tense of the verbs of their antecedents:

(4)   a.   She doesn't love him. If she loved him, she wouldn't marry him.

          b.   She didn't smile at him. If she had smiled at him, he would have smiled back. (Arregui ex 2, chapter 2)

The other side of this claim is that we can't have a past tense modal with a present tense verb in the antecedent.

(5)   a.   She might love him. *If she loves him, she would marry him.

          b.   She won't smile at him. *But if she smiles at him though, he would smile back.

Notice that although there is past tense morphology on the modal, antecedent, and consequent, this past tense does not necessarily correlate with the events of the antecedent or consequent occurring in the past ((4a) doesn't have a denotation with an event of her loving him in the past, but rather in the present). Furthermore, both antecedent constructions can be used to talk about the future, as is clear from the use of the future adverb *tomorrow*:

(6)   a.   If he called her tomorrow, she would be very upset.

          b.   If he had received that letter tomorrow, it would have ruined his day.

Given these facts, past tense does not appear to be expressing standard past-ness in the antecedents of *would* conditionals, and yet it is desirable to give the morphological past tense an analysis that maintains a semantic past in its denotation for several reasons. Among these is the fact that cross-linguistically, past is used in the antecedent of counterfactuals (Iatridou 2000). If past tense is used systematically to mark counterfactuality in unrelated languages, it is appropriate to conclude that the past tense is performing a specific role in the interpretation of counterfactuals.

To make the past tense on the modal in counterfactuals a semantic past tense, rather than a zero tense, Arregui argues for the following structure, in which the modal takes two arguments: first the antecedent and then the consequent, and the whole modal conditional is c-commanded by the tense that shows up morphologically on the modal:

(7)
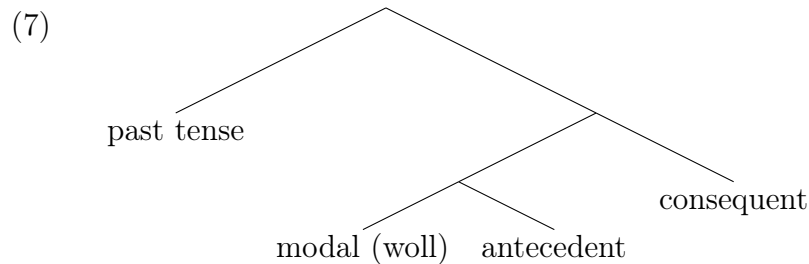
This tree shows a fairly standard syntactic approach to the structure of conditionals except that the semantic tense of the modal c-commands the entire structure. As mentioned earlier, there is a syntax/semantics disagreement with this structure, as the antecedent is syntactically higher, but this is a problem for most analyses of conditionals, and could be fixed in a variety of ways, none of which are necessary for the analyses both Arregui and I are entertaining.

To return to the structure above, *would* is a past tense modal, and it is the modal's past tense, a semantic past tense meaning roughly at some salient time before the speech time, which c-commands both the modal and its two arguments. The exact analysis of this "high" past tense will follow, but first, Arregui explains how this structure accounts for the

interpretation of the past tense in the antecedent of counterfactuals, as well as how a future tense reading is still possible.

Recall the following definitions from Chapter **Background**:

(8)   a.   **Deictic Past**: $[\![\mathbf{past}]\!]^C$ = a contextually salient time that precedes the speech time.

        b.   **Variable Tense**: $[\![\mathbf{t_1}]\!]^g = g(\mathbf{t}_1) = \mathbf{t}_1$

For an example of each of deictic and variable past tense, take the following two examples, where (9) shows deictic past tense and (10) shows how variable tense functions as a copy of a higher tense:

(9)   A: What happened then?

        B: She laughed.

(10)   She said that she loved him.

In (9), the past tense refers to a salient past time – it is interpreted deictically, and cannot be parasitic on a higher tense as there is no c-commanding tense in the sentence. In (10), the matrix past fixes the saying time as some relevant time in the past (deictic), and the past tense in the embedded clause can be dependent on the higher past: when it is dependent, it means that the love-time is the same as the say-time. Essentially, *Mary said, "I love him."* In this case, the lower tense simply copies its morphological features from the higher tense, and is interpreted simultaneously. The lower tense, then, is what we call a temporal variable, the temporal equivalent of a pronoun in the individual domain, that can be bound by another referent. The referent is the salient past time in the antecedent.

To return to conditionals, as was shown in (4a) and (6a), above, even when there is past tense morphology on the antecedent the event does not have to be interpreted in the past. Therefore, the past morphology on the antecedent verb should not be interpreted as meaning

at some salient past time. That is, it should not be interpreted deictically. Therefore, within the referential theory of tense that Arregui has adopted from Partee (1973) and Kratzer (1998), the past tense in the antecedent must be a variable tense – it receives a bound reading.

Tenses refer to times, and so a temporal variable that is lacking its own tense features and is instead copying its tense from a higher clause refers to whatever time the higher past tense referred to. Arregui's idea is that antecedent past tense is a parasitic tense, like those found in the sequence of tense example given above in (10) (see Abusch 1997, Higginbotham 2001 for discussion of sequence of tense, and ideas about how tenses relate go back at least as far as Reichenbach 1947). The deictic past tense on the modal affects the morphological shape of the variable tense on the antecedent verb so that it too is a morphologically past verb. Antecedents are now properties of times, where the antecedent's variable tense is bound by a lambda operator. Therefore, a preliminary denotation of an antecedent will be as follows:

(11) a. If she kissed him, he would kiss her back.

b. $[\![\textbf{If she kissed him}]\!] =$
$\lambda t \lambda w[\text{she-kiss-him at } t \text{ in } w]$[3]

The antecedent clause denotes a property of times that is true of a time and a world if in that world at that time there is a her-kissing-him event. Even with the groundwork just laid, though, there is a problem: if the her-kissing-him event gets its temporal reference from the time of the deictic tense on the modal, then this clause can only be interpreted in the past as well, at this same past time. As this is not the interpretation of the conditional in (11a), we need to remedy this problem.

Arregui's claim (based on work by Enc 1990 and Condoravdi 2001, among others) is that it is the modal that is responsible for the future orientation of the antecedent clause.

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[3]It's a minor change, but in Arregui's denotation, she has $\lambda t \lambda w[\text{she-kiss}\textbf{ed}\text{-him at } t \text{ in } w]$ (bold mine), but I feel that since we are interpreting tense, we should be as clear as possible. Since the tense is represented by t, I find it most helpful to remove the tense from the informal denotation *she-kiss-him*.

When the modal combines with the property of times denoted by the antecedent, the modal contributes a clause that this antecedent property holds at a non-past time. Therefore, once the modal has taken the antecedent argument (in a standard semantic function application way), the antecedent's denotation will be as in the following:

(12)   Preliminary
         Where t is some non-past time,
         λw[she-kiss-him at t in w]

Therefore, the past tense antecedent morphology is a case of morphological agreement as explained previously for variable tense. The semantic portion of the variable tense is valued by the modal and ends up with a non-past denotation due to a time argument that the modal inherently supplies to its arguments. This is important: even though the past tense in a counterfactual is a real past tense in the sense that there is a semantic past tense that refers to a time before the utterance time, this real past is only the temporal argument of the modal. The past in the antecedent is a strictly morphological reflex and has no past interpretation in a semantic sense. Therefore, the antecedent's past tense can be thought of as a fake tense, while the modal's past tense is a true semantic past. Before going on to the analysis of the denotation of the true semantic past tense of the modal, there is a hole in Arregui's theory that she never explicitly addresses.

The theory built above is based on the idea that the the antecedent past tense is a morphological reflex of the past tense of the modal in a sequence of tenses-type way: antecedents show a morphological past tense that is not semantically past, and this fake past gets its value from some other past in the sentence. This leaves open the question of what is meant to happen for languages that do not exhibit SOT behavior in sentences parallel to (10), but do have past tense morphology in the antecedent of counterfactuals with a past modal. For example, Hebrew is considered non-SOT due to its tense behavior outside of conditionals, but its counterfactual morphology is the same as in English.

(13) Dan xaSav   Se   le-ciporim yesh   raglayim
      Dan think-PAST COMP to-birds   there-is-PRES legs
      'Dan thought that birds have legs.'

(14) *Dan xaSav   Se   le-ciporim hayu   raglayim
      Dan think-PAST COMP to-birds   there-is-PAST legs
      'Dan thought that birds had legs.'

From (13) and (14) we can see that in Hebrew, we cannot embed a past tense under another past tense to get the Past under Past readings typical in English (an SOT language). This is taken as evidence that Hebrew is a non-SOT language. However, as the following data show, Hebrew obligatorily uses the past in the antecedent of a *would* counterfactual. Note that in Hebrew there are two *if*s, one used for counterfactual conditionals, *ilu*, and one used for non-counterfactual conditionals, *im*.[4]

(15) ilu   hayu   le-ciporim raglayim, hen hayu holxot
      COUNTER there-is-PAST to-birds   legs   they would walk
      'If birds had legs, they would walk'

(16) *ilu   yesh   le-ciporim raglayim, hen (hayu) holxot
      COUNTER there-is-PRES to-birds   legs   they (would) walk
      'If birds have legs, they (would) walk'

As (15) and (16) show, Hebrew needs past tense in the antecedent of a *would* counterfactual. This is a problem because under the assumption that the tense in the antecedent is a SOT style zero tense acquired from the c-commanding past tense, there is no immediate explanation for why Hebrew can and must use past tense in the antecedent of a counterfactual in the same way that English does.

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[4]Data compliments of Yael Sharvit, p.c.

This poses a problem with, as I presently see it, two possible solutions. The first option is that Hebrew works completely differently than English, and this is an issue that I would have to lay aside for now as it is outside the range of this dissertation. The second possibility is that SOT is construction specific. That is, even though Hebrew has been shown to not have SOT in classic examples like *John said that Mary was pregnant*, Hebrew does have SOT in counterfactuals. Again, this is something that would have to be explored in other work. As such, I will not take a stance on the matter, and instead will leave it as an open question to be explored in future work.

Yet another interesting avenue to pursue when claiming that the past tense we see in the antecedents of counterfactual conditionals is SOT-like bound tense is how to analyze past tense in conditionals with past tense without an overt modal. Arregui does not tackle this issue at all, and so my thoughts on the matter, which are purely speculative and informal, are not an interpretation of her ideas.

(17)   If Marcus left, then Emily followed him.

In this example, we have past tense in both the antecedent and consequent, but there is no overt modal *will* or *would*. Intuitively, this conditional denotes the proposition that in all worlds compatible with what we know in which Marcus left at a past time, then Emily followed him at a past time. I would argue that the covert modal[5] in this example is a present universal modal (roughly equivalent to *must*), and that its tense argument cannot determine the morphology of the antecedent and consequent. Essentially, the tenses in the antecedent and consequent of a past indicative must either be deictic tenses, not bound tenses, since they do in fact refer to a salient past time, or the consequent's past tense can be bound by the tense of the antecedent. The tense on the modal itself is impossible to determine without serious probing, but if we want to maintain that modals have temporal arguments, and the accessibility of this arguments is ostensibly compatible with what the

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[5]It is fairly standard to assume that when there is no overt modal in a conditional there is still a covert modal (Kratzer, 1986)

speaker knows now, not in the past, then possibly we would want to say that it is a present tense covert modal. I will not endeavor to explore non-*woll* conditionals henceforth, but it is worth noting that their denotation, while not falling out from Arregui's system, are not necessarily incompatible with it.

What remains for Arregui is an analysis of what the high past tense (that is, the semantic past that is the temporal argument of the modal) actually means, and why it is important that it be a real past. Arregui's principle argument is that the past tense determines the similarity relation that governs the choice of accessible possible worlds. Arregui's desiderata include a theory will incorporate a true past that will enable appropriate world selection.

The classic arguments for and against similarity as a measure used to determine accessible worlds comes from the following sentence (which future semanticists might want to change, as the example will continue to lose relevance as time marches on):

(18)   If Nixon had pressed the button, there would have been a nuclear holocaust.
        (Fine 1975)

Assume for the moment that this counterfactual is true (as many accept it to be). Under a similarity analysis, this counterfactual will only be true if in all worlds that are as similar to the actual world as possible in which Nixon pushes the button (the worlds the modal quantifies over), there is a nuclear holocaust in those worlds.

In an argument against similarity as the measure of determining closest accessible possible worlds, consider relative similarity to the world as we know it. Let us assume that Nixon pushed the button, and there has been a nuclear holocaust. Call this Scenario One. Then, for Scenario Two, assume that Nixon pushed the button, but due to an electrical wire having been cut, the signal does not go through and we do not end up with a nuclear holocaust. Both scenarios include a button pushing. The first results in a nuclear holocaust, as the counterfactual would predict, and the second does not. The quandary is that Scenario Two is far more like the actual world than Scenario One. We know that there wasn't a nuclear

holocaust, so in assessing the worlds across time, we end up with a similarity problem. Even though the counterfactual is judged true, a more similar button-pushing world exists in which there is **not** a nuclear holocaust.

There are many possible ways to remedy this problem and maintain a similarity approach to conditionals. Lewis chooses to assess similarity as a matter of overall similarity, and puts constraints on what counts toward similarity, as well as what appropriate deviations are, as discussed in Chapter 2. However, Arregui wants to adapt this claim to say that for *would* conditionals, what matters is not similarity to the actual world in general, but rather similarity to the actual world in the past of the antecedent, such that the only facts that matter are those in the past of the antecedent event. Therefore, in the above two scenarios, Scenario One is more like the actual world past than Scenario Two, since in Scenario Two, the wire was cut in the past of the antecedent time – that is, the wire was cut before the button was pushed, and the button-pushing is the antecedent event. So this world in Scenario Two is unlike the actual world at a time before the antecedent time. Therefore, for Arregui, past-ness is crucial to the calculation of similarity.

Furthermore, it may be the past tense itself that licenses counterfactual worlds (Iatridou, 2000). The data point in (19) (originally from Adams (1970)) supports this hypothesis:

(19)   a.   If Oswald didn't kill Kennedy, someone else did.
         b.   If Oswald hadn't killed Kennedy, someone else would have.

Most speakers accept (19a) but reject (19b). Knowing that Kennedy was in fact shot, in (19a) we are happy to consider that someone else did it, but in (19b) we like to think, given the antecedent, that maybe no one would have shot him at all. While the presence or absence of a modal is clearly a major difference between (19a) and (19b), Arregui claims, based on the following data point, that it is the past-ness, in particular, to the modal that licenses the accessibility of non-actual worlds in which Kennedy is not shot at all. Therefore, it is not

the modal alone, but the modal along with its tense that licenses accessibility of non-actual worlds.

(20)   a.   He is not living in her house. #If he is / has been living in her house, she will have told her parents.

            b.   He is not living in her house. If he were / had been living in her house, she would have told her parents.

In (20), both conditionals have a modal, but only the past tense modal licenses the consideration of non-actual worlds. This difference extends to non-past *would* conditionals as well (see Arregui 2005 p 33 for examples).[6] The data in (20a) is a well-known phenomenon in the philosophical literature (Bennett 2003). According to Bennett, indicatives are called "zero-intolerant" and are intolerant of their antecedent have 0% probability, while subjunctives are the opposite and typically require that their antecedent be known or believed to be false. Since the difference between subjunctivity and indicativity is here given to be the difference between a past or present tense on the modal, respectively, this boils down to the same point. The past tense licenses the accessibility of non-actual worlds.

Therefore, since past tense is a sort of privileged tense within counterfactuals, it is the past tense that determines which worlds are are sufficiently similar to the actual world, and it is also the past tense that allows us to look at worlds that do in fact differ from the actual world in some way. Arregui's analysis accounts for both of these properties, and I will present how it achieves this formally shortly.

In order to understand Arregui's analysis, we need another piece of machinery: **counterparts**. Arregui's counterparts are an adaptation of Lewis's (1971) counterparts, used to solve problems of trans-world identity. The idea is that an individual only exists in one world. Therefore, when a person hypothesizes about how an individual could or would be different (at another possible world), they are really hypothesizing about how that individual's

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[6]Arregui leaves open the matter of what happens when there is a present modal, *will*. I will attempt a possible extension of what I believe Arregui would have intended for present modals in Chapter **Analysis**.

counterpart at that world is different from the individual in the world under discussion. So a modal claim about an individual, a *de re* modal claim, as it must be for a real world individual, turns into a non-modal claim about that individual's counterparts. To use Arregui's excellent example, consider the actual-world winner of the last presidential elections:

(21)   The winner of the last presidential elections could have lost.

This is argued to be true if and only if the actual-world's winner has a counterpart at a close enough possible world who loses. This example shows that what is relevant is the individual; it is certainly not claiming that a possible world's winner lost. It can only mean that the actual world's winner's counterpart lost. Like accessible possible worlds, the counterpart relation depends on similarity. Intuitively put, a counterpart is a person who, as far as we are concerned, could have been the individual we are talking about in the actual world. This is a heavily context-dependent relation, and I will (as Arregui did) leave it up to context of utterance to determine what counts as sufficiently similar. See her paper for some examples. The crucial innovation of Arregui's theory is that individuals are not the only semantic objects with counterparts. She argue that events and histories[7] also have counterparts. For now the relevant part is histories.

A history, as far as this theory is concerned, is not just a span of time. So when I say that the actual world past has a counterpart in another world, I do not mean that there is a set of times equivalent to the set of times preceding now. Rather, a history is a complete set of truth values for propositions spanning a continuous stretch of time. So the actual world past includes truth values for any proposition about any event or state that transpired or is hypothesized to have transpired before now in the actual world. Therefore, it will assign a value of true to *Disney's "The Little Mermaid" was released in 1989* and a value of false to *The Loch Ness Monster's existence was scientifically proven in 2013*.

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[7]Arregui actually claims that times have counterparts, but the term "history" fits better with the idea that all of the facts of the actual world past are included, and the term also fits better with other literature on the idea.

This understanding of counterparts is necessary because Arregui's analysis of counterfactuals is that they are making *de re* modal claims about the past. Counterfactuals follow this basic formula: *if the actual world past came before some time interval with the property X, it would also have come before a time with some (other) property Y.* Let me use a variant of (4a), as Arregui does, as a concrete example.

(22)   She doesn't love him. If she loved him, she wouldn't have married him.

So (22) is true if and only if in all worlds in which the actual world past had led to her loving him, it would also have led to her not marrying him. The actual world past is **not** one that has led to her loving him, as stated in the first half of (22): *She doesn't love him.* But, given the analysis of counterparts, it doesn't matter if the actual world past is such a past. What matters is whether or not in all sufficiently close actual world past counterparts, that is, counterparts to the history of the actual world that extends backward in time from the utterance time, have the relevant property of her-loving-him. The claim, then, is that we assess past similarity using the usual contextual parameters, and find all of the most similar past counterparts in which she loves him. Then, if all such counterparts also lead to her not having married him, the counterfactual will be judged true.

This explains the function of the past tense in counterfactual conditionals; it allows the speaker to make claims about worlds with a past that is like the actual world past, as they must be to qualify as counterparts to the actual world past, but also as they are only counterparts, they can differ from the actual world in ways that allow hypotheses about counterfactual claims. This explains why the past is so important and why we use a past tense modal for counterfactual conditionals. Given that we are assuming a theory of tense in which the antecedent tense is a bound tense that gets its morphological form from the modal, this also explains why there is past tense morphology in the antecedent of a counterfactual. Given the real past tense c-commanding the modal, the variable tense of the antecedent, the fact that this antecedent property of times is the first argument of the modal, and that the

real past anchors the counterfactual with respect to counterparts of the actual world past via similarity, Arregui posits the following denotation for the modal, in which I've highlighted the portion representing the world counterparts relation that we are concerned with:[8]

(23) a. $[\![woll\text{-}t_i]\!]^g : \lambda P_{\langle i,\langle s,t \rangle \rangle} \lambda Q_{\langle i,\langle s,t \rangle \rangle} \lambda t \forall w [\,\exists t'[t' \approx t\ \&\ t' \triangleleft w]\,\& P(g(t_i))(w) \rightarrow Q(g(t_i))(w)]$

where g is an assignment function, and $g(t_i)$ is restricted to non-past times.

  b. **English gloss**: *woll takes as arguments P (the antecedent), Q (the consequent), t a time. Then woll(P, Q, t) is true iff for all worlds w that have a counterpart to the actual world past in which the antecedent P is true at a non-past time t_i, the consequent Q is also true at a non-past time t_i in w.*

First I will dissect the intended meaning of the above denotation, and then I will briefly note an update Arregui has made to the denotation in later work (2008a, 2008b, 2009).

First, the meaning of (23a): *woll* takes two properties of times and a time as its arguments. It composes first with the antecedent, then the consequent, and finally the time (which in for *would* conditionals will always be past). Ignore the highlighted clause for the moment. Then, notice that the modal comes with a a temporal index restricted to non-past

---

[8]This is actually my understanding of Arregui's denotation, in which the formalism has been slightly changed. Arregui, even in newer work, uses $<$ for two different relations: that a situation (which can be roughly thought of as something that includes information about both worlds and times; I'm not going to use situations so I will not explore them here) can be part of another situation, and that a situation can be part of another world, both meant as versions of the first relation, what she calls the modal part-of relation. Here is a quote from the 2008a paper:

> Following Lewis, situations (as individuals) are identified in other worlds via counterparts. I will say that a situation in the actual world is part of another world (not in a strict k-sense) to claim that the actual world situation has a counterpart in another world. Imagine that s is a situation in the actual world, and s' is a situation in another world, then:
>
> (8) $s < s'$ iff s has a counterpart in s'

There is also a mereological part-of relation, which is also denoted using $<$, which means that a time is a part of the world in which it exists.

Therefore, I am disambiguating by using $\triangleleft$ to represent only mereological part-of; If $t \triangleleft w$, then t is a time slice of w, and exists only in w. For counterparts, I will use the symbol $\approx$ to represent the relation. $t' \approx t$ means that t' is a counterpart of t.

times (the t_i that is part of the lexical entry for *woll*). This same t_i is the temporal argument for both the antecedent and consequent. This means that the time pronoun that comes with the modal restricts the temporal evaluation of both of the modal's non-time arguments, and in particular, this temporal pronoun is restricted to non-past times. So the antecedent and consequent must both take place at non-past times.

This may seem counterintuitive at first, since some of the examples given throughout this chapter occur in the past ((4b), (18), (19b)). All of these, though, have perfect aspect (non-modal *have*) in the clause that is evaluated at a non-past time. If an event has perfect aspect, this indicates that it occurred before the reference time (Comrie 1976).

(24) a. Camryn had left when Karl entered. (leaving event precedes entering event).

   b. Martha has eaten lunch already. (lunch eating precedes the speech time)

   c. If by the time Josh arrives Kady has already finished the assignment, he will be relieved. (finishing event precedes arriving event)

In counterfactuals, an antecedent or consequent with perfect aspect will indicate that the event of that proposition occurred before t_i. Since t_i is contextually valued and always non-past, this means that the proposition with a perfect happened before some non-past time, which leaves open the full range of temporal possibilities. Before the future is the future, present, or past, and before the present is past, so this restriction to non-past times of t_i actually fully captures the earlier generalization that past perfect antecedents can refer to events in the past, present, or future. Allow me to show this via a time-line diagram. As (25) shows, the past relative to a non-past time is any time compared to the utterance time.

(25)   .

$w_@$ ----------|-------------------||-------------------|-----------------|----------------

Above the line, from left to right:

(past) past of t_i (present) past of t_i (future) past of t_i non-past t_i
UT
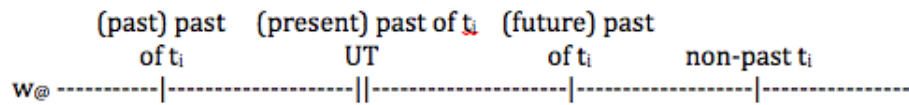
Where UT is the utterance time, and t_i is the non-past time
argument supplied by the modal.

Notably, in Arregui's analysis, the past tense that c-commands the whole counterfactual does not value the temporal arguments of either the antecedent or consequent. The past of the modal shows up only in the highlighted clause that I will explain momentarily which is the clause that restricts the accessibility of possible worlds; this accessibility relation restriction is the effect of tense on the modal. Of interest is the fact that Arregui's modal doesn't actually have an overt accessibility relation, R. It is my understanding that either the counterpart relation is meant to supplant this accessibility relation and that it provides worlds that are accessible instead of an accessibility relation, or that Arregui hasn't overtly represented an accessibility relation that is nonetheless present, and the past tense contributes a clause that restricts the accessible worlds in the same way that the antecedent does. Either way, present and past tense on a modal will lead to different accessible worlds. As I inherit this ambiguity, I will be assuming the latter approach. The past tense adds a clause the restricts the worlds that are accessible, completely parallel to the way that the antecedent clause restricts the accessible worlds.

In particular, the real past tense that c-commands the modal is meant to restrict the domain of quantification of the modal to quantify over possible worlds that have a counterpart of the actual world past, shown in the denotation as possible worlds in which there is a time (history) to which the temporal argument (actual world past) bears the counterpart relation ($\approx$). Recall that times pick out a part of the history of a world, and as such have counterparts in possible worlds. Real past is represented by $past_0$, the past history of the actual world. This part-of relation is represented in the denotation by ◁.

Arregui's intention is that for *would* conditionals, the modal *would* quantifies over worlds that have a counterpart of the actual world past; that is, it should quantify over worlds that have a counterpart of the actual world past as *part-of* them ($\triangleleft$). Therefore, as written, we have that the t tense that is c-commanding the modal must have a counterpart time t' such that this t' is a mereological part of each possible world that is in the quantificational domain of the modal. It is important to note that this account departs from variably strict accounts of Lewis/Stalnaker/Kratzer by searching for all sufficiently similar antecedent worlds rather than just the closest antecedent worlds. This is a different quantificational structure than the variably strict accounts.

In her newer work (2008a, 2008b, 2009), Arregui uses situations (in particular, the Kratzer 1989 type of situation) rather than worlds and times, to account for counterfactuals and counterparts. I will not be switching to a situation-type analysis, but naturally a change to situations is equally possible for the updates that I will add to the Arreguian system as well.

So, the modal quantifies over worlds that have a counterpart of the actual world past, and the conditional will be true as long as all such worlds in which the antecedent is true at some non-past time, the consequent is also true at some non-past time.[9] Let me show a derivation, in this case, for (4a).

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[9]I'm not sure if these have to be the same time. It seems so, but I don't think that is desirable. For example, in *If Nixon had pushed the button, there would have been a nuclear holocaust*, the times of the events of the antecedent and consequent are not identical. Presumably the nuclear holocaust occurs after the button pushing. However, in the system that Arregui gives, it is not clear if the t_i's in the antecedent and consequent can be different times. I will assume that each t_i can refer to its own contextually salient non-past time.

(26) a. If she loved him, she wouldn't marry him.

  b. *The antecedent*

   ⟦ if she loved him ⟧ = $\lambda t\lambda w$[she-love-him at t in w]

  c. *The conditional*

   Where t is a non-past time,

   ⟦ if she loved him, she wouldn't marry him ⟧^{w_0} = 1 iff

   $\forall w[[\exists t'[t' \approx \text{past}_0 \ \& \ t' \lhd w] \ \& \ \text{she-love-him at } t_i \text{ in } w]$

   $\rightarrow [\text{not she-marries-him at } t_i \text{ in } w]]$ (Arregui's ex 34)

According to (26), (4a) is true if and only if for all worlds that have a counterpart to the actual world past and in which she doesn't love him, she doesn't marry him in those worlds. For a world to have a counterpart to the actual world past, its past needs to be sufficiently close to the history that comprises the history of the actual world past with the exception that she does love him. I've now presented the full theory of *would* conditionals that I will be taking as the base for my theory, the changes for which are presented at the end of this chapter. I've shown that in this account, tense is interpreted in a referential theory of tense, antecedent past tense is a zero tense that gets its time argument valued by a non-past time supplied by the modal, and that counterparts to the actual world past are used to compute similarity for the evaluation of *would* conditionals.

With the analysis of *would* and the past in place, I can now present Arregui's generalizations from Chapter 2, and show how the analysis comes up short to analyzing the new data I have presented in Chapter 3. Before doing so, though, I would like to call the reader's attention to the fact that this analysis is very similar in some critical ways discussed so far to the analysis presented in Ippolito 2003. Therefore, I will take a minor detour into Ippolito's analysis to point out the similarities and differences. Ultimately, I will continue forward with Arregui's analysis.

4.1.2 Ippolito's Analysis of Past Tense in Modals

While Ippolito and Arregui approach counterfactuals from very different perspectives and use rather different analyses, interestingly, they come to a similar position on the role of that past in the similarity relation. Ippolito is concerned only with conditionals whose antecedent has a past perfect verb, as in *If he had rolled a five, then she would have won.* The fact that Ippolito is interested in is that what distinguishes this type of conditional from others is that the antecedent contains both a past tense insofar as *have* is not *have* or *has*, the present tense forms, but rather as *had*, the past tense form, and a second past tense attributed by the perfect. If the antecedent were not in a conditional the proposition would denote an event that is in the past with respect to another salient past event, as described in the discussion after (24). So instead of focusing on the tense on the modal, Ippolito accounts for counterfactuality by accounting for the multiple pasts in the antecedent, while Arregui assumes that the morphological past on the antecedent is just a reflex of a higher past tense, and that the other is an aspect that plays into her analysis cleanly, as shown in the diagram in (25). Nonetheless, one of the main principles of each analysis comes down to the same thing: past tense constrains which worlds are accessible by the accessibility relations.

The examples Ippolito uses are called **mismatched past counterfactuals**, because the tense on the verb is the past, but the adverbials makes it clear that the event with past morphology takes place in the future. Here is an example.

(27)   If Charlie had taken his Advanced Italian test tomorrow, he would have passed. (Ippolito example 3)

Notice that like in many backtracking examples, here a past subjunctive conditional is used to talk about the future. The Ippolito (2003) account argues, following Iatridou (2000) and others, that when there are two pasts in a conditional, one introduces the modality (quantification over possible non-actual worlds) required for the interpretation of the conditional, a point which differs from Arregui's perspective, as she believes that the modal itself is respon-

sible for the possible worlds part of the semantics, and that past just influences the worlds accessible to the modal. For Ippolito, then, only the second past is unaccounted for. Ippolito proposes putting it into the accessibility relation. This is a notion quite like Arregui's idea that the past needs a counterpart: that is, past constrains similarity. Accessibility relations are usually thought to be a relation between possible worlds. Ippolito wants accessibility relations to be a relations between world-time pairs and worlds:

> Knowledge, beliefs, plans, desires, and other human attitudes change over time. Therefore, the set of worlds over which modal operators quantify will depend not only on what the actual world is but also on what the time of evaluation is. What I know, believe, plan, or desire may be different from what I knew, believed, planned, desired in the past. Therefore, what was compatible with knowledge or beliefs or plans *then* may be incompatible with knowledge, beliefs, or plans *now*. (page 155)

So an accessibility relation is an $R \in D_{\langle\langle s, \langle i, \langle s, t, \rangle\rangle\rangle\rangle}$. Time and world of evaluation will default to utterance time and the actual world respectively, but both can be bound/specified otherwise. Ippolito labels the world and time of evaluation w_1 and t_2. Ippolito assumes the following structure for counterfactuals:

(28)
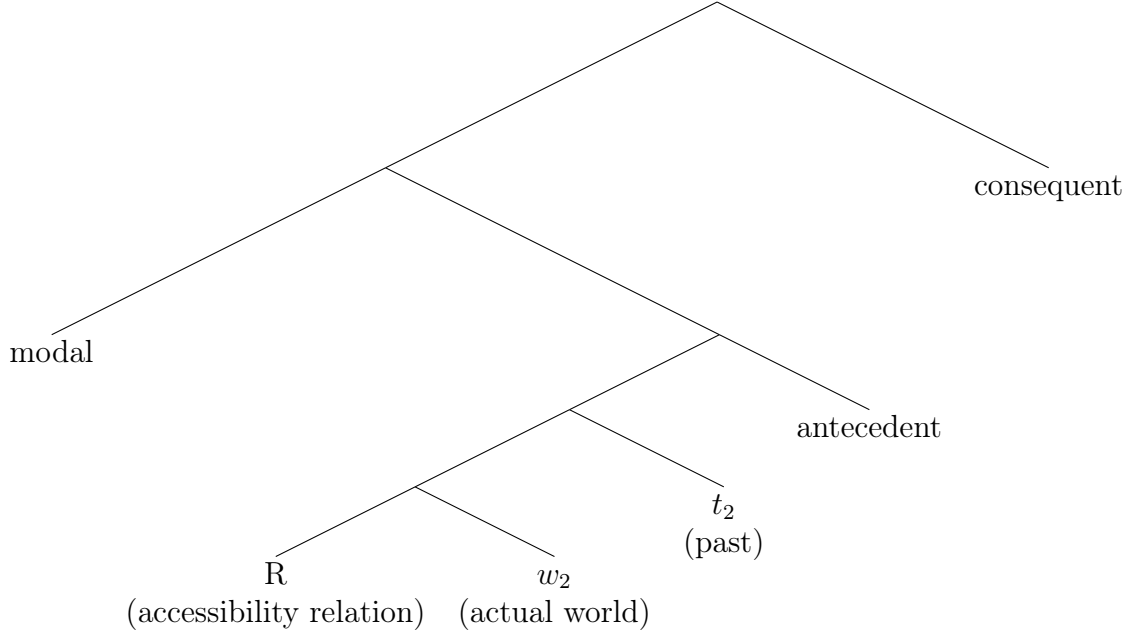
In this structure, the accessibility relation is composing with a past tense, which for Ippolito is one of the two pasts that we see on the antecedent. So for Arregui, the past tense that constrains similarity is the past tense from *would*, while for Ippolito this same function is supplied by one of the pasts on the antecedent. Continuing with Ippolito, the accessibility relation then composes via predicate modification with the antecedent. This composition is what the modal takes as its restricting argument. Therefore, (27), repeated below in (29), would be given the denotation in (33), given the definition of *would* as is given in (30), a denotation for the t_2 (past) in the above tree as in (32), and a denotation of R as in (31).

(29)   If Charlie had taken his Advanced Italian test tomorrow, he would have passed.

(30) $[\![would]\!] = \lambda p \in D_{\langle s,t \rangle} \lambda q \in D_{\langle s,t \rangle}.\forall w \in W[p(w) = 1 \to q(w) = 1]$[10]

(31) $R = \lambda w \lambda t \lambda w'.w'$ is compatible with what the speaker knows in w at t.

(32) $[\![t_2[\text{past}]]\!]^{g,c} = $ defined only if $g(2) < t_c$, then $[\![t_2[\text{past}]]\!]^{g,c} = g(2)$

(33) $[\![\ 20\ ]\!]^{g,c} = 1$ iff $\forall w \in W[w$ is accessible from w_c at g(2) and Charlie takes his Advanced Italian test tomorrow in $w \to$ Charlie passes in $w]$ *defined only if* $g(2) \triangleleft t_c.$

That is, (33) will be true if and only if for all accessible worlds at time $g(2)$, $g(2)$ a relevant past time, if Charlie takes his test tomorrow in those worlds he also passes in those worlds. What is different about this from other analyses? The fact that the accessibility is at a past time. That is, you can go backward to a time before the antecedent time and see what is accessible then. This idea matches up with Arregui's idea of past counterparts: both allow the speaker to consider things that are different from the actual world at a time before the antecedent time. For a more in depth presentation of this analysis, please see the original.

I conclude that it would be feasible to pursue an analysis of backtracking in Ippolito's framework, and I see pros and cons of both it and Arregui's analysis. They have much in common, but are clearly different theories in terms of where the past tense comes from, as well as other specific details that I have not covered here. As a pro for Ippolito, her theory does not rely on sequence of tense, and so it would potentially work better for languages like Hebrew, as well as any others that have multiple pasts in the antecedent of a counterfactual without being an SOT language. However, the con of this is that Ippolito does not account for the tense on the modal in any way. There is no relation between counterfactuality and *would*, which I think is a major strength of Arregui's analysis. While I'm certain both analyses could be adapted to account for the backtracking data, I am going to continue with Arregui's analysis.

4.1.3 Arregui's Backtracking Analysis

With all of the pieces in place, I can now extend Arregui's analysis of the past to something that can account for backtrackers.

Let me start by reminding the reader of Arregui's three generalizations, with the language reformatted to match my new terminology from Chapter 3:

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[10]This is actually the denotation that Ippolito gives for *must*, but she uses it for *would* as well without discussion of there being any difference, so I assume she would accept this as her denotation.

(34) a. **Generalization 1**: Backtracking counterfactuals with normal syntax can be judged straightforwardly true if the relation between antecedent and consequent is analytic/logically necessary.

  b. **Generalization 2**: Backtracking counterfactuals with extra modal syntax can be judged true if some salient law establishes a relation between antecedent and consequent.

  c. **Generalization 3**: Cases in which extra modal syntax does not help with backtracking counterfactuals are cases in which there is no (salient) law or regularity to be invoked by *have to*.

As I showed in Chapter 2, backtracking is a problem in general for a theory of conditionals that is built in a Lewis/Stalnaker framework. In contrast, notice that there is nothing inherently difficult about backtracking for Arregui's analysis. Past similarity is more flexible than the similarity required in a Lewis/Stalnaker approach because Arregui allows for close enough similar worlds (relative to the past) as opposed to closest worlds (relative to overall similarity), and whether the antecedent comes before or after the consequent is irrelevant. The way that flexibility in the past is built into her analysis leads to a view that is very different from Lewis: the point of counterparts is that they allow for worlds that are sufficiently close which in turn allows for more deviation from the actual world past than is acceptable in a Lewisian approach in which only the closest worlds factor into the truth conditionals of a condition. For Arregui, context determines whether a past is close enough to count as a counterpart, and close enough is the important phrase there. Many things will be close enough that are not necessarily equally close. The notion of counterparts is built on similarity, but it is context dependent as to how similar the speaker required the pasts to be. Therefore, in a way, it may be surprising instead that backtracking is ever unacceptable. Therefore, let me start with an example of backtracking that is considered unacceptable without the aid of EMC syntax.

(35) a. If she had eaten pudding, it would have been made without gelatin.

b. *Where t_i is a non-past time*

$\llbracket$ *If she had eaten pudding, it would have been made without gelatin* $\rrbracket^{w_0} = 1$ iff

c. $\forall w[[\exists t'[t' \approx past_0 \ \& \ t' \lhd w] \ \& \text{ she has eaten pudding at } t_i \text{ in } w] \rightarrow$
[the pudding was made without gelatin at t_i in w]]

d. *if and only if for all worlds that have a counterpart to the actual world past in which she has eaten pudding at a non-past time, then the pudding was made without gelatin at a non-past time.*

The antecedent proposition will be true in a world w if she has eaten pudding at some non-past time t_i in w. The domain of quantification of the modal includes all worlds that have a past that is counterpart to the actual world past such that at this non-past time t_i she has eaten pudding. Then, the conditional is true if and only if these worlds are all worlds in which the pudding was made without gelatin. The reason this is not judged true is that the counterpart relation will prefer worlds that are like the actual world in gelatin use, and as such, some of the pudding-eating worlds will made-with-gelatin worlds, and we will have to conclude that she ate the gelatin for some reason or other. Maybe she didn't know, or didn't want to offend her hosts.

Notice something interesting here: only some of the pudding eating worlds are made-with-gelatin worlds. This is because in Arregui's system, there aren't closest worlds, just close enough worlds. So while some worlds without gelatin use are close enough, then there are certainly close enough with-gelatin worlds since with-gelatin worlds are more similar that gelatin-free worlds. And therefore the counterfactual is judged false.

Now that it's clear why some backtrackers are bad without EMC syntax, let me show Arregui's accounts for each generalization within this system in turn. First, why are analyticals good without EMC syntax? Recall, that analyticals are not problematic for an overall similarity approach, but it is still necessary that the current analysis is able to account for them too, so (36) is a derivation of such a backtracker:

(36) a. If she were president, she would have won the last elections.

   b. *Where t_i is a non-past time,*

       $[\![$*If she were president, she would have won the last elections*$]\!]^{w_0} = 1$ iff

   c. $\forall w[[[\exists t'[t' \approx past_0 \ \& \ t' \lhd w]] \ \& \ \text{she is president at } t_i \text{ in } w] \rightarrow$

       $[\text{she has won the last elections at } t_i \text{ in } w]]$ (A36)

   d. *iff for all worlds that have a counterpart to the actual world past in which she is president at a non-past time, she has also won the last elections at a non-past time.*

Again, the accessible worlds are constrained with respect to the relative similarity of the counterparts. Therefore, the accessible worlds will have counterpart pasts in which she is president at t_i. If the counterpart past were to be as close as is logically possible to the actual world past, the counterpart past would agree with the actual world past regarding her not having being elected. However, due to the definition of president, in any world in which she is the president she must have been elected, and so the past must have been one in which she was elected, definitionally, and so all close enough pasts will be those in which she won the elections, and the counterfactual will be judged true. This account comes up against the same problems that all similarity based approaches come up against. For example, here, why is it a close enough past for her to have been elected, as opposed to ascending to the presidency via presidential death and vice presidential responsibilities. Arguably this is because presidents standardly come to power by election, and so vice-presidential-ascension-world would be a less similar world than an election-world, inherently.

Given the fact that (35) gets the wrong truth conditions for the backtracking counterfactual, I will now show Arregui's insight into EMC syntax. First, she starts with the assumption that *have (to)* is a modal; clearly I agree with her (I do call it extra *modal* syntax when *have to* is used). In Arregui's analysis, *would* quantifies over worlds that contain a counterpart to the actual world past in which the antecedent is true, and then *have to*

predicates something additional about these worlds. Basically it makes a modal claim about the worlds accessible to such world: those in which the laws are followed.

Modal *have* is a universal quantifier over possible worlds, like *would*. Unlike *would*, though, the quantificational domain of *have* is determined by a contextually salient accessibility relation that does not have to deal with similarity in the past. The nature of the relation can vary a bit, as *have* can have several different meanings, the following three are a sample of which (types of modality are taken from Arregui).

(37)   a.   She has to go.   (Circumstantial)

          b.   She has to know.   (Epistemic)

          c.   She has to pay a parking ticket.   (Deontic)

So while the similarity to the past is fixed for *would*, the accessibility relation for *have to* is more context dependent.

Arregui suggests the following as the denotation of *have*:

(38) $[\![\text{ have}_{mod-R}]\!]^g(P_{\langle i,\langle s,t\rangle\rangle})(t)(w) = 1$ iff

        $\forall w'[g(R)(t)(w)(w') \rightarrow \exists t'[(t = t' \text{ or } t < t') \& P(t')(w')]],$

        where R is of type $\langle i, \langle s, \langle s, t\rangle\rangle\rangle$ and g(R) is a contextually salient temporally sensitive

        accessibility relation.[11]

        English gloss: *'have to P' is true at a time t and a world w iff for all worlds w'*

        accessible to w at t, there exists a non-past (with respect to t) time t' such that P

        holds at t' in w'.

To break it down, the modal comes with a free variable accessibility relation R presupposed to to be contextually available. This R is temporally sensitive, so it takes a time and a set of worlds and returns a set of worlds that must meet a particular property. The time argument of *have to* provides the time of the accessibility, not the time of either the

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[11]In this denotation, $<$ represents temporal precedence, so either t' is cotemporal with t or t precedes t'.

antecedent or consequent. It comes down to when things were necessary, not when they were or were not executed. Evidence for this comes from the basic contrast between:

(39)   a.   She has to leave.

       b.   She had to leave.

With both examples, regardless of when she leaves or doesn't leave, the tense locates the time of the obligation; in (39a) there is a current necessity, while in (39b), the necessity sits in the past. So regardless of the time of the necessity, *have to* combines with a property of times, where that property of times is located at some time t' that is non-past with respect to t.

With the definition of *have to* laid out, Arregui is now in a position to show the compositional effect of *would* and *have to*. Let us return to pudding and vegetarians, where (41) is a loose version of the LF of the consequent of (40):

(40)   If she had eaten pudding, it would have to have been made without gelatin. (A42)

(41)   [would [have$_{mod-R}$-to [have$_{perf}$ [the pudding been made without gelatin]]]] (A49)

The consequent has two modals: *would* and *have to*. The first modal has already been restricted by the antecedent clause to all of those worlds with actual world past counterparts such that she has eaten the pudding at a non-past time. There will be worlds in this set of worlds in which the pudding was and was not made with gelatin, since in the actual world it was made with gelatin. *have to* predicates a modal property of these worlds, namely that in the law-like worlds accessible to these worlds, the pudding has been made without gelatin at some non-past time, the relevant law being that vegetarians don't eat gelatin. So this conditional does not in any way assert that the pudding was made without gelatin in all pudding-eating worlds; rather it asserts that in all pudding-eating worlds, it **should have** been made without gelatin, if rules are being obeyed.

Allow me to present some final details of Arregui's theory, but I refer you to the original for the details. *have to* cannot make accessible worlds that are incompatible with the actual world, so it is the *would* that is doing the counterfactual heavy lifting, and as such, it is definitely restricted by the if-clause. As to whether *have* is restricted by the if-clause: the laws used by *have* lead to two kinds of law abiding worlds: those in which pudding is made with gelatin and not eaten, and those where pudding is made without gelatin and eaten. In order for the truth conditions to come out as expected, the modal only accesses the latter, and this is taken as evidence that *have to* is restricted by the antecedent in addition to *would* being restricted by it. Given this conclusion, Arregui claims that, while she does not pursue the option, this is evidence for a dynamic account of backtracking counterfactuals. Essentially, in order for the antecedent to compose with both modals, a dynamic analysis is needed. I do not agree. If the higher modal composes with the antecedent, and then with the lower modal, then the lower modal has access to the antecedent as well. Worlds that the lower modal has access to will already have been restricted by the antecedent, and so by nature the antecedent restricts both modals. Therefore, I argue that there is no evidence thus far that a dynamic account is necessary. That is not to say that a dynamic account would not work – I simply will not pursue one.

And there, in a rather large nutshell, is Arregui's full account of how backtracking is possible. Given the data that I presented in Chapter 3, this analysis will not be sufficient to account for all of the backtracking data, or for a more general usage of *have to*. Before I show where Arregui's analysis of backtracking needs an update, I will diverge slightly from the seemingly necessary path to share Arregui's analysis of the effect of aspect on *would* conditionals in §4.1.4. While I do not pursue the effect of aspect on counterfactuals in my analysis, as they are not central to my data, I will consider and ultimately reject this analysis in my analysis of statives. In §4.1.5, I will continue with covering some areas of Arregui's analysis of backtracking that need expansion or change if all of the data is to be accounted for.

4.1.4 Arregui's Analysis of Aspect

This analysis is an amalgamation of Arregui's original implementation of her take on aspect (Arregui 2005) along with a later update (Arregui 2006b). Both are concerned with the differences between examples of the following two varieties:

(42)   She made her first souffle last Tuesday. If she had made her first souffle next Tuesday, she would have had help from her mother in law.

(43)   #She made her first souffle last Tuesday. If she made her first souffle next Tuesday, she would have help from her mother in law.

Arregui will argue that (42) includes quantificational aspect which comes from the perfect, and (43) has referential aspect, which is from the default perfective. Perfect aspect indicated that the event in question occurred before some other reference event, while the perfective aspect indicates that the event is being viewed from the outside and is considered finished. In English, the perfect is marked with the verb *have* and an *-en* suffix on the main verb, while the perfective is usually marked with the simple past.

Arregui uses data like (42) as an argument against Iatridou 2000. Iatridou's analysis in a nutshell extended to examples like (42) would say that there are two pasts in the antecedent: one indicates that the event is in the past, and the other indicates that it occurs not in the actual world. Each past shifts the interpretation away from the here and now. However, the counterfactual in (42) clearly occurs in the future, and so this account cannot be sufficient to account for the data.

Arregui's analysis is an adaptation of Kratzer (1998), in which aspectual heads map properties of events to properties of times. The syntax that she assumes for aspect is the following:

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(44)
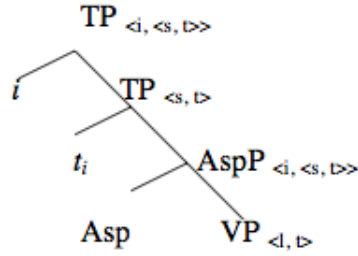
As with her referential theory of tense, events are also characterized by event variables that belong to only one world, and event pronouns are variables over events. Deictic event pronouns refer to events in the actual world. Just like with tense variables and times, events can be identified across worlds with counterparts, but the counterpart relation is fairly strict: the events must match spatiotemporally to count as counterparts. Given these assumptions, Arregui claims that perfective aspect anchors antecedent clauses to the actual world, while perfect aspect does not.

The perfect existentially quantifies over its event as in (45), and given the loose denotation of would as in (46), the antecedent of the counterfactual in (42) has a denotation as in (47).

(45) $[\![perfect]\!](P) = \lambda t \lambda w \exists e[P(e)(w) \& \tau(e) < t]$

(46)   Where t_i is a contextually salient non-past time and P and Q are properties of times, $[\![would]\!](P_{\langle i,\langle s,t\rangle\rangle})(Q_{\langle i,\langle s,t\rangle\rangle})(w) = 1$ iff the most similar worlds to w in which $P(t_i)$ is true are also worlds in which $Q(t_i)$ is true.

(47)   For some non-past time t_i,
        $\lambda w \exists e[\text{she-makes-her-first-souffle}(e)(w) \& \text{next-Tuesday}(e)(w) \& \tau(e) < t_i]$

The notable part of (47) is that it says that there is *some* event of first time souffle baking that takes place next week, and this then excludes souffle baking last week, and so we are allowed access to genuinely counterfactual worlds: in the real world, souffle baking occurred

last week, but in the worlds quantified over, it didn't. Hence, (42) succeeds in making the intended counterfactual claim.

The difference between (42) and (43) comes down to just the aspect. In (43), the perfect is lacking, and there is instead default perfective aspect,[12] (48), which makes direct reference to events in the actual world. It is this direct reference, as opposed to the quantification of the perfect, that prevents the desired counterfactual reading in (43).

(48) $[\![perfective - e_i]\!]^{g,w_0} = \lambda P \lambda t \lambda w[P([\![e_i]\!]^{g,w_0})(w) \& \tau([\![e_i]\!]^{g,w_0}) \subset t]$

This denotation introduces a free event pronoun which must be interpreted in the actual world, per the definitions of how event pronouns work, and it is assigned by the assignment function g. Given a particular property of events P, perfective is true of a time in a world if and only if the relevent assigned event e_i has the P property in the given w's and has a run time included in the t times. Therefore, the antecedent of the conditional in (43) has the following denotation.

(49)   For some non-past time t_1

         $\lambda w[\text{she-makes-her-souffle}([\![e_i]\!]^{g,w_o})(w) \& \text{ next-Tuesday}([\![e_i]\!]^{g,w_o})(w) \& \tau([\![e_i]\!]^{g,w_0}) \subset t_i]$

By definition, this e_i must identify an event in the actual world, and as such it can only be identified in other worlds via counterparts. Since counterparts are identified by spatiotemporal identity, though, all worlds that have an event counterpart to the actual world will have her making her first souffle last Tuesday, and so (49) will not be true in any worlds, and hence the infelicity of (43).

This view of aspect and event pronouns resolves the differences between (42) and (43) and helps to explain why the perfect is used for true counterfactuals in ways that the simple past cannot be used. Arregui has further notes on how this aspect difference affects the interpretation of statives in counterfactuals (also in Arregui 2006a), and I will delve more

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[12]Arregui bases her view of default perfective on Bennett and Partee (1978).

deeply into this in Chapter 5. For the moment, I will instead turn to showing how my data challenges the analysis Arregui proposed for backtracking.

4.1.5 How My Data Challenges the Arreguian BTCF Analysis

What I've just shown is an extremely successful account of backtracking of the types indicated in Arregui's three generalizations. However, the reason that I need to update and adapt this analysis is that it does not fully cover (or at minimum, does not intend to address) the examples that I presented in Chapter 3.

The first kind of data point that is not predicted by an Arreguian analysis is the *instead of* backtracker.

(50)   Katie and James fought yesterday because James asked Katie for help while she was trying to write. Today she isn't writing, and so would have been happy to help.

    a. *If James had asked Katie for help TODAY, there *would have to have* been no fight yesterday.

    b. If James had asked Katie for help TODAY, there **would have** been no fight yesterday.

According to Arregui's analysis, a scenario like the one found in (50) will only be licit with NC syntax if there is an analytical rule linking the antecedent to the consequent, but that is certainly not true here. There is no world-independent rule that says that asking for help today instead of yesterday prevents yesterday's fight. Moreover, given that it is a legal backtracker, there is no reason in Arregui's system why the EMC syntax version should fail. The analysis is set up specifically so that EMC syntax licenses backtracking, and so this is a double problem for the analysis presented so far.

An additional problem arises when considering non-BTCFs. In all of the other categories, there is what I've called an adversity reading to the EMC syntax conditionals. Since backtracking counterfactuals don't have an adversity reading, the theory built so far has no

mechanism in place to explain why the only difference between the following two examples is the adversity reading that arises with the second:

(51)   If Willa rolls snake eyes, she will win.

(52)   If Willa rolls snake eyes, she will have to win.

In the remainder of this chapter I will show a few ways to add to the theory presented above that will help solve these issues. Then, in Chapter 5, I will present a complete theory to account for all four distinctions I presented in Chapter 3. First, however, I will address an analysis of counterfactuality from another author in the counterfactual literature, Katrin Schultz. Since I've just shown that my data is problematic for Arregui's analysis, I will now highlight that the same data is unaccounted for in another interesting theory of counterfactuals. While Schulz takes a very different approach than Arregui does to analyzing counterfactuals, her analysis is intended to account for some backtracking data as well. As I will now show, not only does Schulz's theory not account for the data presented in Chapter 3, but it also does not have any theoretical advantages over Arregui's theory with respect to the data that I'm interested in.

4.2   Schulz 2007, 2014

In her dissertation *Minimal Models in Semantics and Pragmatics: Free Choice, Exhaustivity, and Conditionals* (2007), Katrin Schulz's goal is to account for free choice, exhaustivity, and conditionals such that the lines between what is semantic and what is pragmatic are clearly drawn. I will be concerned only with her thoughts on conditionals.

Her concern is the same as Arregui, Ippolito (2003), and Iatridou's (2000) – why does the tense morphology in English conditionals not match up with its temporal properties. That is, in a sentence like (53), why is there past perfect morphology on the antecedent verb, morphology that typically indicates that the event denoted by the verb occurred in the

past of some reference event, usually also in the past, when the event in (53) denoted by the antecedent actually occurs in the future?

(53)   If you asked him, Peter would help you.

Schulz argues, in agreement with the analyses provided by Arregui, Ippolito, and Iatridou, that the answer to this problem is semantic. However, Schulz takes the viewpoint advocated by Iatridou and Ippolito that the unexplained past tense in a conditional is a morphological marker of modality, rather than being a semantic tense. That is, past tense is ambiguous between a temporal meaning and a modal meaning. I will not try to explore Schulz's analysis, which relies on Pearl's (2003) causal models and Veltman's (2005) premise semantics account of similarity, in this section; it is far too in depth for a cursory explanation here. I will instead outline some of Schulz's arguments for a past-as-modal analysis and defend my choice to pursue an Arreguian approach as opposed to a Schulzian approach.

Between her dissertation (2007) and newer work (2014), Schulz argues both that for similarity, the past cannot be more important than other times, and also that the morphological past tense that we see in conditionals is better understood as a modal marker than a tense marker. I will provide counterarguments to several of her arguments.

Her first argument is that the following example is proof against a similarity-of-the-past approach, as she calls the type of approach that Arregui takes.

(54) A farmer uses the following strategy to turn sheep into money. First he tries to sell a sheep to his brother. If he doesn't want it, it gets special feeding and some weeks later the farmer tries to sell it to the butcher. If the butcher doesn't want it, he gives it as a gift to the local zoo. One of the sheep is a particular favorite with his little son Tom. Tom doesn't know what became of Bertha, his favorite, because he was away for four weeks. The first thing he does after coming back is checking where Bertha is. He hears that his uncle bought her. Tom says that he is happy that he doesn't have to pay to visit her, because:

a. If my uncle hadn't bought her, she would have been a gift to the zoo.

This conditional is intuitively false in this scenario. Schulz argues this is a problem for a similarity-of-the-past approach as follows:

> However, the approach sketched above would predict the sentence to be true: the butcher had to buy or refrain from buying Bertha before she was offered to the zoo. Hence, if the restriction on similarity described above were in force, then a world where the butcher did not buy Bertha should be closer to the actual world, than a world where the butcher bought her. Therefore, in the most similar worlds making the antecedent of [(54a)] true the consequent is true as well.

Notice, though, this the consequent is not predicted to be true based on the approach defended in this dissertation. In all of the closest worlds in which Bertha was not sold to the uncle that have a counterpart to the actual world past, there are close enough worlds in which she goes to the butcher and also close enough worlds in which she goes to the zoo. Therefore, not all close enough antecedent worlds are consequent worlds, and the counterfactual is false, as predicted.

Schulz also presents (55) as a problematic case for what counts for similarity in general, and then offers (56) as proof that temporal properties (that is, similarity-of-the-past) cannot be used to account for both.

(55)   Consider a man – call him Jones – who is possessed of the following disposition as regards wearing his hat. If the man on the news predicts bad weather, Mr. Jones invariably wears his hat the next day. A weather forecast in favor of fine weather, on the other hand, affects him neither way: in this case he puts his hat on or leaves it on the peg, completely at random. Suppose, moreover, that yesterday bad weather was prognosed, so Jones is wearing his hat. In this case, ...

a.   If the weather forecast had been in favor of fine weather, Jones would have been wearing his hat. (Schulz's Adaptation of an example from Tichy 1976)

(56)   A coin is going to be thrown and you have bet $5 on heads. Fortunately, heads comes up and you win. You say:

a.   If I had bet on tails, I would have lost.

Example (55), which is false, can clearly be accounted for within the theory I'm using. In all worlds that have a counterpart to the actual world past in which the forecast is for good weather, some are hat-wearing worlds and others are hat-free worlds. Thus the falsehood of (55) falls out straightforwardly. For (56), Schulz argues:

> The would have conditional [(56)] is intuitively true. But that means that the outcome of the chance event, that lies in the future of my betting, has to count for similarity. This example clearly shows that the future of the evaluation time of the antecedent matters for similarity.

This is not the only possible analysis of (56). In my account, the accessible worlds are all of those with a counterpart to the actual world past in which I bet tails, but my betting has no influence on the outcome of the coin toss, so as long as the world proceeds as normal, the outcome will still be heads, and all antecedent worlds will be consequent worlds. This highlights an assumption that many theories of conditionality, mine included, hold: all accessible worlds must behave normally after the antecedent time. So (56) can also be

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accounted for in the theory I am supporting. Therefore, Schulz's arguments against taking fake tense as a real semantic tense and against allowing prioritization of the past for the calculation of similarity are unconvincing, and so I will continue with the theory I have been supporting.

Regarding backtracking, Schulz acknowledges that it is possible, and also that it is a phenomenon that needs accounting for: "...we have to conclude that true backtracking counterfactuals do exist, and that they do not necessarily involve reasoning about abnormal conditions concerning causality or time" (2007, p.88). Interestingly, she also says that backtracking is possible without EMC syntax, but all of the examples she gives for acceptable NC backtrackers are either analytical or have a stative antecedent (57), and she does not make any claims about when backtracking does or does not need EMC syntax except to echo Arregui's generalizations.

(57)   a.   If Clarissa were 30 now, she would have been born in 1966. (Frank 1997:297)

          b.   If he were a bachelor, he wouldn't have married. (Arregui 2005: 85)

          c.   If Stevenson had been President in February 1953, he would have been elected in November 1952. (Bennett 1984: 79) (Stevenson lost the presidential elections to Eisenhower in November 1952.)

          (Schulz:2007)

Therefore, her account does not build in the crucial differences that I have been exploring in Chapter 3, and which I can account for straightforwardly with the changes that I'm making to Arregui's analysis. Furthermore, not only does Schulz not note *instead of* backtrackers, but she also says that *have to* always improves the acceptability of backtrackers, which I have shown to be false. Her theory is thus not designed to handle *instead of* cases either. So while Schulz's theory is intended to allow for backtracking as a possible phenomenon, it does not account for any of the new generalizations that I am presenting and accounting for in this dissertation.

Schulz also addresses the issue of treating the fake tense in conditionals as an SOT phenomenon and decides against it for several reasons. One is that SOT pasts are embedded and conditional fake past in her system is not embedded under another past, but in the the analysis provided in this dissertation, the fake past in conditionals is in fact embedded under the real semantic past of the modal. She also argues that there are languages that have fake past in conditionals that do not show SOT phenomena elsewhere; I have indicated in Chapter 2 that this is indeed a problem for the theory that I support, but have also suggested several ways that this could be accounted for. The third claim is that SOT tenses do not contribute anything semantically, while fake tense in a conditional contributes some meaning like "hypotheticality, distance from reality, etc." (2014 p. 6). However, the fake past in a conditional does not necessarily contribute any meaning – this is a completely theory-internal claim. In this dissertation's theory, the past tense in the antecedent does not contribute anything semantically, so it behaves exactly like an SOT dependent tense. Therefore, the only potential argument I see against an SOT style analysis of the antecedent past tense is the fact that there are non-SOT languages that use antecedent fake past. However, I leave this as a problem to be solved in future research, and continue with the theory that the fake past in conditional antecedents is an SOT style tense.

Given the arguments I have provided contra Schulz's arguments, I will continue to use Arregui's as a foundation for my analysis of backtracking counterfactuals.

In the next section, I will present Ogihara's analysis of focus in counterfactuals, which I will adopt and adapt for my theory of *instead of* conditionals.

4.3 Ogihara 2000

While Arregui's analysis is a contender for an analysis of regular scenario BTCFs, it does not make any claims that can account for *instead of* BTCFs. As these must contain focus in order to be felicitously used, I summarize Ogihara's (2000) take on the role of focus in counterfactuals in an informal way here. Others (Arregui 2005, Ippolito 2003) have discussed

the merits and drawbacks of his account; I present it only to show what tools have been offered in the recent literature that pertain to my data.

Ogihara does not look at backtracking in particular, but it stands to reason that his analysis could be extended to help cover the BTCF facts I'm interested in. Ogihara's analysis is actually aimed at accounting for mismatched past counterfactuals (term taken from Ippolito 2003), counterfactuals whose tense and temporal adverbial do not match in terms of the time indicated (58)-(59), using focus alternatives.

The data points that are of concern to Ogihara are the following, for example.

(58) Imagine that tomorrow is Mary's birthday, but her boyfriend got mixed up and gave her flowers yesterday. She was and is upset that he got her birthday wrong.

  a. If John had given flowers to Mary TOMORROW$_F$, she would have been pleased.

(59) Imagine that you and I both have busy schedules, and had isolated today and tomorrow as possible days for a walking date, and we can only go once. We went this morning and got rained on, and tomorrow's forecast is sunny and clear.

  a. If we had gone out for a walk TOMORROW$_F$, we would have had a good time.

Notice that there is morphological past tense in the antecedent clauses of the examples above, seemingly indicating a time before the utterance time, but then the adverb *tomorrow* indicates a time after the utterance time. As a basis for his analysis of mismatched focus counterfactuals, Ogihara assumes a semantics of counterfactuals, based on Lewis (1973) and Iatridou (2000), as follows:

(60) A conditional of the form "If A had V^1-ed, B would have V^2-ed" is true in w_c at t_c iff at some contextually salient time t earlier than t_c in w_c, all worlds w closest to the actual world w_c in terms of a similarity hierarchy among those in which "A V^1" (tenseless) is true at t, it follows that "B V^2" (tenseless) is true at t in w.

  Note: t_c and w_c indicate the utterance time and the actual world, respectively.

Clearly this is not sufficient, as the events in (58)-(59) are not occurring in the past, but rather in the future (recall that Arregui gets around this by having the modal *would* come with a free variable over times that is restricted to non-past times that fills the temporal argument of the antecedent and consequent). Ogihara's analysis to account for the mismatch of the tense and event time is this: the past tense refers not to the time of the eventuality of the antecedent, but rather to the time of the eventuality that occurs in the actual world that the antecedent eventuality is contrasted with. In (58), the contrasted past event is construed as yesterday's flower-giving, and in (59), it is this morning's walk.

Another potential problem for (60), and one that pertains in particular to my data, is the matter of similarity. It stands to reason that, in considering the closest possible worlds for (58), these will be ones in which John still gave flowers to Mary yesterday, and then also gives them to her tomorrow. But this is not the case when we compute the counterfactual intuitively: it is only judged true on the reading that he give flowers to her tomorrow and **not** yesterday. This fact is not accounted for the preliminary denotation of counterfactuals in (60).

Ogihara's analysis combines Kratzer's (1981) theory of counterfactuals with Rooth's (1985) theory of focus. Kratzer's theory begins with a function f on worlds that picks the set of all propositions holding in a given world. Given f, $A_w(p)$ is the set of all consistent subsets of $f(w) \cup p$ which contain the proposition p. Then *If p, q* will be true if q is true in every maximal set in $A_w(p)$. It is necessary that $f(w)$ characterizes the world w uniquely. The plan then, is that the antecedent with a focused element kicks out of $A_w(p)$ all propositions that are the same as the antecedent except for the focused element. So, in (61), the contrast set will be (62), and everything of this form where x *isn't* tomorrow will be kicked out of $A_w(p)$.

(61)   If John had given flowers to Mary TOMORROW...

(62)   John gave flowers to Mary at x.

The latter part of formulation comes from Rooth (1985), who claimed that the set of alternative propositions of a proposition with a focused element, its p-set, is used to produce an existentially quantified proposition that is chosen by the partition function f of the actual world w_c. This, for (61), would more accurately be:

(63)   There is a time x such that John gave Mary flowers at x, where x is one of the contextually salient individuals.

Ogihara uses Kratzer and Rooth's analyses for focus alternatives to create a new definition of counterfactuals:

(64)   The truth conditions for a sentence of the form "If DP_1 PAST $PERF_3$ VP_1, DP_2 would $PERF_3$ VP_2" are given in the following way. Let q be the denotation of "DP_1 VP_1" (tenseless), and r the denotation of "DP_2 VP_2" (tenseless), where q and r are elements of $D_{\langle i, \langle s,t \rangle \rangle}$. The entire conditional is true iff (i) the semantic object $p \in D_{\langle i, \langle s,t \rangle \rangle}$ that is provided by the context and is contrasted with q is such that $p(g_c(3))(w_c) = 1$ and for all maximal sets X in $A_{w_c}(\{w|$ there is an interval i such that $q(i)(w) = 1\})$, $p(g_c(3)) \notin X$, and (ii) the proposition $\{w|$ there is an interval i such that $r(i)(w) = 1\}$ follows from every maximal set in $A_{w_c}(\{w|$ there is an interval i such that $q(i)(w) = 1\})$

Notation: g_c = the value assignment provided in the context c (e.g., $g_c(3)$ = the time interval that the index 3 denotes)

D_a (where a is any type) = the set of all possible denotations of type a

There is no better way to summarize this formalism than in Ogihara's own words:

Put informally, [(64)] says that a past counterfactual is true iff (i) the proposition that is contrasted with the one conveyed by the antecedent is true at the contextually salient past time (indicated by the perfect) in the actual world, and (ii) the consequent is true in all those worlds that are consistent with what is the case in the actual one except that the antecedent is true and the proposition contrasted with it is false in those worlds. (page 9)

Ogihara then proposes a covert *instead* that gets rid of all of the contrasting elements of the context set. It is unclear to me at this point why the semantics presented in Rooth and Kratzer do not already accomplish this, but since my backtrackers are explicitly called *instead of* scenario backtrackers precisely because of the covert *instead of* clause, I agree with the intuition that this is doing some of the work. For Ogihara's denotation of *instead* and the analysis of how the focused counterfactuals are interpreted, please see the original. What I plan to take from this paper is that focus in the antecedent of counterfactuals produces a contrast set (as is a standard assumption for focus), and that when evaluating such a counterfactual (or conditional), the contrast set is taken to be false in the possible worlds that the modal is quantifying over. I will not be using Ogihara's denotation of counterfactuals otherwise.

4.4   Other Tools I Need

In my approach to conditionals, I will be following a vaguely Kratzerian tradition in using modal bases and ordering sources. I want to be completely explicit in saying that I am confident that this analysis could be done in many of the competing theories. I have simply found that ordering sources are the most intuitive way to explain the intuitions behind the facts that I wish to present. As such, it behooves me to present a brief introduction to modal bases and ordering sources. I will try to be as theory-neutral as possible within the world of ordering sources, and as such will present a very shortened version of a few authors' thoughts on the topic. After I've done that, I will translate Arregui's account into a theory

with modal bases and ordering sources. I will also try to capture Ogihara's intuitions in a modal base/ordering source framework.

4.4.1 The Formalism

To present my additions to Arregui's formalism, it makes the most sense to start at the beginning with the basic possible world semantics of conditionals, as it was presented in brief in Chapter 2. The original analysis is the following:

(65)   *If p, q* is true iff q is true in all worlds in which p is true.

An important update, arrived at separately by Lewis (1973) and Stalnaker (1968), changes the p worlds to relevant p worlds, which are decided on by similarity:

(66)   *If p, q* is true iff q is true in all worlds in which p is true that are most similar to the evaluation world.

This update handles the classic kangaroo problem, that is, the issue of antecedent strengthening. In the strict conditional analysis, *if p, q* entails *if p&r, q*, but as the following example shows, this is not true of natural language examples.

(67)   a.   If kangaroos had no tails, they would topple over.

        b. $\nRightarrow$ If kangaroos had no tails but used crutches, they would topple over.

Lewis and Stalnaker addressed this conditional data by making the conditional evaluation relative to closest worlds. It is false that in the worlds most similar to the actual world in which kangaroos have no tails, they also have crutches. Therefore, these two conditionals have different worlds in their domain of quantification when they are being evaluated. Lewis and Stalnaker also successfully navigate conditional transitivity and failure of contraposition; see the originals for more information.

As a reminder from Chapter 2, the two differ on their assessment of the similarity ordering. Stalnaker assumes that similarity will present one singular best possible world, while Lewis assumes neither this Uniqueness Assumption, nor the Limit Assumption. I will take the Limit Assumption for granted: there are best possible worlds.

Another theory that has been presented to deal with new and interesting data is due to von Fintel (2001), summarized in von Fintel (2011). It tackles the problem of Sobel sequences (68) (first presented in Lewis 1973 and attributed to personal communication with J. Howard Sobel) and their ugly cousins, Reverse Sobel Sequences (69) (attributed to Heim in von Fintel 2012).

(68)   If the USA threw its weapons into the sea tomorrow, there would be war; but if all the nuclear powers threw their weapons into the sea tomorrow, there would be peace.

(69)   If all the nuclear powers threw their weapons into the sea tomorrow, there would be peace; but if the USA threw its weapons into the sea tomorrow, there would be war.

To address the differences in felicity of these two data points ((68) and (69)), von Fintel proposes a modal horizon, that is, a set of worlds that can be potentially expanded upon by the antecedent of a conditional. So in (68), the second antecedent changes the worlds that the modal is quantifying over to include those (farther away worlds) in which all nuclear powers throw their weapons into the sea, and so both conditionals in sequence can be judged true. In (69), the modal horizon already includes worlds where the US throws its weapons into the sea, and so by looking at those worlds, we are already in situations where there is peace, and so the sequence comes out as false. The expansion of the modal horizon is accomplished by the same similarity ordering used by Lewis and Stalnaker.

The next major advancement in the conditional literature was made by Kratzer (1986). The idea is that *if* is not an operator, and that a standard conditional has only one operator, which is then restricted by the *if* clause. So while this idea is compatible with what has been

proposed before, the point is to have the analysis be compositional. *If* does not contribute anything semantically on its own, but rather marks that its clause is a restrictor.

The final part of conditional analysis that I need to present my analysis is of course the change to modal bases and ordering sources. In response to the Samaritan Paradox (see von Fintel 2011, Kratzer 1991 for more information), Kratzer proposed that modals do not just operate over the set of accessible worlds that make up the domain of quantification, but rather that modals have two separate contextual parameters, the modal base and the ordering source.

Theories of modals that include both modal bases and ordering sources are essentially extensions of theories of modality that use accessibility relations (see Hughes and Cresswell 1968 and Bull and Segerberg 1984 for some more info), as Arregui did. However, instead of a modal coming with just a contextually valued accessibility relation, each modal comes with *two* conversational backgrounds, a modal base and an ordering source. The modal base f determines what worlds are accessible to the world of evaluation given the facts, or what is known in that world. Precisely two conversational backgrounds are possible here: epistemic and circumstantial. To quote Hacquard 2011, "Circumstantial modality looks at the material conditions which cause or allow an event to happen; epistemic modality looks at the knowledge state of the speaker to see if an event is compatible with various sources of information available" (p. 18).

The other conversational background is the ordering source g, which is the means of determining the relative closeness or goodness of the possible worlds identified by the modal base. It induces an ordering on, or ranking of, the accessible possible worlds, and the flavor of modality determines many facts of this ranking. That is, the meaning difference between the two types of *have to* in (70) will be reflected as different ordering sources, one epistemic and one deontic. Even though it is also true that they will have different modal bases, since the facts of each case are different, that is not what gives the flavor difference. The different modal bases will make different worlds accessible, and the different ordering sources

will decide which accessible worlds are better, depending on which kind of relation is being pursued.

(70) a. But Charlotte's bedroom light is on. She *has to* be home right now. (epistemic)

   b. Charlotte is grounded. She *has to* be home right now. (deontic)

Formally, an ordering source works as follows:

(71) $w' \leq_{g(w)} w'' \Leftrightarrow \{p \in g(w)|w'' \in p\} \subseteq \{p \in g(w)|w' \in p\}$

That is, w' is closer to or better than (or equal to) w'' if and only if all propositions from $g(w)$ that w'' makes true, w' also makes true. It is relevant to note that in possible world semantics, a proposition is identified as the set of possible worlds in which it is true. So according to the ordering source of w ($g(w)$), w' is at least as good as w''. This system allows worlds to tie, that is, to be equally good with respect to the ordering source. This leads to the following definitions of modals (adapted from, rather than taken from, Kratzer's early work, as she does not adopt the Limit Assumption):

(72) $[\![\text{Must } \phi]\!]^{f,g} = \{w| \text{BEST}(f(w), g(w)) \subseteq [\![\phi]\!]^{f,g}\}$

   $[\![\text{May } \phi]\!]^{f,g} = \{w| \text{BEST}(f(w), g(w)) \cap [\![\phi]\!]^{f,g} \neq \varnothing\}$

(73) $\text{BEST}(f(w), g(w)) := \{w' \in \cap f(w)|\forall w''[w'' \neq w' \& w'' \in \cap f(w)] : w'' \leq_{g(w)} w'\}$

Allow me to break these down into almost-layperson terms. *Must ϕ* is the set of all of the best worlds in which ϕ is true, and *may ϕ* is the set of all of the best worlds that overlap with ϕ, where ϕ is a set of worlds that make ϕ true. The best worlds are those in the modal base (which will be those that hold true all of the relevant propositions of the world of evaluation) such that there are no closer worlds relative to the world of evaluation. The conditionals that I will be accounting for include neither *must* nor *may*, but the universal quantifier analysis of *must* is sufficient for my purposes as I also have a universal quantifier (*woll*). A basic

universally quantified conditional could be treated as follows (although this loose definition will be updated later):

(74) *If p, must q* is true is w relative to a modal base f and ordering source g iff

$\forall w' \in \text{BEST}(f'(w), g(w))$, where $f'(w) = f(w) \cup \{p\}$, $w' \in [\![q]\!]^{f,g}$

that is, q is true in all of the closest (by $g(w)$) accessible (by $f(w)$) p worlds.

Given that I find the evidence in favor of modal bases and ordering sources compelling, I will be updating the previous analyses into this framework in order to present my analysis. I also do so because I think this framework more straightforwardly portrays what I believe to be important to my analysis, but I am aware that the modal base/ordering source approach is a notational variant of the accessibility relation with selection functions (as in Lewis 1973, Stalnaker 1968) approach. I will use the denotation in (74) as a starting point for my analysis, and will adapt it to incorporate insights from Arregui and Ogihara as I go.

4.5   My Denotations: Reformulating Arregui and Ogihara

Firstly, I will reformulate only the important (for my purposes) denotations of Arregui's theory into an analysis with ordering sources. For the moment, I will adopt the syntactic structure she is assuming (repeated from (7) here as (75)), and I will also be adopting the referential theory of tense set out in Chapter 2. Furthermore, I will follow her analysis in assuming that the past tense that is the semantic past of the modal is scoping over both the antecedent and the consequent, leaving a reflex of morphological tense agreement, and that the past tense on the modal restricts the domain of quantification to worlds that have a counterpart of the actual world past.

(75)

```
              ●
           /     \
    past tense     \
          /    \    \
         /      \    consequent
   modal (woll)  antecedent
```
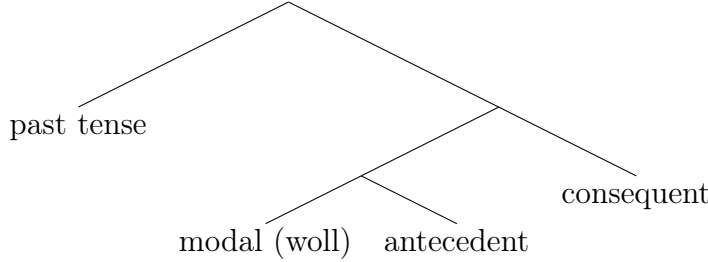
The previous denotation of *woll* is as follows:

(76) $[\![\text{woll-}t_i]\!]^g : \lambda P_{\langle i,\langle s,t\rangle\rangle}\lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t\forall w[\exists t'[t' \approx t \ \& \ t' \lhd w]\&P(g(t_i))(w) \rightarrow Q(g(t_i))(w)]$

       where g is an assignment function, and $g(t_i)$ is restricted to non-past times.

The only thing that needs updating is to identify the worlds under consideration using a modal base, and to restrict the best of these using an ordering source. Therefore, while I agree with Arregui that counterfactuals are evaluated relative to worlds that have a counterpart of the actual world past, I will claim that this clause is contributed by a combination of the past and the denotation of the modal itself, and that the accessible worlds should be determined by the modal base. Therefore, a first pass at an update would be that the only addition needed is the highlighted clause in (77).

(77) $[\![\text{woll-}t_i]\!]^{h,w_0} : \lambda P_{\langle i,\langle s,t\rangle\rangle}\lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t\forall w' \in \text{BEST}(f(w_0), g(w_0))$

       $[\exists t'[t' \approx t \ \& \ t' \lhd w'] \ \& \ P(h(t_i))(w') \rightarrow Q(h(t_i))(w')]$

       where h is an assignment function, and $h(t_i)$ is restricted to non-past times.

The above denotation has an interesting quality: it is strange in that it has both a similarity relation (the counterpart relation) and a modal base/ordering source mechanism. There have been accounts of various phenomena that require more components of modality than is evident on the surface, like von Fintel and Iatridou's account of weak necessity or anankastic conditionals (2008, 2005), von Stechow, Krasikova, and Penka's account of anankastic conditionals (2006), or Kaufmann and Kaufmann's analysis of conditional imperatives (Kaufmann and Schwager 2009). Therefore, it is not at all unconventional to propose

an extra layer restricting the possible worlds in the domain of quantification in the event that the data supports it. Therefore, as I will show, I need both ordering sources and the counterpart relation to successfully solve some of the problems presented in Chapter 3.

To determine which kind of and how much modal layering I need, allow me to outline some previous accounts of layered modality to compare. Ideally, there would be an existing account that adds modal restrictions for the same reasons that I do, but as I will show, none of the existing accounts (that I am aware of) account for the kinds of problems I am trying to account for. Nonetheless, the fact that these accounts exist sets up a precedent for the kind of account that I am providing.

von Fintel and Iatridou pursue an analysis in which weak necessity modals are subject to two ordering sources, and this is necessary specifically because weak necessity modals like *ought* contrast with strong necessity modals like *have to* or *must*.

(78) a. You ought to do the dishes, but you don't have to.

  b. #You must do the dishes, but you don't have to.

    (examples from von Fintel and Iatridou 2008)

As I am dealing with strong necessity, this type of modal layering is not a concern. Kaufmann and Kaufmann argue for a covert epistemic modal in conditional imperatives due to examples like the following:

(79) a. If you lose your job, take a lower-paying one.

  b. But if you lose your job and have a comparable offer, don't take a lower-paying one. (Kaufmann and Schwager 2009, pg. 246)

The ordering source of the imperative operator takes into account the desires of the speaker. So, the only way for both (79a) and (79b) to be utterable in this sequence without contradiction is for comparable offer jobs to be too far-fetched to be in (79a)'s modal base. But clearly this does not mean that the speaker's desires in (79a) are that the addressee loses

his or her job and doesn't get a comparable offer. Rather, given what is known, and the improbability of getting fired with a comparable offer, comparable-job-offer-worlds do not make it to the best of the modal base worlds in (79a). Therefore, Kaufmann and Kaufmann argue that there must be a covert modal that is doing this work. I find this example extremely compelling, and support the idea that an extra modal can resolve the conflict of which worlds count as best, but unfortunately the speaker's wishes have no obvious impact on my decisions regarding ordering sources and the counterpart relation.

As far as I can glean, there is no evidence in my backtrackers for an additional modal, but rather for different ways of ranking the best accessible worlds. The same can be said for the arguments for anankastic conditionals' layered modality, which I will not discuss here. Therefore, since covert modals, layered modality, and extra ordering sources all have a precedent in the literature, I will follow the principle of Occam's Razor in assuming the simplest theory for my data – as far as is clear now, layered restrictions on the modality are the simplest analysis, but only insofar as I allow an ordering source and counterpart relation. There is no evidence of additional ordering sources or modals. Given all of the facts presented in this chapter, I will assume that the similarity must be constrained by the past tense so that similarity is computed relative to the past. I furthermore have a standard modal base (set of accessible worlds) and ordering source (way of ranking worlds as better according to something contextually valued). I do not think there is evidence for any further constraints of the accessible worlds by another modal base or ordering source when it comes to dealing with backtracking and *woll*.

The way the analysis for backtracking has been set up so far – an analysis that I agree with and will be using moving forward – the constraint of the past on the similarity relation is essentially the reflex of subjunctivity (or indicativity), and it is what makes backtracking possible. It allows the worlds accessed to be those with a past similar *enough* to the actual world past, so that there does not need to be the best or closest similar pasts since time counterparts are not strict in this way. The flexibility is necessary for backtracking to be possible.

Ordering sources, then, come into play in that they rank worlds as better based on a (set of) proposition(s). For *have to*, better worlds will be those that hold true the propositions that are the equivalents of Arregui's rules in the case of EMC syntax conditionals. For *instead of* cases, *would*'s ordering source ranks worlds as better if they make true the covert *instead of* clause, that is, if they exclude the relevant past focus alternative. See more discussion about these ordering sources in particular below the trees in the next couple of pages. In a conditional without focus or an extra modal, the ordering source will be essentially empty, requiring only that the antecedent is true, which is a generally required to compute the truth of conditionals regardless.

A seemingly open question is what the role of the modal base is in this set up, since Arregui did not have an overt accessibility relation that would be the parallel of the modal base in my theory. This furthermore leaves open the question of what Arregui intended the past-counterpart clause to be. I believe that there has to be a covert accessibility relation that was not overtly discussed, because the role of an accessibility relation or modal base is only to provide accessible worlds – all of them, no matter how distant. Then it is the role of a selection function or ordering source to decide which of these count as good enough to matter for the evaluation of the truth conditions of the modal statement. The counterparts are a restriction on which accessible worlds count for evaluation, just as an antecedent is a restriction on which worlds count for evaluation. Therefore the $t' \triangleleft w'$ clause comes from the modal itself, and its time argument is valued by tense.

The modal base is separate and, as always, provides a set of accessible worlds that the antecedent, ordering source, and now counterpart relation, can restrict. That is, in the case of *woll* conditionals, the modal base together with the tense and antecedent restrict the accessible worlds to those that had a temporally appropriate counterpart to the actual world given the facts or circumstances of the antecedent, as usual. A simplified way to think about this is to think of the past-counterpart relation as a restriction on the modal base, however to formulate the counterpart relation as part of the modal base inherently would be theoretically non-trivial. Since the difference between the counterpart relation being part of

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the modal base or not is unimportant for the details of my analysis, I am avoiding a modal base formulation of the role of the counterpart relation. However, putting the counterpart relation into the modal base, or using it to replace the modal base, does not seem like a left-field idea: if some theories claim that accessibility relations can be time dependent (per Arregui, Ippolito), having past counterparts restrict the modal base is roughly equivalent to having a time sensitive modal base. In this case, the reflex of the time argument on the modal base is that it restricts to counterparts at that time. I am open to an analysis that uses further layered modality if it captures additional phenomena, but at the moment, I do not think it is necessary. Therefore, the denotation given above is perfectly acceptable for my purposes. I repeat it here as the official denotation of *woll*:

(80) $[\![\text{woll-}t_i]\!]^{h,w_0} : \lambda P_{\langle i,\langle s,t\rangle\rangle} \lambda Q_{\langle i,\langle s,t\rangle\rangle} \lambda t \forall w' \in \text{BEST}(f(w_0), g(w_0))$
        $[\exists t'[t' \approx t \ \& \ t' \lhd w'] \ \& \ P(h(t_i))(w') \rightarrow Q(h(t_i))(w')]$

        where h is an assignment function, and $h(t_i)$ is restricted to non-past times.

Notice that it is possible in the modal base/ordering source theory to have an empty ordering source, so there may be cases where an epistemic or circumstantial modal base along with the past counterpart requirement do all of the work of accounting for the worlds in the quantificational domain of the modal. Allow me to show in a pair of trees what is different about my theory so far from Arregui's. Arregui's tree is given in (75), but I will update it in (81) to include the accessibility relation in the syntax. There is no need for syntax to be so rich as to include accessibility relations, modal bases, or ordering sources, but their presence in the syntax is helpfully illustrative of what is different between our theories.[13] Let's start with an NC syntax counterfactual.

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[13]I'm putting the modal bases and ordering sources in the trees because it is a helpful tool for understanding my theory, and I am in no way asserting that this is necessary. I realize that if they are actually in the tree, then they would need to be pronominal and valued by the assignment function h. However, as this is not crucial to my analysis, I will not worry about the details. Furthermore, I will not be representing the modal base and ordering source with lambda expressions in my denotations. I realize that this is an inconsistency given the fact that both are in my trees, but this inconsistency is intentional, and will be maintained for presentational purposes.

(81)

```
            past
                        ┌──────────────┐
                        │    Consequent
              would  R  Antecedent
```

(82)

```
            past
                        ┌──────────────┐
                        │    Consequent
              would  f  g  Antecedent
```
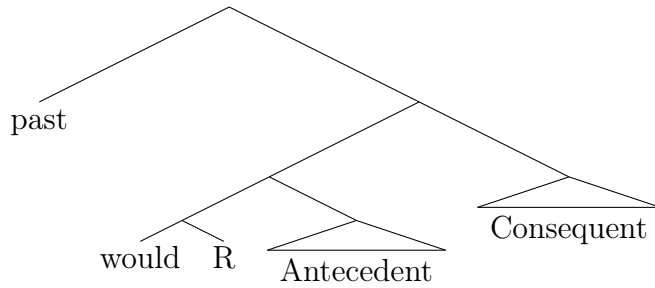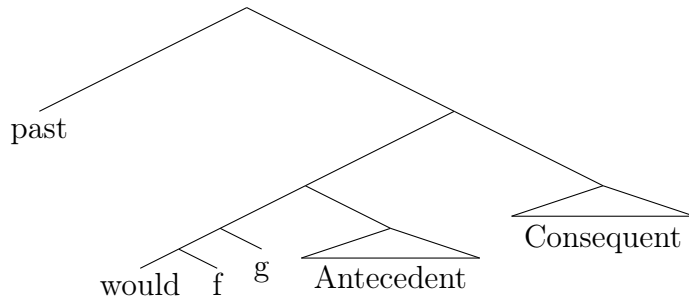
The princpal difference in my tree is the ordering source *g*. I'm claiming that the past

counterpart relation is not in the syntax, but is rather part of the denotation of the modal,

and that the modal base, *f*, is equivalent to the accessibility relation that I have been

assuming Arregui intended. However, without *have to* Arregui has no means of "saving" a

backtracking counterfactual. I am claiming that the source of backtracking rescue is not

have to, but rather anything that successfully excludes undesirable worlds, and *instead of*

contexts do just that. I claim that the focus that makes *instead of* backtrackers acceptable

is a form of ordering source. As such I will need to update the tree and semantics to reflect

this claim (which draws heavily on concepts from Ogihara.) I will be using Rooth's (1992)

formalism to represent my analysis, in which I claim that there is a focus operator that acts

as the ordering source for *woll*. When there is focus in the antecedent of a conditional, the

focus alternatives to the antecedent must be false in the best accessible worlds. When there

isn't focus, the best worlds will make the antecedent true, which is the standard function of

the antecedent in any conditional and amounts to an empty ordering source. Informally, the

instead of proposition is the argument of *would*'s ordering source. Otherwise, this ordering

source will be empty, and *would* will behave exactly as Arregui predicted, with all accessible

worlds that meet the counterpart relation's requirements and make true the antecedent remaining accessible.

Therefore, without necessarily adopting Ogihara's formalism, let me translate his insights into an MB/OS perspective. The main intuition that I want to borrow is that when there is focus on a word or phrase in the antecedent, somehow all of the members of the contrast set, typically for time adverbials just the proposition that is true in the actual world that it is contrasted with, get kicked out of the set of worlds that are considered for the evaluation of the conditional. Ogihara uses a pre-MB/OS Kratzerian method (1981), but this can be straightforwardly adapted to the new Kratzerian method (1991).

As per the standard Roothian theory, I will be positing an operator $\sim$ in the syntax whose denotation is that the clause with focus, for me, the antecedent, is a member of the focus alternatives that are overtly represented by the variable C, also in the syntax, whose reference is determined by $\sim$ and context. The tree for an *instead of* conditional is given as shown in the following tree.

(83)
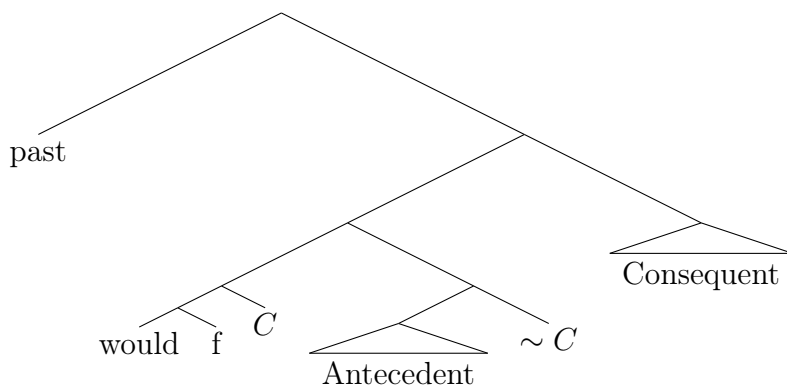
The focus alternative propositions in C will take the form of the antecedent, but with the focused constituent replaced by salient alternatives. In the examples that I have provided, like *If he had attended the concert* THURSDAY, a potential focus alternative would be *He had attended the concert Friday.*

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Notice that in this set up, the focus alternatives take the place of the ordering source, g. This is only one possible way to formalize the focus semantics, but since the modal *would* in conditionals typically has an empty ordering source, replacing *would*'s ordering source with the focus semantics suits my needs. When there isn't any focus, then the variable C will just contain the antecedent, and the conditional will be computed as has already been explored in this chapter. When there is focus, $\sim$ provides focus alternatives to the antecedent, and something in the semantics provides the fact that the antecedent is true to the exclusion of the rest of the focus alternatives. There are also many ways this fact can be formalized. One possibility is that the modal *would* comes with a presupposition that the antecedent is true and all of its focus alternatives are false. Another option is that the focus alone pragmatically provides a covert *only* operator, which excludes all of the focus alternatives that are not the antecedent. I am not making any claims about what theory is best, as both (and possibly others as well) accomplish my goals, and I do not currently have a way to distinguish between them.

The result of the focus semantics is that instead of the antecedent solely restricting the accessible worlds, the focused constituent adds necessary propositions to what would be the ordering source of the modal. Let me take one of Ogihara's examples:

(84)   Imagine that tomorrow is Mary's birthday, but her boyfriend got mixed up and gave her flowers yesterday. She was and is upset that he got her birthday wrong.

a.   If John had given flowers to Mary TOMORROW$_F$, she would have been pleased.

I propose that the modal base here is epistemic: it accesses possible worlds that are compatible with what the speaker knows; the modal, together with past tense, adds a further restriction that these worlds have a past that is a counterpart to the actual world past. In this case, this set of worlds will include worlds in which John gave flowers to Mary yesterday, since the speaker knows this to be true. The epistemically accessible worlds also includes the facts that tomorrow is Mary's birthday, Mary is upset, etcetera. There will also be worlds

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that say nothing about John giving flowers to Mary yesterday, and these will be compatible in other ways with what is epistemically accessible to the speaker. It may seem as though these worlds are less similar, but it is up to the ordering source to determine what counts as close or similar enough.

Next up is the work of the focus semantics as the ordering source. The operator $\sim$ will provide the fact that *John had given flowers to Mary tomorrow* is a member of the focus alternatives in C, which will also contain the contextually salient *John had given flowers to Mary today*. I believe that the most straightforward way to account for the fact that for the interpretation of the conditional the antecedent is taken as true and none of its focus alternatives are is for there to be a convert *only* as part of C. With the focus semantics, then, two new clauses will be added to the semantics of *woll*. One is that the antecedent is a member of the focus alternatives, and the other is that of the elements of C, only the antecedent is true and all of the others are false. Together these clauses will order worlds where flowers are given tomorrow *instead of* yesterday as better than those in which flowers are given on both days; the focus semantics, with context, has access to this covert material, and will order the worlds so that the best of them meets this requirement. Therefore, the best worlds according to f and g will be those in which flowers are given tomorrow, flowers were not given yesterday, and the consequent is then true in all of these worlds.

In order to reflect these changes, I need to update my denotation of *woll*, but first, a note. I am explicitly claiming that the syntax of *woll* conditionals always has the focus semantics as part of its denotation, and that when there is no focus, the denotation is the same as if there were an empty ordering source. Therefore, for presentational simplicity, when there is no focus I will not include the focus semantics in the tree and will use the denotation of *woll* given in (80). When there is focus, though, I will use the denotation in (85) and the accompanying tree in (86), in which I've color coded the semantic contributions of the new portions of the tree:

(85) $[\![\text{woll-}t_i]\!]^{h,w_0} : \lambda P_{\langle i,\langle s,t\rangle\rangle}\lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t\forall w' \in (f(w_0))$

$[\exists t'[t' \approx t \ \& \ t' \lhd w'] \ \& \ P(h(t_i))(w')$

$\& \ \boxed{P \in C} \ \& \ \boxed{\forall A \in C[A \neq P \rightarrow \neg A(h(t_i))(w')]} \rightarrow Q(h(t_i))(w')]$

where h is an assignment function, and $h(t_i)$ is restricted to non-past times, and C
is a set of contextually salient alternatives of P.

English gloss: *woll(P)(Q)(t) is true iff for all worlds w' in the modal base that have
a counterpart to the actual world past in which P is true at a non-past time t_i and
all of the focus alternatives A in C not equal to P are false at a non-past time t_i, Q
is also true at a non-past time t_i.*

(86)

In Chapter 5 I will show how this denotation for *woll* accounts for *instead of* backtrackers.

Continuing on, I also need to update the entry for *have*. Example (87) is Arregui's
modal *have to*, repeated from (38) above. Again, the update to a modal base/ordering
source analysis requires only a straightforward replacement of the accessibility relation with
a modal base and ordering source in (88), where I've changed the modal base to be time
sensitive to meet with Arregui's claim that the accessibility relation is time sensitive. In (89)
I've updated the denotation so that I can maintain the fact provided in (87) and (88) while
also making it more clearly compositional with *woll*.

(87) $[\![\text{have}_{mod-R}]\!]^g (P_{\langle i, \langle s, t \rangle \rangle})(t)(w) = 1$ iff

$\forall w'[g(R)(t)(w)(w') \rightarrow \exists t'[(t = t' \text{ or } t < t')\&P(t')(w')]]$,

where R is of type $\langle i, \langle s, \langle s, t \rangle \rangle \rangle$ and g(R) is a contextually salient temporally sensitive accessibility relation.

(88) $[\![\text{have}_{mod}]\!]^h (P_{\langle i, \langle s, t \rangle \rangle})(t)(w) = 1$ iff

$\forall w' \in \text{BEST}(f(w)(t), g(w)) \; [\exists t'[(t = t' \text{ or } t < t')\&P(t')(w')]]$,

where f is a contextually salient temporally sensitive modal base function.

(89) $[\![\text{have to}]\!]^{h, w_0} : \lambda Q_{\langle i, \langle s, t \rangle \rangle} \lambda t. \forall w' \in \text{BEST}(f(w_0)(t), g(w_0))[\exists t'[(t = t' \text{ or } t < t')\&Q(t')(w')]]$,

where f is a contextually salient temporally sensitive modal base function and $<$ represents temporal ordering.

What would it mean for a modal base to be time sensitive? Arregui claims that accessibility relations can be time sensitive (and this should again be reminiscent of Ippolito's analysis 2003), and modal bases are generally thought of as a notational variant of accessibility relations, and so the principles of a time sensitive modal base are the same as those of a time sensitive accessibility relation. Instead of accessing all the worlds that are compatible with the circumstances or facts of *now*, the modal base will access worlds that are compatible with a set of circumstances or facts at the time of its temporal argument t. These worlds can then be ordered according to the ordering source, which in the case of *have to* requires that there be a rule that the modal can order the worlds according to. In deontic uses of *have to* this will be a rule that is provided by authorities, and for epistemic uses of *have to*, there will be a stereotypical ordering source that has a rule about how people typically behave or how the world typically works.

Again, let me show the updates I've just given in syntax trees to elucidate. The tree in (90) is meant to illustrate my understanding of Arregui's *have to* analysis, and (91) is my update to include modal bases and ordering sources. You will notice in this case that there is nothing substantially different between the two.

(90)

past

would

Antecedent

have to

R

| Arregui's laws

Consequent

(91)

past

would f g Antecedent have to f'

g'

| Arregui's laws

Consequent
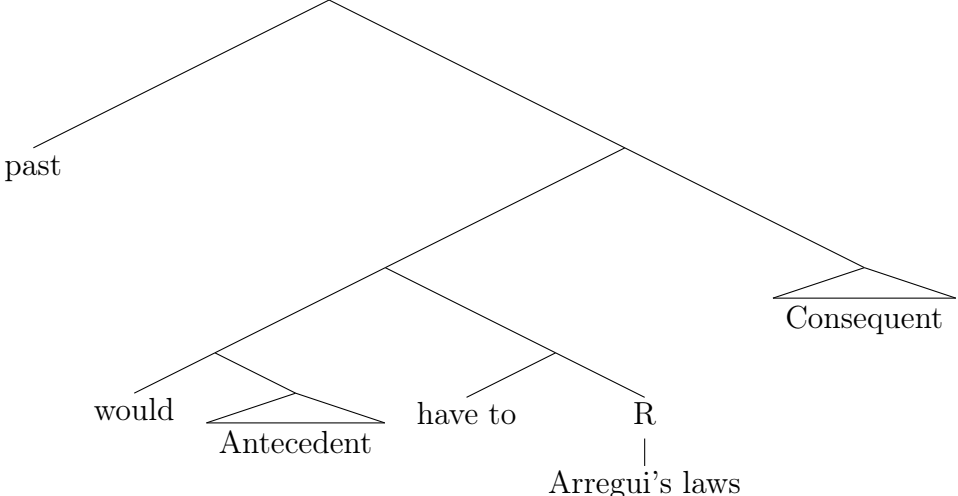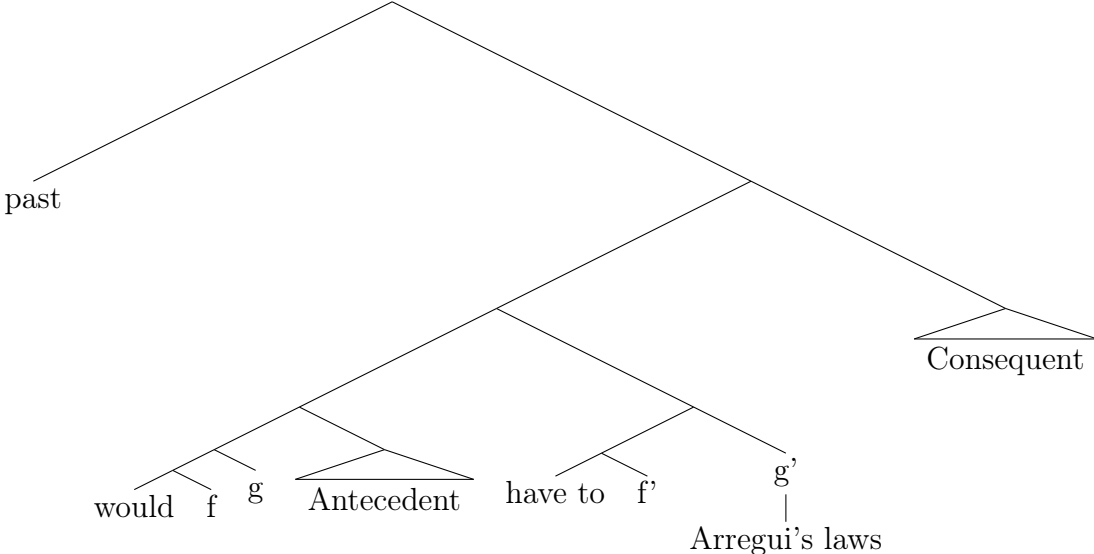
Recall that for the purposes of clarity in my trees and semantics I will not be including the focus semantics C and $\sim C$ unless they illustrate a crucial point, which they do not in a standard backtracking EMC conditional. In both trees, the *would* is behaving as has been described throughout this chapter, with f being the modal base, the counterpart relation being part of the denotation of the modal, and g of the modal *would* being empty. The only change between the two is that for me, *have to*'s law is encoded as the information in

have to's ordering source g', rather than having the laws be the content of an accessibility relation.

Before I conclude this chapter and move on to how this analysis accounts for the novel data I presented in Chapter 3, I will do a derivation of a basic counterfactual to show exactly what each piece of each denotation given is doing to achieve the appropriate truth conditions of a counterfactual. For now I will present just a forwardtracking NC syntax counterfactual (92), to be as basic as possible, and I give its denotation in (93):

(92)   Myka and Pete are partners working for the Secret Service, and they are very good at their job. Last night, they were called to stop an evil madman, and Artie is habitually concerned about their job. It all went well, and Claudia says that even if it hadn't, there's nothing to worry about.

     a.   If Myka had been in trouble, Pete would have saved her.

(93)   a.   If Myka had been in trouble, Pete would have saved her.

     b.   *Where t_i is a non-past time,*

          $[\![$*If Myka had been in trouble, Pete would have saved her*$]\!]^{h,w_0} = 1$ iff

     c. $\forall w' \in \text{BEST}(f(w_0), g(w_0))[\exists t'[t' \approx past_0 \ \& \ t' \lhd w'] \ \&$

          Myka was in trouble t_i in w' $] \rightarrow$

          $[$*Pete saves here at t_i in w'*$]]$

This is the simpler case between EMC and NC conditionals, with only one layer of modality: the counterfactual is true if and only if for all worlds that have a counterpart to the actual world past in which Myka was in trouble, Pete saves her in all of those worlds. Since there is nothing fancy going on, the ordering source is empty, and so all sufficiently close accessible worlds will count for the evaluation of the conditional. Therefore, propositions that must be satisfied by all worlds in the modal base together with the antecedent include, but are not limited to: {*Myka and Pete had a job last night, Pete and Myka are partners, Myka was in*

trouble, Pete and Myka always save each other}. And the counterfactual comes out at true, as anticipated.

With the pieces in place, I can now move on to tackling the major data puzzles presented in Chapter 3. In the next chapter, I plan to account for every facet of the data expressed in the final chart of Chapter 3, and afterward will present some additional data puzzles and open questions.

CHAPTER 5

Applying the Analysis

At last, all of the critical pieces are in place for me to apply my analysis to the data presented in Chapter 3. As repeated in the table below, there are four major contrasts that need to be accounted for, and I will approach each in a separate section of this chapter, culminating in a unified analysis that captures all of the facts. Since the groundwork is already laid out for it, I will start with the interesting complementary distribution of the EMC and *instead of* contexts in BTCFs in §5.1. Then I will briefly show in §5.1.1 that Arregui's analysis of analyticals can be translated straightforwardly into my analysis. In the next section, §5.2, I will address the contrast between *knowing* and *not-knowing* contexts in non-BTCFs. The third section, §5.3 will explain both why there is an adversity reading in the EMC non-backtracking counterfactuals, as well as why this adversity reading does not arise in BTCFs. The fourth section, §5.4, concludes the discussion of non-counterfactuals with my analysis of possibitionals. The final section of the analysis, §5.5, will investigate the properties of statives that make them different from their tense-equivalent counterparts. I will be answering why statives alone out of all non-analytical backtrackers allow NC syntax backtrackers. Afterward, in §5.6 I will present some additional data that was not shown in Chapter 3 that shows some dialectal differences in the conditionals under discussion.

Conditional Type	Regular Scenario	Instead of Scenario
Backtracking CF	EMC *NC	***EMC** **NC**
Forwardtracking CF *knowing*	*EMC* **NC*	*EMC* **NC*
Forwardtracking CF *not knowing*	***EMC** **NC**	***EMC** **NC**
BT & FT Possibitional *knowing*	*EMC* **NC*	*EMC* **NC*
BT & FT Possibitional *not knowing*	***EMC** **NC**	***EMC** **NC**
Analytical BTCF	EMC NC	EMC NC
Stative BTCF	EMC NC	EMC NC

[*EMC,NC] ; *[EMC,*NC]*, adversity ; [EMC,*NC], non-adversity ; [EMC, NC]

5.1 Backtracking Counterfactuals

Given the denotations provided at the end of the previous chapter, most of what I need is already in place for the analysis of backtracking counterfactuals. As shown, I base my analysis on Arregui's while adding the details covered from Ogihara, albeit in a different formalism. Let me start by showing how a non-*instead of* BTCF is evaluated using my denotations of *would* and *have to*. As far as I'm concerned, what Arregui has presented is sufficient for these purposes, and I'm just updating it to incorporate ordering sources. I will start with the classic backtracking example:

(1) Perry would never ask Julie for help after a fight, even if he needed it, because he is far too proud. They had a fight last night, and now that he needs help, he won't ask.

    a. If Perry had asked Julie for help today, there *would have to have* been no fight yesterday.

    b. *If Perry had asked Julie for help today, there **would have** been no fight yesterday.

Remember that I am assuming the syntactic structure as in (15) (and here I am including the full structure, rather than the abbreviated structure that I will typically use for non-focused examples), where parentheses indicate material that is not in every tree. I am also using the consequent structure as in (3), and the denotation of *woll* as in (4) (again, this is the non-simplified form; at times I will drop the extra focus semantics clauses for ease of presentation, as in (5)):

(2)
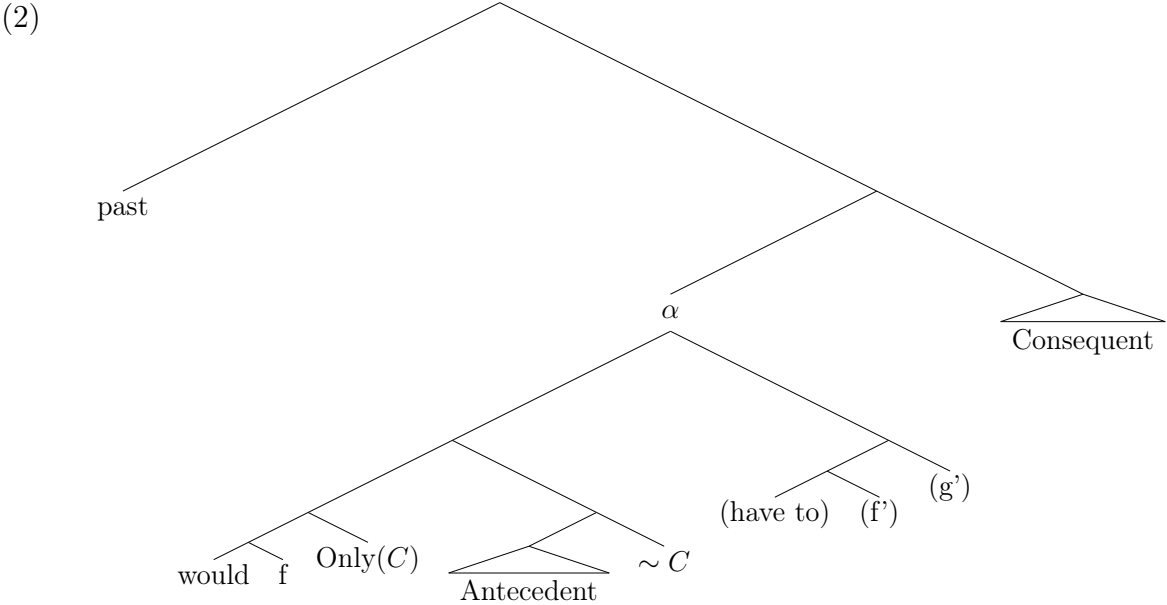
(3)   [would [have to [have$_{perf}$ [there be no fight yesterday]]]]

(4)   **With Focus Alternatives: *woll*** $[\![\text{woll-}t_i]\!]^{h,w_0} : \lambda P_{\langle i,\langle s,t\rangle\rangle}\lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t\forall w' \in (f(w_0))$

$[\exists t'[t' \approx t \ \& \ t' \lhd w'] \ \& \ P(h(t_i))(w')$

$\& \ P \in C \ \& \ \forall A \in C[A \neq P \to \neg A(h(t_i))(w')] \to Q(h(t_i))(w')]$

where h is an assignment function, and $h(t_i)$ is restricted to non-past times, and C is a set of contextually salient alternatives of P.

English gloss: *woll(P)(Q)(t) is true iff for all worlds w' in the modal base that have a counterpart to the actual world past in which P is true at a non-past time t_i and all of the focus alternatives A in C not equal to P are false at a non-past time t_i, Q is also true at a non-past time t_i.*

(5)   **Simplified *woll***: $[\![\text{woll-}t_i]\!]^{h,w_0} : \lambda P_{\langle i,\langle s,t\rangle\rangle}\lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t\forall w' \in \text{BEST}(f(w_0), g(w_0))$

$[\exists t'[t' \approx t \ \& \ t' \lhd w'] \ \& \ P(h(t_i))(w') \to Q(h(t_i))(w')]$

where h is an assignment function, and $h(t_i)$ is restricted to non-past times.

Next, let me remind the reader of my denotation of *have to*, after which I will show how it and *woll* compose via predicate modification so that both take the consequent clause and tense as their arguments, preserving the appropriate argument structure for all of the denotations involved.

(6) $[\![\text{have to}]\!]^{h,w_0} : \lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t. \ \forall w' \in \text{BEST}(f(w_0)(t), g(w_0))[\exists t'[(t = t' \text{ or } t < t')\&Q(t')(w')]]$, *where f is a contextually salient temporally sensitive modal base function and < represents temporal ordering.*

Notice that when *woll* has taken the antecedent as its argument by function application, it and *have to* will be of the same type, $\langle\langle\langle i, \langle s, t\rangle\rangle, i\rangle, t\rangle$. Therefore, once *woll* takes the antecedent as its argument, then this new complex denotation combines with *have to* via predicate modification at node α in the tree above so that both then take the consequent and tense as arguments, again via function application. This order suits the argument structure needs of both modals. Therefore, at the point of the derivation at which the antecedent has

already been merged, (7) is be the denotation of the merged modals when including the focus semantics clauses, and (8) is the denotation without the focus semantics clauses. Both are dense denotations, and I will give English glosses in the body of the text after the examples.

(7) $[\![$ antecedent would have to$]\!]^{h,w_0} : \lambda Q_{\langle i, \langle s,t \rangle \rangle} \lambda t \; \forall w' \in (f(w_0))$
       $[[\exists t'[t' \approx t \; \& \; t' \lhd w'] \; \& \; P(h(t_i))(w') \; \& \; P \in C \; \& \; \forall A \in C[A \neq P \rightarrow \neg A(h(t_i))(w')]]$
       $\rightarrow \forall w'' \in \text{BEST}(f'(w')(t), g'(w'))[\exists t''[(t' = t'' \text{ or } t' < t'')\&Q(t'')(w'')]]]$,
       where f is a contextually salient modal base, f' is a contextually salient temporally sensitive modal base, < represents temporal ordering, h is an assignment function, $h(t_i)$ is restricted to non-past times, and C is a set of contextually salient alternatives of P.

(8) $[\![$ antecedent would have to$]\!]^{h,w_0} : \lambda Q_{\langle i, \langle s,t \rangle \rangle} \lambda t$
       $\forall w' \in (f(w_0), g(w_0)) \; [[\exists t'[t' \approx t \; \& \; t' \lhd w'] \; \& \; P(h(t_i))(w')] \rightarrow$
       $\forall w'' \in \text{BEST}(f'(w')(t), g'(w'))[\exists t''[(t' = t'' \text{ or } t' < t'')\&Q(t'')(w'')]]]$,
       where f is a contextually salient modal base, f' is a contextually salient temporally sensitive modal base, < represents temporal ordering, h is an assignment function, and $h(t_i)$ is restricted to non-past times.

If P, *would have to*, that is, α in (15), takes the consequent and then tense as its arguments. The conditional composed of (7) and consequent and tense is true if and only if for all worlds w' in the modal base of *would* that have a counterpart to the actual world past in which the antecedent is true and all of its contextually salient focus alternatives are false, then if for all of the best worlds with respect to *have to*'s modal base and ordering source at the tense time t to those worlds, there is a time t'' non-past with respect to t' such that Q holds at t'' in w''. Very informally, given the set of worlds that the speaker was at for an NC syntax modal, there is now the added requirement that a rule was followed.

Now, let me repeat the process for (8). A conditional composed of (8), the consequent Q and tense t is true if and only if for all worlds w' that are best with respect to *would*'s modal

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base and empty ordering source that have a counterpart to the actual world past in which the antecedent is true, then for all worlds w'' accessible to w' that are best with respect to *have to*'s law there is a non-past time such that Q holds in this w''. The only difference is the simplification away from worrying about focus alternatives, which is acceptable when there is no overt focus as there will only be the antecedent proposition in the focus alternatives set C.

One thing to note about this analysis is that it contains two separate modal bases and ordering sources; since both *woll* and *have to* are true modals, I see no reason that each should not come with the pieces inherent to a modal. I do, however, see how the analysis could be modified to allow for the second ordering source to be appended to the first, making for a multiple ordering source analysis, much like that proposed for weak modality (von Fintel and Iatridou, 2008). However, as both modals exist outside this construction with both a modal base and an ordering source, I will not pursue this analysis.

Since (7) and (8) are less than ideal to read, comprehend, process, and utilize, I will endeavor not to show them as given above again, choosing instead to discuss only pieces at a time. I will also use a simplified version of (7) as follows in (12), and (8) as in (13). (9)-(11) give notational conventions that I will be using, based on the denotations given above, that will act as minor shortcuts for the denotations in (12) and (13). While these denotations are still involved, they are undoubtedly less difficult to read than their long-form equivalents.

(9)   NONPAST(t'): $t = t'$ or $t < t'$, for t the time relevant to the given denotation.

(10)   ONLY($P(h(t_i))$) : $P(h(t_i))(w')$ & $P \in C$ & $\forall A \in C[A \neq P \rightarrow \neg A(h(t_i))(w')]$
        That is, ONLY(P) determines that P is true in w', P is part of its set of focus alternatives, and all other focus alternatives are false.

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(11)   ∀ IDEAL-w: $\forall w' \in$ BEST$(f(w)(t), g(w))$ **or** $\forall w' \in (f(w_0))$, depending on context.

IDEAL-w is shorthand for the worlds in the modal base or the best worlds according to the modal base and its ordering source. The previous denotations make clear which case is which.

(12) $[\![P \text{ would have to}]\!]^{h,w_0} : \lambda Q_{\langle i, \langle s,t \rangle \rangle} \lambda t$

$\forall$ IDEAL-$w'[[\exists t'[t' \approx t \ \& \ t' < w'] \ \& \ $ONLY$(P(h(t_i))(w'))] \rightarrow$

$\forall$ IDEAL-$w''[\exists t'[$NONPAST$(t') \ \& \ Q(t')(w'')]]]$

English gloss: *P would have to Q is true at t iff for all of the ideal worlds (here, the worlds in the modal base) with a counterpart to the actual world for the history t in which P and none of its focus alternatives is true, then for all of the best worlds by have to's modal base and law-based ordering source, there is a non-past t'' at which Q is true.*

(13) $[\![P \text{ would have to}]\!]^{h,w_0} : \lambda Q_{\langle i, \langle s,t \rangle \rangle} \lambda t \ \forall$ IDEAL-w'

$[[\exists t'[t' \approx t \ \& \ t' \lhd w'] \ \& \ P(h(t_i))(w')] \rightarrow \forall$ IDEAL-$w''[\exists t'[$NONPAST$(t') \ \& \ Q(t')(w'')]]]$

The English gloss for (13) is exactly the same as for (12), except that it is unconcerned with focus alternatives.

With these simplified definitions in place, I can now present the analysis. For the scenario in example in (1), there is a clear judgment that the NC syntax conditional is false, and that the EMC syntax conditional is true. The explanation for why the NC syntax is false is the same as the one that Arregui gave in her analysis. Without the EMC, the counterfactual is true if and only if in all worlds that have a past counterpart to the actual world in which Perry had asked Julie for help at a non-past time,[1] then there is no fight yesterday. But given the similarity to the actual world past requirement, there will certainly be close enough worlds in the modal base, with an empty ordering source since there is no focus, in which

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[1]Recall, to 'have asked' at a non-past time is equivalent to asking at any time. If something is in the perfect, it is viewed as occurring before the time t_i, so before the non-past can be past, present, or future, and the actual time is determined contextually.

Perry asks for help but there was still a fight yesterday. What this comes down to is the fact that in this case, the ordering source doesn't have access to any more information since this is a standard epistemic use of *would* without the focus to lend alternatives that exclude worlds. Therefore, the denotation in (13) for the conditional in (1) will be false just as it would be in the accessibility relation approach that Arregui pursues.

Throughout this chapter, I will be using models like the following to make explicit exactly what worlds are under consideration. The models are based entirely off those that Arregui uses in her dissertation for the same purpose. In them, the x-axis represents the timeline of a world, and worlds are noted as either counterparts of or not counterparts of the actual world, $w_@$.

Here is a model to show which worlds count as close enough for the NC regular scenario from (1a), and notably, if w_2 is close enough, w_1 must also be close enough since it is more similar to the actual world past than w_2 because it is more faithful with respect to the fact that there actually was a fight yesterday. This is the reason why standard NC syntax backtrackers are unacceptable.

(14)
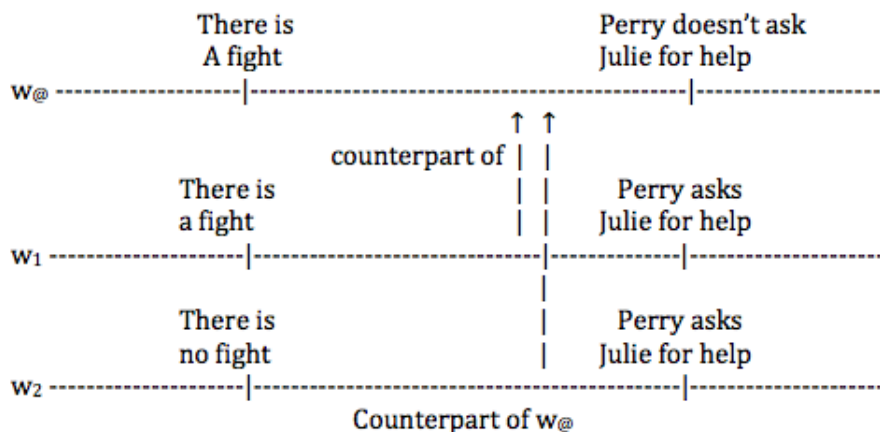
Next, let me compare this to the EMC syntax construction in (1b).

Speaking very informally, in the EMC context, the speaker first moves to worlds w' that have a counterpart to the actual world past, some of which will be fight worlds and some which won't, in which Perry asks for help. These worlds are ordered according to the empty ordering source (i.e. not ordered, and all of them are considered), and thus the falsehood of NC syntax is derived as above. What makes EMC syntax different is that the second modal then makes accessible worlds w'' that are accessible from these w' worlds, which have a modal base without a counterpart relation. The worlds in the second modal base are those that match the information available at the time that t denotes. The worlds are ordered according to the ordering source that is associated with *have to*: one that needs a salient rule. All of those w'' worlds, then, are ordered according an ordering source that includes the epistemic rule-like proposition *Perry never asks for help after a fight.* This together with the fact that all of the worlds already include asking for help, given the antecedent, means that the ordering source will order those worlds in which there was no fight yesterday as better or closer since they obey the law in *have to*'s ordering source, and the counterfactual will be evaluated as true, as expected. All of this fits with Arregui's analysis.

Now allow me to give a node by node composition using the following tree with its labelled nodes, recalling that I'm representing modal bases and ordering sources in the tree but not as lambda expressions in the denotations for presentational purposes.

(15)

δ
```
        δ
       / \
    past   γ
          / \
         β   Consequent
        / \
       α   (have to) (f')  (g')
      / \
  would f  g  Antecedent
```

Tree (15) nodes: δ; past; γ; β; Consequent; α; (have to); (f'); (g'); would; f; g; Antecedent
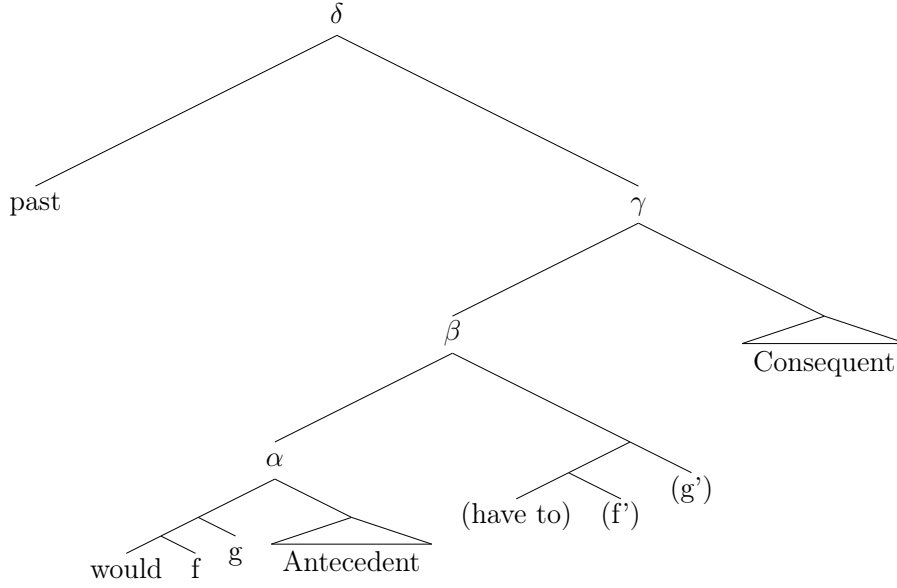
(16) a. $[\![\alpha]\!]^{h,w_0} = \lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t\forall$ IDEAL-w' $[\exists t'[t' \approx t \ \& \ t' \triangleleft w']$ & Perry has asked for help at a non-past time t_i in $w' \rightarrow Q(h(t_i))(w')]$

b. $[\![\beta]\!]^{h,w_0} = \lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t \ \forall$ IDEAL-w'
$[[\exists t'[t' \approx t \ \& \ t' \triangleleft w']$ & Perry has asked for help at a non-past time t_i in $w']$
$\rightarrow\forall$ IDEAL-$w''[\exists t'[\text{NONPAST}(t') \ \& \ Q(t')(w'')]]]]$

c. $[\![\gamma]\!]^{h,w_0} = \lambda t \ \forall$ IDEAL-w'
$[[\exists t'[t' \approx t \ \& \ t' \triangleleft w']$ & Perry has asked for help at a non-past time t_i in $w']$
$\rightarrow\forall$ IDEAL-$w''[\exists t'[\text{NONPAST}(t') \ \& \ \text{There was no fight yesterday in } w'' \text{ at } t']]]$

d. $[\![\delta]\!]^{h,w_0}$ is true iff $\forall$ IDEAL-w'
$[[\exists t'[t' \approx past_0 \ \& \ t' \triangleleft w']$ & Perry has asked for help at a non-past time t_i in $w']$
$\rightarrow\forall$ IDEAL-$w''[\exists t'[\text{NONPAST}(t') \ \& \ \text{There was no fight yesterday in } w'' \text{ at } t']]]$

The English gloss for (16d) is $[\![\delta]\!]^{h,w_0}$ is true iff for all worlds w' accessible to the actual world that have a counterpart to the actual world past in which Perry has asked for help at a non-past time t_i in w' (which will include both fight and non-fight worlds), then for all worlds w'' accessible to w' such that the law that Perry never asks for help after a fight is obeyed, there is a non-past time such that there has been no fight yesterday.

Allow me to again show the claimed result with a figure, where the red world is a world that has been excluded because it is not good enough according to the ordering source of *have to* because it is not rule-following.

(17)
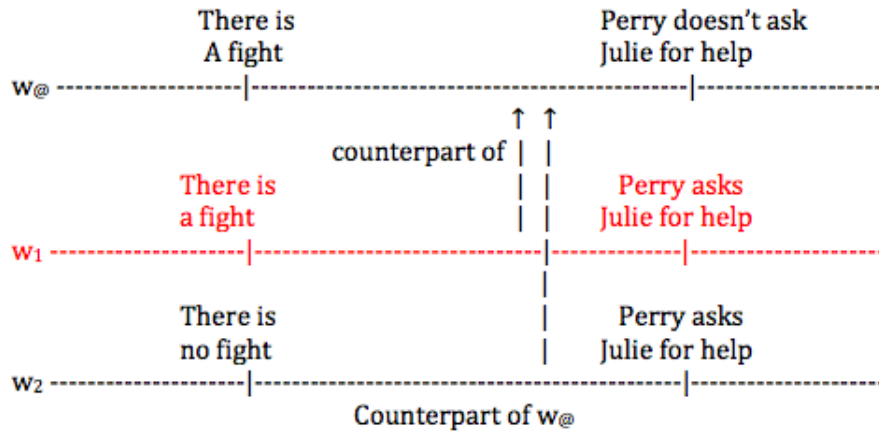
Let me pause for a moment to discuss a claim I made in the previous paragraph: the law that *have to* uses in this denotation is an epistemic law.[2] That is, it is a law based on tendency or habit, not on the rules laid down by an external source. So while *have to* always needs a rule to operate successfully, this doesn't mean that *have to* must be deontic in all of its uses. This fact will end up being important for the analysis of adversity readings.

Let me demonstrate the difference between EMC and NC syntax regular scenario backtracking counterfactuals in trees.

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[2]I am using epistemic here to contrast with deontic, and I do not mean anything more formal by "epistemic" than the fact that such a law comes from general knowledge of the world rather than knowledge of the rules.

(18)   EMC Syntax Backtracker

would   f   g   Antecedent

have to   f'   g'   Consequent

Arregui's laws

(19)   NC Syntax Backtracker

Consequent

would   f   g   Antecedent
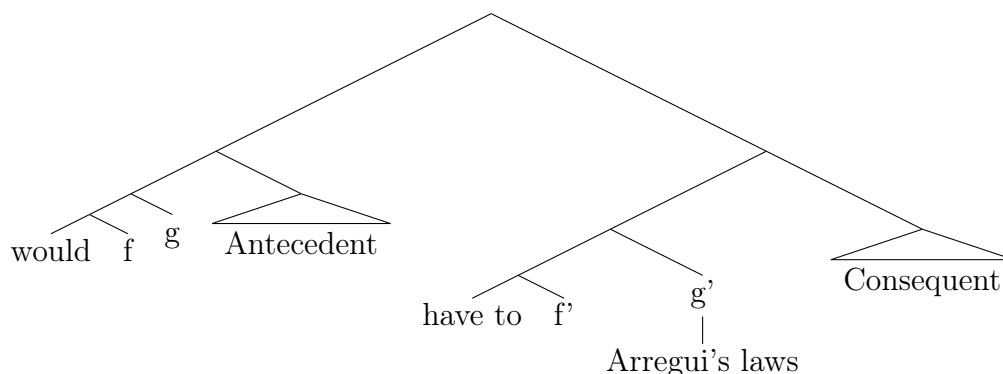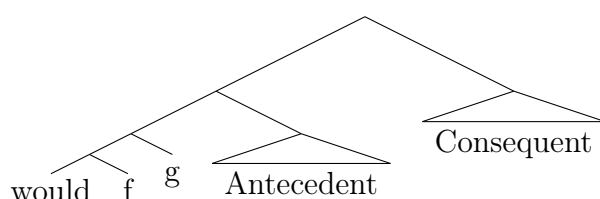
In the tree, we can locate the unacceptability of the NC syntax backtracker in the lack of *have to*, or more generally, as I'll show below, the lack of **some** way to rule out worlds with a past more similar to the actual world than the pasts that satisfy the assertion of the the consequent.

What I've shown so far is that, using the denotations I've set out in (4) and (6), I have a story, completely parallel to Arregui's, in which non-analytical regular scenario backtracking counterfactuals are able to be judged true with EMC syntax, and are judged false with NC syntax. What remains is to consider why we find that EMC syntax is unacceptable and NC syntax is acceptable for *instead of* backtrackers and show how they work successfully within this analysis, using the focus semantics account that I've presented. The analysis will be presented in a manner parallel to the presentation of regular scenario backtrackers, but now I will be including the details of the focus semantics outlined at the end of Chapter 4, adapted from Ogihara's *instead of* forwardtracking counterfactuals.

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Let's start with explaining why the *instead of* backtracker is good with NC syntax. I'll show this using the example below, copied from Chapter 3.

(20)   Katie and James fought yesterday because James asked Katie for help while she was trying to write. Today she isn't writing, and so would have been happy to help.

    a. *If James had asked Katie for help TODAY, there *would have to have* been no fight yesterday.

    b. If James had asked Katie for help TODAY, there **would have** been no fight yesterday.

Using the denotations above, the derivation will be as follows:

(21)   a. If James had asked Katie for help TODAY, there would have been no fight yesterday

    b. *Where t_i is a non-past time,*
      [[If James had asked Katie for help TODAY, there would have been no fight yesterday]]$^{h,w_0} = 1$ iff

    c. $\forall$ IDEAL-$w'[[\exists t'[t' \approx past_0 \ \& \ t' < w'] \ \&$
      ONLY(James has asked Katie for help today at t_i in w')]$\rightarrow$
      [there has been no fight yesterday in w' at t_i]]

That is, (21a) is true if and only if for all of the close enough worlds w' that are compatible with what the speaker knows in which James has asked Katie for help today and not any other day and which have a counterpart to the actual world past, there was no fight yesterday in w'. Because there is focus, the worlds will not be ordered according to the empty ordering source, as in regular scenario EMC syntax backtrackers, but rather according to an ordering source containing the propositions *James asked for help today,* $\neg$ *James asked for help yesterday*; these facts come from the C and $\sim$ that I've posited in the syntax. These focus facts are what make *instead of* backtrackers acceptable and potentially true with NC syntax: the

focused constituent makes available focus alternatives that contrast with the antecedent and are false by the denotation of the covert *only* that I've posited. With this ordering source, the best worlds will be those in which help is asked for today and not yesterday, and since there is no other evidence for a fight yesterday, the consequent will be true in these worlds. This is the desired result. So, in the following two diagrams, the former shows which worlds are accessible by the modal base, and the latter eliminates worlds of the w_1 type, which are no longer close enough given *would*'s focus semantics ordering source since any world in which James asked for help yesterday is eliminated by the ordering source.

(22)

```
        James asks        There is                James does not
        for help          a fight                 ask for help
  w@ -----|--------------------|--------------------------------|-------------------
                                               ↑
                                   counterpart of |
        James asks        there is              |    James asks
        for help          a fight               |    for help
  w1 ------|--------------------|----------------------------|--------------------

        James doesn't     there is                James asks
        ask for help      no fight                for help
  w2 ------|--------------------|--------------------------------|--------------------
                               Counterpart of w@
```

(23)

```
        James asks        There is                James does not
        for help          a fight                 ask for help
  w@ -----|--------------------|--------------------------------|-------------------
                                               ↑
                                   counterpart of |
        James asks        there is              |    James asks
        for help          a fight               |    for help
  w1 ------|--------------------|----------------------------|--------------------

        James doesn't     there is                James asks
        ask for help      no fight                for help
  w2 ------|--------------------|--------------------------------|--------------------
                               Counterpart of w@
```

What has been puzzling about *instead of* backtracking counterfactuals is not just the fact that they are acceptable without EMC syntax; given Ogihara's work, it seems clear that

focus material can affect the acceptability of a counterfactual, and in my analysis this is realized by the negation of all of the antecedent's focus alternatives. But it is also the fact that *instead of* backtrackers are *unacceptable* with EMC syntax that needs explaining. If the EMC syntax were supplying a simple epistemic universal modal, then there is no clear reason why these examples should be false. In the derivation that I provide below, I will endeavor to prove why the fact that they are false falls out immediately from the definitions and assumptions I've laid out so far.

The derivation is as follows; I will try to dissect it as clearly as possible below.

(24)   a.   If James had asked Katie for help TODAY, there would have to have been no fight yesterday

   b.   *Where t_i is a non-past time,*
        $[\![$*If James had asked Katie for help* TODAY*, there would have to have been no fight yesterday*$]\!]^{h,w_0} = 1$ iff

   c. $\forall$ IDEAL-$w'[[\exists t'[t' \approx past_0 \ \& \ t' < w'] \ \&$
        ONLY(James has asked Katie for help at t_i in $w')] \rightarrow \forall$ IDEAL-w''
        $[\exists t'[\text{NONPAST}(t') \ \& \ \text{there has been no fight yesterday at } t' \text{ in } w'']]]$

Rather than attempt this one as one large translation, I'm going to step through each part of the derivation, with the color-coding intended to help with understanding each of the steps:

(25) $\forall$ IDEAL-$w'[[\exists t'[t' \approx past_0 \ \& \ t' < w'] \ \&$

This portion of the derivation accounts for the modal base of the antecedent clause, along with the past counterpart relation. At the end of this phrase of the denotation, the accessible worlds are only those worlds that have a counterpart to the actual world past that are in the modal base – that is, that are epistemically accessible.

(26)   ONLY(James has asked Katie for help at t_i in w')]

This clause adds the restriction that the antecedent be true at t_i, a time that is non-past, which ends up meaning that help was asked for at any time – past, present, or future – since the antecedent is in the past perfect, and so is in the past of a future event; in this case, any time today, since there is a temporal adverbial. Because (26a) has focus, this clause also adds the restriction that the antecedent is true to the exclusion of its focus alternatives. That is, this clause removes from the close enough worlds any world in which help was asked for yesterday. Therefore the close enough worlds will only be those that make true the following propositions: {*James asked Katie for help today,* ¬ *James asked Katie for help yesterday*}. At this point, the denotation is just like the denotation of the NC syntax counterfactual in (21c). As described above, if the derivation at this point tested the consequent clause without any additional semantic content (i.e. without *have to*), the counterfactual in (24a) could be true in the correct context. However, the next clause is where this denotation diverges from the previous derivation.

(27)   ∀ IDEAL-w''

The accessible worlds in this clause are those worlds w'' that are compatible with the worlds accessible from those discussed after (26) in the derivation. Again, I am assuming an epistemic or circumstantial modal base, so the worlds will be compatible with what is known, which will include, for example, the propositions {*James asked Katie for help today and not yesterday, Katie is free to help today, James needs help*}. These worlds are then ordered according to some contextually salient rule, since the ordering source for *have to* is always rule based. However, there is no salient generality that the context readily provides, and so *have to* uses the only rule that seems probable given the conditional under discussion: *James never asks for help after a fight.* In order to hold fixed the antecedent, then, all close enough worlds must be worlds in which there were no fights yesterday, at all. While it is true that the particular fight caused by asking for help is not present in any close enough

worlds, there is no information here about whether other fights did or did not occur, and so the close enough worlds will contain both.

(28) $[\exists t'[\text{NonPast}(t') \ \& \text{ there has been no fight yesterday at } t' \text{ in } w'']]]$

Therefore, the consequent which is asserted for a non-past time, *there has been no fight yesterday at t' in w''* is not true. That is, it is not necessary that all of the w'' worlds are fight-free worlds. They simply lack the fight caused by asking for help. When asking a native speaker about the judgment on this conditional, the invariable response is "There could have been a fight for some other reason," and this is precisely what my analysis predicts. There is no reason for worlds with no fights yesterday to be the only kind of close enough worlds, since there is no rule linking asking for help today to no fight yesterday in the way there was for the non-*instead of* backtracker, (1a). Therefore *instead of* backtrackers will always be false with EMC syntax because all of the work is done by the first ordering source. Informally, by adding a second modal, interlocutors are forced into considering possibilities that otherwise would not have been entertained. By the time the second modal base and ordering source comes into play, there are no salient rules available to the second ordering source that will make the conditional true. The requirements of the EMC syntax are not met in a way that can make the *instead of* backtracking counterfactual true. As before, let me locate the difference between the potential truth of (20b) from the necessary falsity of (24a) in a diagram, as well as the two trees representing an EMC and NC *instead of* backtracker.

(29)

There is a fight	James asks for help	There is that fight		James does not ask for help

w@ -----|-----------------|---------------|--------------------------|--------------------

counterpart of ↑

There is a fight	James asks for help	There is that fight	|	James asks for help

w₁ -----|-----------------|---------------|--------------------------|--------------------

There is a fight	J. doesn't ask for help	There is that fight		James asks for help

w₂ -----|-----------------|---------------|--------------------------|--------------------

Counterpart of w@
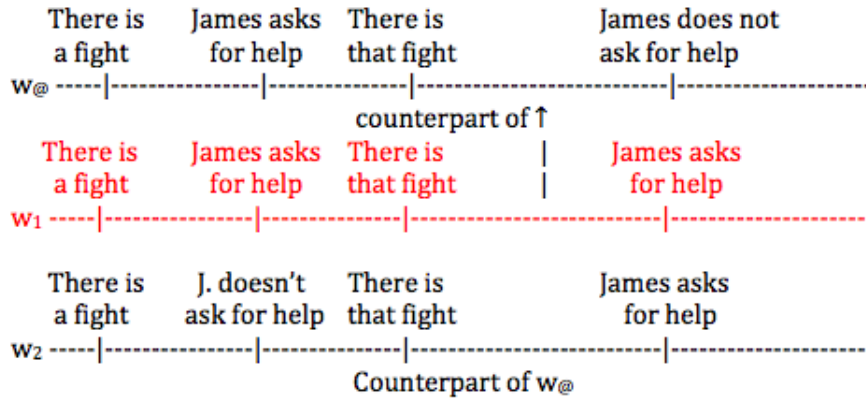
The same worlds are available here as were for the NC syntax backtracker in (20b) above, except that we now evaluate all of the fights yesterday, both the fight caused by asking for help, as well as other fights. Even though a world like w_1 is excluded by the focus ordering source, worlds like w_2 will still be close enough and have no way of being excluded, and so the counterfactual is false. The following two trees show the difference between NC and EMC *instead of* backtrackers.

(30)   NC Syntax *instead of* Backtracker

```
              past
                        would   f   Only(C)        Antecedent    ~ C       Consequent
```
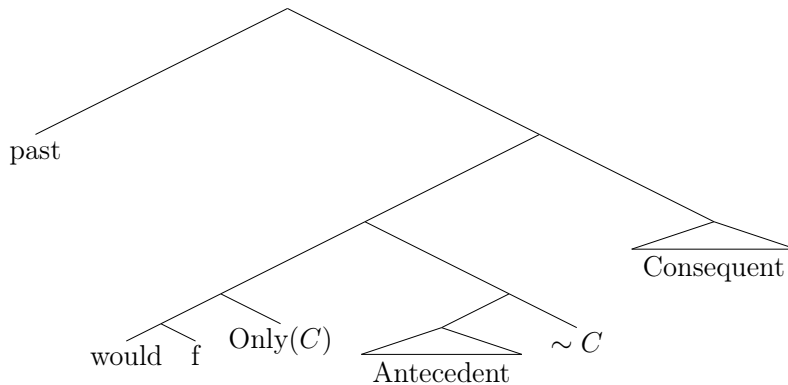
This syntax of this tree provides an acceptable *instead of* backtracker because the C includes the information that help was asked for today instead of yesterday, successfully ruling out undesirable w_2 worlds in (23). However, the tree that follows results in a false

conditional because by adding the *have to* modal, there is an ordering source that needs a rule to be satisfied, and forces the domain of quantification to include further afield worlds. Therefore, while *instead of* and *have to* are both ingredients that can incidentally make a backtracker true with their standard denotations, their denotations taken together can cause a problem which leads to necessary falsehood.

(31)   EMC Syntax *instead of* Backtracker
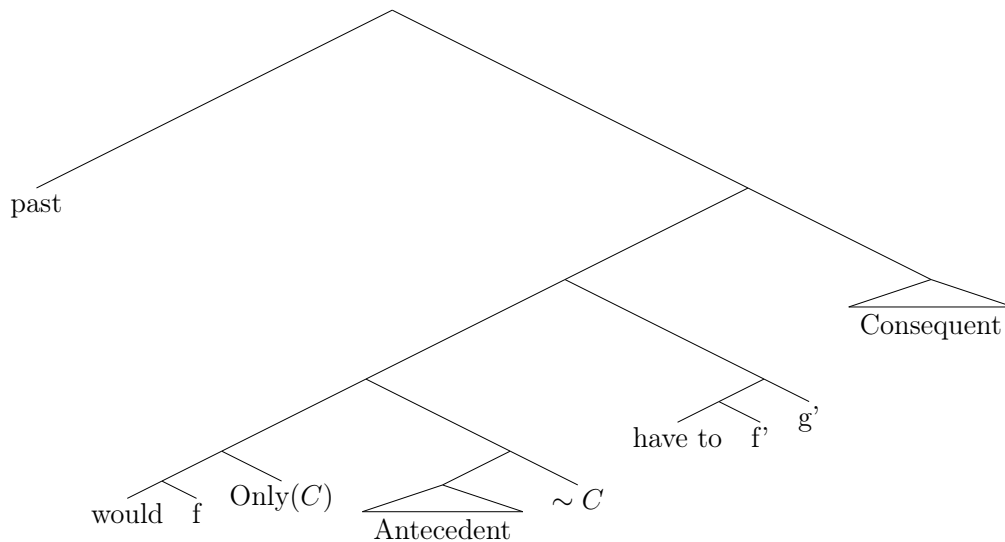
What I've shown in this section is that by using focus semantics in my denotation of *woll*, I can account for the major contrast between regular and *instead of* contexts for backtracking counterfactuals. Not only that, but there is nothing out of the ordinary about the denotations of either semantic element: *have to* works as a rule based universal modal, and counterfactuals have a denotation that is the same as it would be were it a forwardtracking counterfactual, where past similarity is determining factor for concluding which worlds count as close enough worlds. Furthermore, focus is not working any unusual magic either: it simply makes contrast set information available as the ordering source and therefore excludes worlds that make true any of the antecedent's focus alternatives. I am explicitly claiming that a unified account of conditionality needs to take into account the effect of focus on the denotation of a conditional.

Before moving on to the difference between *knowing* and *not-knowing* contexts for non-BTCF conditionals in §5.2, I will show that the definitions defended in this section succeed in account for analytical backtrackers as well. Afterward, I will move on to FTCFs and Possibitionals, but I will be coming back around to BTCFs when I discuss the presence or absence of the adversity reading in *have to* conditionals.

5.1.1 Analyticals

Before moving on to non-BTCFs, I need to ensure that my account still covers the fact that analytical backtrackers are acceptable with both NC and EMC syntax, which is something that isolates analyticals (and stative antecedent counterfactuals, which I will account for in §5.5) as completely unlike the rest of the BTCF examples. Examples of analyticals (32) are given here:

(32)   a.   If she had a twin sister, her mother **would have had** at least two children.

   b.   If she had a twin sister, her mother *would have to have had* at least two children.

For these analyticals, I follow the same analysis that Arregui gave: since the relation between the antecedent and consequent is independent of the world argument, it is automatically true with respect the the actual world that all antecedent worlds are consequent worlds. Similarly, since there is an epistemic law relating the antecedent and consequent – in (32) the law is something like {*To be a twin entails having a sibling*} – the EMC syntax conditional will also be automatically true. The derivations are given as follows, but the counterfactuals are essentially trivially true.

(33) a. If she had a twin sister, her mother would have had at least two children.

b. *Where t_i is a non-past time,*

[If she had a twin, her mother would have had at least two children.]$^{h,w_0} = 1$ iff

c. $\forall$ IDEAL-w' $[\exists t'[t' \approx past_0$ & $t' \triangleleft w']$ & She has a twin sister at t_i in $w' \rightarrow$

[Her mother had at least two children in w' at t_i]]

(33a) is true if and only if all of the worlds in the modal base (given an empty ordering source) that have a counterpart to the actual world past in which she has a twin sister at a non-past time are also worlds in which her mother had at least two children (at a non-past time). By definition, all close enough accessible worlds will be such worlds and so (33a) is true in all worlds.

(34) a. If she had a twin sister, her mother would have to have had at least two children.

b. *Where t_i is a non-past time,*

[If she had a twin sister, her mother would have to have had at least two chil-dren.]$^{h,w_0} = 1$ iff

c. $\forall$ IDEAL-w' $[[\exists t'[t' \approx past_0$ & $t' \triangleleft w']$ & She has a twin sister at t_i in $w']$

$\rightarrow \forall$ IDEAL-$w''[\exists t'[$NONPAST(t') & Her mother had at least two children at t' in

$w'']]]$

As in (33), (34a) is true if and only if for all close enough worlds w' accessible to the actual world that have a counterpart to the actual world past in which she has a twin sister at a non-past time, for all close enough worlds w'' accessible to w' that follow the rule *To be a twin entails having a sibling* there is a non-past time at which her mother had at least two children. Again, this is true world-independently, and so (34a) is true.

In this section I have shown that the theory I presented at the end of Chapter 4 accounts for all of the data that Arregui presented, as well as the novel *instead of* backtracker data. Allow me to reiterate that even though some definitions of backtracking would not consider *instead of* backtrackers as cases of backtracking because they do not involve reasoning back-

ward through a causal chain, there nonetheless needs to be an account of when an *instead of* BTCF is licensed, which I have provided in this section. Next, I will explore the differences between EMC and NC syntax backtrackers in FTCFs.

5.2   It's all about What you Know

In this section I will be explaining the facts of the judgments for Forwardtracking Counterfactuals and both kinds of Possibitionals. I need to account for two separate facts here: firstly, I need an explanation for why an *instead of* context does not change the acceptability judgments of EMC and NC syntax conditionals for FTCFs and Possibitionals, and secondly, I must analyze why there is a difference between the *knowing* and *not knowing* contexts with respect to EMC and NC syntax in all of the conditionals except backtracking counterfactuals.

I will start my discussion with a forwardtracking counterfactual in a *knowing* context, that is, an FTCF that is true only with EMC syntax, and I will show why an *instead of* context does not change the facts. As with the backtrackers, all of the data for the rest of this chapter will be data points repeated directly from Chapter 3.

(35)   Brad had a concert invitation for Thursday night and a paper due Friday. He is a really good student, but had a really busy day on Friday with meetings all day, so he declined the concert invitation. Knowing about his paper deadline and that he is a good student, and wishing he had come Thursday, Janet says:

   a.   If Brad had attended the concert Thursday, he *would have to have* written his paper on Friday.

   b.   *If Brad had attended the concert Thursday, he **would have** written his paper on Friday.

First, why does this scenario make an NC syntax conditional false? Below is the derivation:

(36)   a.   If Brad had attended the concert Thursday, he would have written his paper on Friday.

       b.   *Where t_i is a non-past time,*

           $[\![$*If Brad had attended the concert Thursday, he would have written his paper on Friday*$]\!]^{h,w_0} = 1$ iff

       c. $\forall$ IDEAL-w' $[\exists t'[t' \approx past_0$ & $t' \lhd w']$ &

           Brad has attended the concert Thursday at t_i in $w' \rightarrow$

           [he has written his paper on Friday w' at t_i]]

In (36), the domain of quantification is all of the epistemically accessible worlds that have a past counterpart in which Brad has attend the concert. What is also epistemically accessible to the speaker are the propositions like {*Brad had a busy day on Friday, Brad is a good student*}, so these facts will be included in the modal base worlds as well. Thus, when the ordering source orders the worlds according to the empty ordering source associated with epistemic *would*, the close enough worlds will all be ones in which he has an obligation to write his paper, and being a good students wants to do so, but due to the nature of his busy day, some of these close enough worlds will be worlds in which he doesn't finish his paper. Therefore, this counterfactual is judged false. Let's look at a model of the accessible past counterpart worlds.

(37)
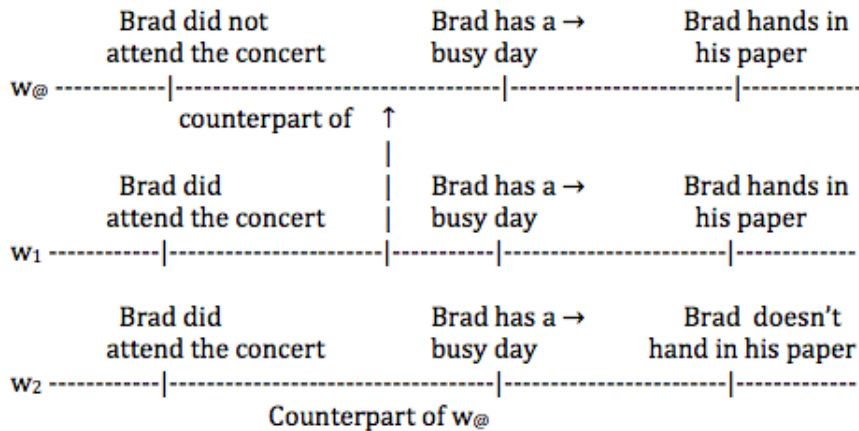
The reason that an NC syntax conditional is false is shown here with the fact that the modal base has access to the fact that Brad has a busy day on Friday, and so there will be worlds like w_2 where Brad attends the concert, and he does not in fact finish his paper. Therefore, the counterfactual in (35) will be false.

There are two questions that arise from the data in (35) and its NC syntax derivation: why does an *instead of* context not save this derivation? Also, why <u>does</u> *have to* save it? I will start with the question of *instead of*, since the analysis I provide for why and *instead of* backtracker does not rescue a FTCF will be true for all of the forward tracking examples (counterfactual and possibitional alike), as well as for backtracking possibitionals. Therefore, here is the example of an *instead of not-knowing* forwardtracking counterfactual.

(38)   Eric had a paper due Friday and a concert invitation for either Thursday or Friday night. His friends were all going on Thursday. He is a good student, but had a really busy day on Friday with meetings all day, so he decided to go to the Friday night concert. Gracie knows about all this, so while lamenting his absence, Gracie nonetheless understands and says:

   a.   If Eric had attended the concert THURSDAY, he *would have to have* written his paper on Friday.

   b.   *If Eric had attended the concert THURSDAY, he **would have** written his paper on Friday.

Unlike with backtracking counterfactuals, the *instead of* BTCT in (38a) is felicitous with the EMC syntax. But first, why is it infelicitously used without it? Were this a backtracking counterfactual, we would expect that the *instead of* context would license the NC conditional. However, notice what the focus operator ($\sim$) and focus alternative variable C have access to in this example: *Eric went to the concert Thursday, Eric went to the concert Friday.* The semantics of focus that I have use will make accessible to the ordering source the following propositions, which close enough accessible worlds must make true: {*Eric went to*

the concert Thursday, ¬ Eric went to the concert Friday} This doesn't change the evaluation of the conditional from the derivation given in (36). Going on Thursday is enough to make completing the paper on Friday impossible irrespective of Friday's concert attendance. That is, there is no link between Friday's paper-writing and Friday's concert-going. Let me show this in a model.

(39)

```
   Brad did not          Brad has a →    Brad hands in  Brad attends
   attend the concert     busy day        his paper      concert
w@ ------|--------------------------|------------------------|----------------|------
             counterpart of    ↑
                               |
   Brad did               Brad has a →    Brad hands in  Brad doesn't
   attend the concert     busy day        his paper      attend con.
w1 ------|--------------------------|-------|------------------------|----------------|------
   Brad did               Brad has a →    Brad  doesn't   Brad doesn't
   attend the concert     busy day        hand in his paper  attend con.
w2 ------|--------------------------|------------------------|----------------|------
                    Counterpart of w@
```
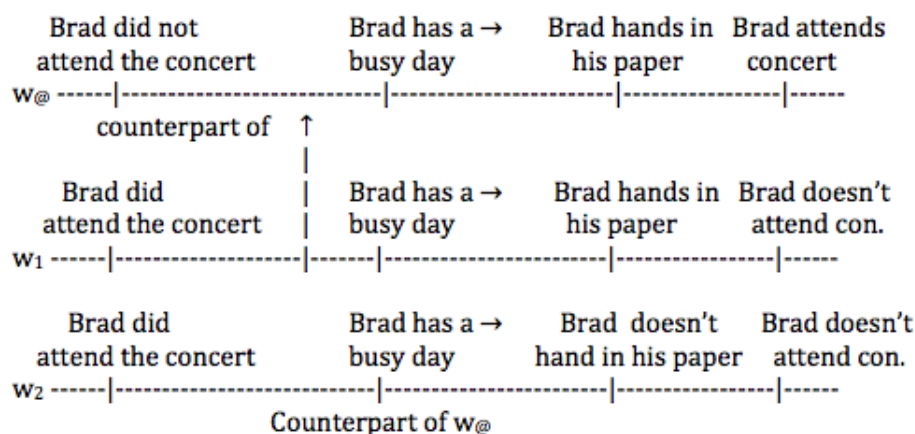
In this model, I'm considering only worlds where the semantics of focus has done the work of excluding worlds in which he attends the concert both Thursday and Friday. Notice, though, that in the close enough accessible worlds (w_1 and w_2), the worlds otherwise behave exactly like the regular scenario worlds in (37). That is, attending the concert Thursday is enough to make worlds accessible in which Brad doesn't finish his paper. Therefore, *instead of* has no effect. The same is true of all of the non-BTCF *instead of* examples, so I will not show a model or derivation for any other non-BTCF *instead of* conditionals.

The story for backtracking counterfactuals was different because in (20), asking for help today instead of yesterday actually has bearing on yesterday's fight. Therefore, the fact that the counterfactual is forward- or back-tracking will affect the effect of an *instead of* clause. For any forwardtracking conditional, then, we anticipate that in general the focus that leads to the *instead of* reading of the conditional will not affect the grammaticality judgments

either way, even though it successfully adds information to the ordering source that affects the interpretation of the conditional.

Having resolved the problems with NC syntax for regular and *instead of* forwardtracking counterfactuals, I will now explain why the EMC conditional (35a) is acceptable and can be true for both NC and EMC FTCFs. The only difference from denotation between the EMC syntax denotation and the denotation in (36) is the addition of the *have to* modal. As was true for backtracking counterfactuals, what *have to* does is allow a second ordering among the already established epistemically accessible worlds (which were unordered, due to the empty ordering source of *woll* for a non-focused conditional), and this second ordering is dependent on accessible laws. So, in all of the worlds accessible to those that hold true the propositions {*Eric went to the concert Thursday night, Brad is a good student, Brad has a paper due Friday*} will be worlds that are ordered as better if that laws are obeyed, and Eric writes his paper. Here's the model, and as before, the red world is one that is excluded by the ordering source of *have to* because they are not law-abiding.

(40)
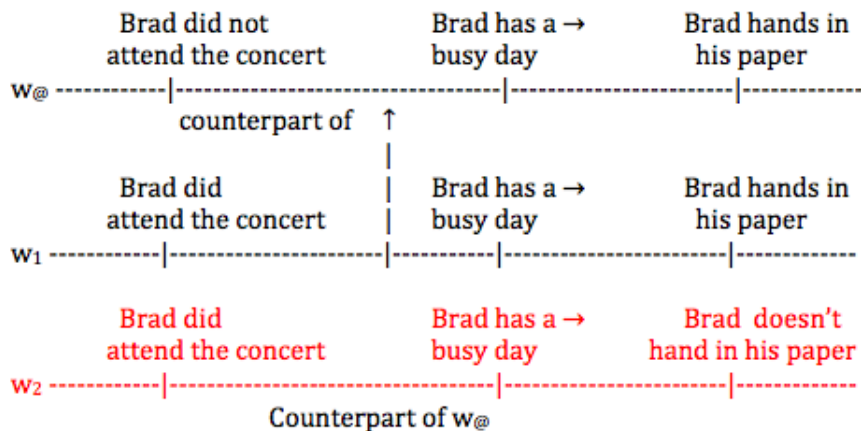
The only difference between this model and the model in (37) is the fact that the rule that *Eric writes his paper by Friday* is obeyed in all of these worlds, and so the counterfactual excludes the worlds in which he is too busy to write it, and the counterfactual is true.

In this case, the law is a deontic law: the law that Eric's paper get written by Friday is handed down by an authority, presumably the professor of the class. This is different than the laws of backtracking counterfactuals which were epistemic, or laws about how the world typically behaves.

The law of the second ordering source is what provides the appropriate accessible worlds: in close enough w'' worlds accessible to the w' worlds, the paper gets written because w'' worlds are law-abiding worlds. But, in the w' worlds accessible to *would*, it is not true that the paper gets written because some of the close enough actual worlds include the fact that Friday is a busy day. So while the paper writing obligation holds in the actual world, including worlds where he attends the concert on Thursday night, the actual paper writing does not necessarily hold. Further evidence for this comes from the fact that the speaker can assert that the obligation holds and that the task will not be accomplished without contradicting him/herself:

(41)   If Brad had attended the concert Thursday, he *would have to have* written his paper on Friday, but he wouldn't have finished because he had a busy day.

And this same explanation holds for the *instead of* context because, as above, the *instead of* clause does not impact the evaluation of the FTCF in any relevant way. Therefore, the proposition {*Eric hands his paper in on Friday*} in the ordering source of *have to* is what guarantees that in all worlds w'', the paper is written and the counterfactual is judged true in the provided context.

Next, let me show how being in a *not-knowing* context changes the facts so that the conditional is licit with NC syntax. Given the discussion above, the acceptability and potential truth of an NC syntax conditional may be clear for this example, but I will present the analysis nonetheless. After, what will still need explaining is why this scenario is such that the EMC syntax FTCF is unacceptable.

(42)   Will had a paper due on Friday and a concert invitation for Thursday night. Will decided not to attend the concert, and Elizabeth is wondering why. Knowing about the paper, but also knowing that he is a good student, Elizabeth says:

   a. */? If Will had attended the concert Thursday, he *would have to have* written his paper on Friday.

   b. If Will had attended the concert Thursday, he **would have** written his paper Friday.

First, I will demonstrate how this scenario works with the NC syntax.

(43)   a. If Will had attended the concert Thursday, he would have written his paper on Friday.

   b. *Where t is a non-past time,*
       $[\![$*If Will had attended the concert Thursday, he would have written his paper on Friday*$]\!]^{h,w_0} = 1$ iff

   c. $\forall$ IDEAL-w' $[\exists t'[t' \approx past_0$ & $t' \lhd w']$ &
       Will has attended the concert Thursday at t_i in $w' \rightarrow$
       [he has written his paper on Friday w' at $t_i]]$

The modal *would* accesses all of the close enough possible worlds that have an actual world past counterpart in which Will had attended the concert on Thursday; the modal base will include information along the lines of {*Will is a good student, Will has a paper due Friday*}. These accessible worlds are ranked according to an empty ordering source because there is no focus in (43a), and the conditional is true if in all of these close enough worlds (i.e. all of the accessible worlds) Will has written his paper on Friday. Given the available information in this scenario, the conditional is true. This is because the modal base does not have access to any information that excludes the possibility of his finishing his paper, and in particular the modal base contains the information that he is a good student. Therefore, as the following model shows, all concert-attending worlds are also paper-writing worlds, and

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worlds in which he attends the concert but doesn't write his paper are not close enough to count as counterpart worlds.

(44)
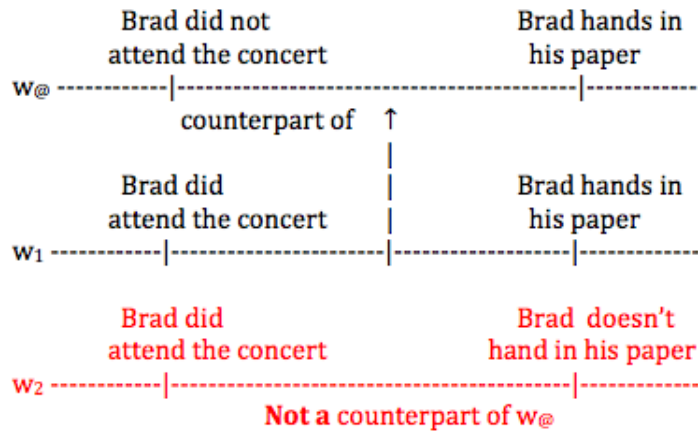
Therefore the conditional is true and acceptable without the EMC syntax. The epistemic modal base does not include any information similar to that in (35) or (38) that Friday is busy, and so there is no need for the *have to* ordering source: all of the accessible worlds (which incidentally follow the deontic rule that would satisfy *have to*'s need for a salient law) are worlds in which the paper gets turned in on time on Friday.

I'd like to make clear what the difference is between these forwardtracking examples and backtracking counterfactuals. The difference comes down to the actual world past similarity relation inherent to *would*'s denotation. In FTCFs, the closest worlds with an actual world past counterpart in which the antecedent is true are all going to have the consequent evaluated in the future of this antecedent. If a world manages to be close enough and is an antecedent world, then with the world proceeding as normal, the consequent will follow as is claimed (for a true conditional). In contrast, in backtracking counterfactuals, the *consequent* is what is the farthest in the past, and needs to have a counterpart to the actual world past. So even once the worlds have been restricted by the antecedent

and the counterpart relation, there will still be close enough worlds with actual world past counterparts in which the consequent is not true, and so the backtracker will come out false.

Now, the tricky part is why EMC syntax is unacceptable with a *not-knowing* scenario for both the regular and *instead of* contexts. Given the reasoning above, the outcome of adding the extra modal layer is to say that there is an obligation that the paper be written by Friday, which is true in all of the scenarios that I've presented for the FTCFs. Hence, I cannot appeal to the same reasoning that I used to exclude EMC syntax from *instead of* backtracking counterfactuals. To solve this problem, I am going to present a purely pragmatic analysis that ties directly into the adversity reading. Therefore, I will put off the second part of this analysis until after I've accounted for the adversity reading.

5.3   The Adversity Reading

I claim that the adversity reading arises due to an implicature drawn from the entailment relation between NC and EMC syntax conditionals. This analysis is linked to an intuitive approach to the difference between the two. With EMC syntax, the usage correlates with the fact that there is an obligation, made salient by the deontic rule in the ordering source, and while this obligation, that is, the consequent, is met in the *have to* worlds, in the actual world, it might not be. So there is a mismatch between ideal worlds and the actual world, and this is interpreted as a negative thing.

This reasoning aligns nicely with a more formal approach to the intuition, and one that dovetails prettily with the puzzle I left temporarily unsolved at the end of the last section (why the EMC syntax is unacceptable for *not knowing* FTCFs). The idea is that the adversity reading is partially determined by conversational implicature. Essentially, if in all worlds compatible with what the speaker knows now, the consequent is true, then the speaker need only use an NC syntax conditional to express the facts. For example, in (42), with everything that Elizabeth knows, Will can and will complete his paper on Friday, and so the NC syntax conditional is true, and to use the EMC syntax conditional would imply more information

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in the modal base than Elizabeth actually has epistemic access to. On the other hand, if it is not a given that the consequent is achievable given the facts in the actual world, but by the "laws," the consequent must be accomplished, a speaker will use *have to* to indicate that the world cannot continue on its current trajectory for the consequent to be carried out successfully in all epistemically accessible worlds to the actual world.

This bears on a type of example I have not yet discussed:

(45)   My evening is completely free, and I could quite clearly do work if it were required of me, but I don't want to. My boss calls around 5:00pm with an urgent request, and I respond with:

a.   If I completed this project by tomorrow, I would have to work through this entire evening.

What is special about this example is that there is nothing inhibiting me from working through the evening, except that I don't want to. This scenario and its acceptable conditional strengthen the intuitive idea that I've just presented. By using a conditional that implies that the task is not guaranteed to be accomplished in all of the currently epistemically accessible worlds, I am indicating to my boss that this is an undesirable course of events, even though I know that it is completely feasible. In essence, I am adding something to the modal base that, as far as my interlocuter understands, indicates that I cannot or will not work through the entire night given the current course of events.

To account for the adversity reading, I will use the standard Gricean (1975) approach to calculating implicatures. To computer an implicature of this sort, consider two propositions α and β, where α entails β, $\alpha \Rightarrow \beta$. Then, assume that the speaker chooses to utter β. The hearer, upon hearing β, will reason that since $\alpha \Rightarrow \beta$, if the speaker uttered β, it's because (s)he can't utter α. Therefore, the hearer concludes that either the speaker doesn't know α or knows that $\neg\alpha$.[3]

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[3]Ippolito 2003 formulates it this way in particular, but this is also a fairly standard view of scalar implicatures.

It is hopefully clear how this reasoning extends to my data: I claim that the NC/EMC entailment pattern is a specialized version of an *all/some* scale. I further claim that the NC syntax version of a conditional is the stronger (*all*-type) of the two conditional assertions on the scale, and so by uttering the weaker EMC syntax conditional (*some*-type), the speaker wants the hearer to draw the conclusion that either the NC conditional is not true, or the speaker is not sure that the NC conditional is true, or that the consequent denotes a negative event for its subject. In the semantics that I have shown this far, it is not clear how either conditional entails the other. EMC does not entail NC because having to do something does not mean it gets done, as I've established above. And the NC syntax conditional seemingly does not entail the EMC syntax due to the nature of the differences of ordering source options. The following is an example:

(46)   Sarah needs to go shopping for a new pair of tap shoes, and can go any day this week. She was thinking of going tonight, but there's a party that Ryan will be at, so she wants to be there too. In that case, she's going to go buy the shoes tomorrow.

    a.   If Sarah goes to the party tonight, she will buy her shoes tomorrow. (True)

    b.   *If Sara goes to the party tonight, she will have to buy her shoes tomorrow. (False)

This seemingly shows that with certain kinds of possibitionals, there are situations where NC syntax is true but the EMC syntax is false. What matters for this problem is the fact that it is not the case that all scenarios in which one will do something are scenarios in which one has to do said thing. Many people do things for reasons other than rule-like behavior. So it appears as though neither conditional entails the other, and this could be a problem for the approach I've built up.

However, if we limit ourselves to scenarios with a deontic use of *have to* in which both the NC and EMC syntax conditionals adhere to the rule that defines the *have to* ordering source, then it is true that the NC syntax conditional entails the EMC syntax. Take the

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paper writing example. The consequent *he would write his paper on Friday* satisfies the rule that isn't appealed to overtly by the modal *have to* but nonetheless present: *He has to hand in his paper on Friday.* So in every case in which it is true that he will hand the paper in (and he is satisfying a potential rule for a *have to* ordering source), then it is also the case that he has to hand the paper in. So the adversity reading does in fact make use of an asymmetric entailment relation, where a deontic-natured NC syntax conditional entails its deontic EMC syntax equivalent.

Formally, I claim that if all scenarios that make one proposition true make a second true as well, but not all scenarios that make the second true make the first true, then there is a generalized entailment pattern that gives rise to a scalar implicature. A second way to think about this contrast is to consider all of the worlds in *woll*'s modal base. For a true NC syntax conditional, all of the worlds accessible to the actual world with an actual world past counterpart in which the antecedent is true will also be worlds in which the consequent is true. For an EMC syntax conditional, though, it is possible that there are worlds that are accessible to the actual world by *woll*'s modal base and ordering source in which the consequent is **not** true – this is the entire function of *have to* in backtracking, to exclude worlds from *woll*'s accessible worlds that do not adhere to the laws. Therefore, every world accessible to the actual world w' in an NC syntax conditional is such that every world w'' accessible to it by *have to*'s modal base and ordering source will make an EMC syntax conditional true. However, not every world accessible to the actual world by *woll* in an EMC conditional will make an NC conditional true. Therefore, there is an asymmetric entailment relation, albeit a non-traditional type of entailment, so that a scalar implicature can be drawn.

There may be a concern that since I have ordering sources, the sets of worlds for each conditional are related in a non-monotonic way. However, I do not require that one set of worlds properly includes the other. Rather, by my analysis, as long as all of the close enough worlds in NC syntax *woll*'s modal base can be added to the EMC syntax *woll*'s modal base,

and the conditional will still be true, this is sufficient for my purposes. And the relation is still asymmetrical, and so all of the requirements for a scalar implicature are met.

I am not the first to propose a non-standard scalar implicature. For example, Ippolito 2003 proposes a scalar implicature between presuppositions that are in an asymmetric entailment relation. The result of the scale proposed above is that by using NC syntax, the speaker is saying something stronger about the potential reality of the consequent than if the speaker used EMC syntax. Thus, the appropriate implicatures can be drawn by the hearer, and computed as dictated above.

If, as I'm saying, EMC syntax is unacceptable in *not knowing* scenarios because it is a scalar implicature, it should be able to stand up to some standard tests for scalar implicatures. Take the example in (47), adapted from an example from Sauerland (2004) who cites it as originally from Horn (1972), with the following explanation:

> One of Horn's tests using what he calls suspender clauses is illustrated in [(47)]. Horn (1972, p. 30) argues that continuations of a sentence ϕ with *and possibly … even ψ* are acceptable only if the negation of ψ is a scalar implicature of ϕ.

(47)   Kai had some of the peas last night, and possibly Kai even had all of the peas last night.

Let's try the same with conditionals.

(48)   If Will had attended the concert Thursday, he would have to have written his paper on Friday (EMC), and possibly if Will had attended the concert Thursday, he would have (even (successfully)) written his paper on Friday (NC).

To the extent that there is an acceptable place to put *even* in this complicated sentence, it is acceptable. Without even, or with the addition of *successfully*, this sequence of conditionals is successful and parallel to (47). This is evidence that we do in fact have a scalar implicature.

All that remains is the issue of why the reading that arises with the weaker conditional is one of adversity, or something that negatively impacts the subject of the consequent. This can be accounted for, I hypothesize, by appealing to the nature of the denotic modal *have to* in this usage. When using an ordering source that orders things according to their abidance to deontic rules, and crucially deontic rather than epistemic – rules laid down by an authority rather than by tendencies and generalities – the subject of the clause is in a position of being required to do something, and requirements are generally perceived as a burden on the subject of the responsibility.

Even in isolation, *have to* has a low grade adversity reading. Out of context (or even with many contexts), the speakers of the following propositions seem, at minimum, slightly displeased with his/her tasks.

(49)   a.   I have to go watch my cousin's high school play tonight.

           b.   I have to go buy milk for the apartment.

           c.   I have to eat cookies for breakfast.[4]

Even in (49c), eating cookies for breakfast, arguably a pleasant thing in many people's minds, is seen as a negative event. This can only be used if cookies are the only thing in the house and the speaker was in the mood for something else, or some similar scenario. As an aside, a way to mitigate this reading is to add *just*:

(50)   a.   I just have to go watch my cousin's high school play tonight.

           b.   I just have to go buy milk for the apartment.

           c.   I just have to eat cookies for breakfast.

While an analysis of *just* in this context is outside the scope of this dissertation, it is clear that it can be used to alleviate the negativity of a *have to* claim.

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[4]*Have to* probably has a positive counterpart in *get to*. I will not get to discuss its effects here, but I would predict the effects to be the same as for *have to* except that there is an anti-adversity reading. I leave this as an area of future research.

Aside from *have to* coming with its own adversity properties, there is the further issue that an EMC syntax conditional used in competition with its stronger NC syntax equivalent implies that the obligation cannot be met. So in addition to the onus of whatever the deontic law of the *have to* ordering source is, there is the implication that the necessity won't be met, which further adds to the adverse connotation of EMC syntax forwardtracking counterfactuals.

This adversity reading is the key to the reason that (42a), a *not knowing* EMC syntax FTCF, is unacceptable. If Will has a paper due on Friday, and Elizabeth knows this and also thinks that writing the paper is achievable, Elizabeth is not licensed to use the EMC syntax conditional to express this because it will come with a reading that implies that writing the paper on Friday is difficult, and furthermore, not necessarily achievable. If she is trying to claim that writing the paper on Friday is easy, or something he could have achieved, then it cannot be seen as a negative thing, and hence cannot be asserted using a construction that comes with an adversity reading. So it is, at least in part, an implicature that leads to the infelicity of EMC syntax in forwardtracking counterfactuals, even though the semantics without the implicature denotes a technically true conditional. Furthermore, there seems to be something disingenuous or uncooperative about using EMC syntax with a *not knowing* FTCF. When using the EMC syntax conditional, one is implying that there is information available to speaker, and hence in the modal base, that makes the consequent plausibly not true. If one has no such evidence, then this is an illicit modal base, and so the conditional is marked as infelicitous.

Two interesting examples that show the difference between being able to use just the NC syntax or use both EMC syntax and NC syntax are the following:

(51)   Iro and Zuko are playing a game of Pai Sho, and there's a fun bet riding on it. Aang, watching the game, sees that Zuko is one White Lotus tile away from winning. He says to Katara:

   a. *If Zuko drew a White Lotus, he *would have to* win.
   b.   If Zuko drew a White Lotus, he **would** win.

(52)   R2D2 and Chewey are playing a game and R2D2 is winning. Chewey, a Wookiee, is getting angry, and Han advises that it is unwise to upset a Wookiee, and that R2D2 should let Chewey win. Luke notices that, unfortunately, if R2D2 rolls a 6 on the next turn, he will win regardless. Luke says:

   a.   If R2D2 rolled a 6 on his next turn, he *would have to* win.
   b.   If R2D2 rolled a 6 on his next turn, he **would** win.

Example (51) is exactly like the examples above where the consequent is not negative for its agent, and so while it is true that according to the rules he will have to win, saying so would indicate that this is undesirable. The more interesting case is (52). Here, the use of either is acceptable, and this is precisely because it is unusual for winning to be a adverse effect while playing a game. In short, both the stronger and the weaker conditionals are true. Therefore, when a speaker uses the weaker, it is for a reason. Here, the speaker is not using the weaker to indicate that the stronger conditional is not true, but instead is using the weaker to mark for the adversity effect. This is a case where the EMC syntax is used intentionally to bring about the adversity reading, regardless of the truth or falsity of the NC syntax equivalent.

   The final question is why this implicature does not arise in backtracking counterfactuals. The answer is simple: there is no competition or entailment that can lead to the computation of the desired implicature. In backtracking counterfactuals, the *have to* is not deontic, and so the entailment relation between NC and EMC syntax doesn't hold. As such, there is no reasoning that the hearer can use to arrive at an adversity reading for an EMC syntax

counterfactual. Since there is no competition between a strong and weak version of the same claim, then the backtracking counterfactual is computed without an adversity reading.

With these questions thus resolved, I return to non-BTCFs briefly to wrap up why Possibitionals show the same judgments for EMC and NC syntax conditionals as FTCFs do, regardless of their back- or forward-tracking nature.

5.4 Possibitionals

In this section I will be accounting for the conditionals I've termed Possibitionals: conditionals that still have a possibility of happening. As was shown in the chart at the beginning of this chapter, Possibitionals, both forward- and back-tracking, behave identically to forward-tracking counterfactuals. Let's start with a forward tracking possibitional, to be as parallel to FTCFs as possible.

(53)   Tristan was planning on staying in tonight, since he has to clean his apartment before his landlord visits in two days, and tomorrow is full of other chores. Yvaine asks Una why Tristan isn't coming out tonight, to which Una replies:

a.   If Tristan came/comes out tonight, he *would/will have to* clean his apartment tomorrow.

b.   *If Tristan came/comes out tonight, he **would/will** clean his apartment tomorrow.

The derivation is below, and I'm doing only a derivation for the *comes/will* option above, since the *came/would* option is nearly semantically identical to an FTCF since the modal, antecedent, and consequent are all in the past tense. When the antecedent is in the past, the derivation is identical to a FTCF except that to say *Tristan comes at t_i* where t_i is a non-past time, actually means a non-past time relative to speech time, whereas in FTCFs, the antecedent would have said something like *Tristan has come at t_i* where t_i is a non-

past time, which equates to Tristan coming at any time, since the past of the future of the utterance time can be present, past, or future with respect to the utterance time. However, when the antecedent used is in the present tense, we are stepping outside what Arregui has laid out for us. In the derivation that will follow in (54), then, notice that the only thing different from a *knowing* FTCF is the tense on the modal, antecedent, and consequent.

Whenever the modal is in the present tense, the tense on all three tensed verbs will appear as morphologically present; since *woll* is present, its present tense is real tense, and the morphologically present tenses on the antecedent and consequent are expected as these tenses are morphologically parasitic on the modal's tense. Given that *woll* provides t_i a non-past time as the temporal argument of both of its arguments, the temporal evaluation of the antecedent will still be at a non-past time, t_i. That is, the basics of our semantics are all the same as before. What is lacking is a roadmap for the present tense equivalent of the actual world past counterpart; what exactly is an actual world present counterpart?

The fact that accessible worlds have to have a counterpart of the actual world *past* is what is contributed by the past tense of the modal *would*. With a present tense modal, my best guess for Arregui's analysis is that it would say that all accessible worlds must have a counterpart to a time including the speech time, that is, a counterpart to the present. The problem is that I am not certain how present similarity is computed in her system. What relevant time period does the present encompass, for a given conditional? Arguably the only requirement is that the speech time is included in the present and that otherwise it is a contextually valued interval. Notice that the semantics now does not have to say the history of the actual world up to the present, since the past is only prioritized when there is a past tense on the modal. Therefore, there is not necessarily a reason that a present history need include all the facts of the past. I will not endeavor to answer this question in detail, and will leave it as a follow up question for future work. Instead, I will say only that this parameter is contextually valued, and that to have a counterpart to the actual world present means that things in that world are comparable to how things are presently in this world. The part that remains unclear is the level to which the past must be the same as the actual world

past, but this problem won't interfere with the evaluation of any of my conditionals, and so I leave it as an open issue for now. As before, the ordering source ranks which worlds count as the good enough worlds to be in the domain of quantification of the modal. Now, on to the derivation.

(54) a. If Tristan comes out tonight, he will have to clean his apartment tomorrow.

 b. *Where t_i is a non-past time,*

 $[\![$*If Tristan comes out tonight, he will have to clean his apartment tomorrow.*$]\!]^{h,w_0} =$ 1 iff

 c. $\forall$ IDEAL-$w'[[\; \boxed{\exists t'[t' \approx present_0 \; \& \; t' \triangleleft w']'}$

 $\&$ Tristan comes out tonight at t_i in $w'] \rightarrow$

 $\forall$ IDEAL-$w''[\exists t'[\text{NONPAST}(t') \; \& \;$ Tristan has to clean his apartment at t' in $w'']]]$

I've highlighted the relevant difference between a present tense modal and a past tense modal in this derivation. As to its meaning: The closest accessible worlds must have a counterpart to the actual world present such that Tristan comes out tonight (at a non-past time t_i); the modal base includes propositions like {*Tomorrow is a busy day, Tristan has to clean his apartment before two days from now*}. The accessible worlds are then ordered according to an empty ordering source, since there is no focus. Then for all worlds accessible to those worlds, order them according to the rules accessible to the ordering source, namely {*Apartments are clean before the landlord arrives*}. The conditional will be true, then, if in all of the law-abiding worlds, Tristan cleans his apartment tomorrow (at a non-past time). Given the scenario that I've provided, this is true, as desired. Crucially, the NC syntax conditional is false because it is not true that in all close enough worlds in which he comes out tonight including the fact that he has a busy day tomorrow are such that he also cleans his room tomorrow. There will be some worlds in which he comes out tonight and runs out of time to clean his apartment tomorrow, and so the NC syntax possibitional is false. Hence both native speaker attested judgments are appropriately accounted for.

For the final major possibitional data point, I have a backtracking possibitional. What is interesting about backtracking possibitionals is that they pattern like forwardtracking possibitionals and forwardtracking counterfactuals, not backtracking counterfactuals. I argue that this is expected due to the temporal relationship of the antecedent and the consequent. Here are the examples I have in mind.

(55)   *knowing* Backtracking Possibitional

Sofie has all of her friends in town and plans to go out with them tonight, and someone calls her office last minute on Friday to ask her to talk at an event on Saturday. Her secretary Jamie, looking at his version of her calendar, says:

a.   If Sofie gives/gave the talk tomorrow, she *will/would have to* write her speech tonight.

b.   *If Sofie gives/gave the talk tomorrow, she **will/would** write her speech tonight.

(56)   *not knowing* Backtracking Possibitional

Someone calls Bella's office last minute on Friday to ask her to talk at an event on Saturday. Her secretary Adam, looking at his version of her calendar, sees nothing in particular on for the night and says:

a.   *If Bella gives/gave the talk tomorrow, she *will/would have to* write her speech tonight.

b.   If Bella gives/gave the talk tomorrow, she **will/would** write her speech tonight.

Like with all of the forward trackers, the difference between a scenario that is acceptable with an EMC syntax conditional and one that is acceptable with an NC syntax conditional is how much the speaker knows about the whether the consequent is achievable or not in all currently epistemically accessible worlds. That is, it is a matter of what kind of information is available to the modal base, not the presence or absence of an *instead of* context. I claim that this is because of the difference between $\exists t'[t' \approx past_0 \ \& \ t' < w']$ and $\exists t'[t' \approx present_0 \ \& \ t' < w']$. In backtracking counterfactuals, the *have to* or focus induced *instead of* is needed

because when keeping the past as fixed as possible relative to the actual world past, if antecedent is true in the accessible worlds, then both consequent and non-consequent worlds are close enough. In backtracking possibitionals, though, both the antecedent and the consequent are in the future with respect to now, and so all accessible antecedent worlds will have the changeability that forwardtracking possibitionals had. Therefore, backtracking possibitionals behave like forwardtracking conditionals with respect to the acceptability judgments of the NC and EMC syntax conditionals, and do not patten at all alike with backtracking counterfactuals. Below are the two derivations of (55) and (56) (in the same order as the examples), but I will forgo explanations, as they are completely parallel to explanations already given for FTCFs.

(57)   a.   If Sofie gives the talk tomorrow, she will have to write her speech tonight.

       b.   *Where t_i is a non-past time,*

          $[\![$*If Sofie gives the talk tomorrow, she will have to write her speech tonight*$]\!]^{h,w_0} =$ 1 iff

       c. $\forall$ IDEAL-w' $[[\exists t'[t' \approx present_0 \,\&\, t' \lhd w']$

          $\&$ Sophie gives the talk tomorrow at t_i in $w'] \rightarrow$

          $\forall$ IDEAL-$w''[\exists t'[\text{NONPAST}(t')$

          $\&$ Sophie has to write her speech tonight at t' in $w'']]]$

(58)   a.   If Bella gives the talk tomorrow, she will write her speech tonight.

       b.   *Where t_i is a non-past time,*

          $[\![$*If Bella gives the talk tomorrow, she will write her speech tonight*$]\!]^{h,w_0} = 1$ iff

       c. $\forall$ IDEAL-w' $[\exists t'[t' \approx present_0 \,\&\, t' \lhd w']$ $\&$

          Bella gives the talk tomorrow at t_i in $w' \rightarrow$

          [Bella writes her speech tonight at t_i in $w']]$

As the reader can see, these possibitionals behave exactly like forwardtracking possibitionals in every way, which is to be expected given their meaning and temporal similarities. This

concludes my discussion of possibitionals. Their judgments pattern exactly like those found in forward tracking possibitionals in that EMC syntax conditionals receive an adversity reading, *instead of* contexts do not pattern differently from regular contexts, and the choice of EMC versus NC syntax can be evaluated relative to what the speaker knows about the possibility of the consequent, as well as the implicature that comes with the use of the EMC syntax possibitional. In particular, if the event denoted by the consequent can be accomplished in the actual world (or at least is perceived to be accomplishable by the speaker) the NC syntax is used. The EMC syntax is used when an obligation holds in the actual world regardless of the consequent being achievable in the actual world. For the last puzzle, I've left stative antecedent counterfactuals, which I will now account for.

5.5 Stative Antecedents

The last distinction to be explored is that fact that conditionals with stative verbs in their antecedent are acceptable with both EMC and NC syntax, again without an adversity reading. The fact that stative antecedent conditionals behave differently than their eventive counterparts is a new claim, to my knowledge. These conditionals are particularly interesting and exciting because they involve reasoning backward through a causal chain, but do not require special syntax to be acceptable. An example of a stative is given here (59).

(59)   Jayne has always been an avidly against the Alliance, but he is also easily bought, and the Alliance has been out over the last month undertaking a conversion mission where they pay people to switch sides. There was a scuffle this morning between the Alliance and the Rebels, and Jayne still fought with the rebels. Commenting on this, Mal said:

   a.   If Jayne had been a member of the Alliance this morning, he *would have to have* been recruited in the last month.

   b.   If Jayne had been a member of the Alliance this morning, he **would have** been recruited in the last month.

There are two interesting problems here: first, as backtracking counterfactuals, it is surprising that the NC syntax is an available construction without an *instead of* context. The second quandary here is that stative antecedent backtracking counterfactuals are acceptable with both the NC and EMC syntax, but according to the system that I set up in §5.3, if a conditional with NC syntax is acceptable in a context, the same context should not make the use if EMC syntax acceptable unless it is intentionally marking the consequent as an adverse effect, which is not the case here.

The latter of these two problems is easier to solve. While it is true that semantic competition rules out EMC syntax conditionals if the NC syntax is available, this is only the case for deontic uses of *have to*, but backtracking counterfactuals only use epistemic uses of *have to*, and so there is no possibility for semantic competition. Therefore, even though both the EMC and NC syntax are good, there will be no problem explaining the lack of an adversity reading.

With respect to the fact that both EMC and NC syntax are acceptable, stative antecedent conditionals seem on the surface like a tricky case, but the analysis falls out quite nicely as a matter of aspect and result states. As I explained in Chapter 4, Arregui uses external aspect (that is, perfect and perfective) to explain the differences between the simple past and the perfect in the antecedent of counterfactuals with eventive verbs. The perfect introduces an

event variable that ties the interpretation to the actual world. Hence it is infelicitous to utter *If your plants died next week, I would have been upset* if it is known that the plants are already dead. A real world event of the plants dying last week prevents identifying with a possible world event of them dying next week. The perfect, on the other hand, quantifies over events, and so it is possible to identify events across worlds less particularly, and it is felicitous to say *If your plants had died next week, I would have been upset* knowing that the plants are already dead.

This relates to my stative issue because Arregui posits the idea (following Katz 1995) that statives are like eventive verbs with perfect aspect in that they behave unlike verbs with perfective aspect. The difference is that states do not refer to events at all, and instead are properties of times. Therefore, when using a stative in the antecedent of a counterfactual, there is no need to identify a strict counterpart relation across worlds of the "event" of the antecedent; there is no such event. Therefore, it is possible to use the simple past on a stative verb and get a truly counterfactual meaning, as in *Your plants don't have enough light. If they had enough, the would be doing fine.*

Unfortunately, this doesn't solve my problem immediately, but what it does is add to the body of literature that shows how states behave differently from events, and that it is not surprising that they can get special interpretations (see also Katz 1995 (which is what Arregui bases her analysis on), Parsons 1990, Kratzer 2001, Stowell 2012, as well as the classic Vendler classification of internal aspect (1967)). Internal aspect, or aktionsart, is the classification of verbs into categories depending on their internal structure. Vendler originally proposed a four-way distinction for verbs: states, activities, accomplishments, and achievements. They are typically distinguished across two parameters: is the verb telic (has an endpoint and is compatible with *in an hour*) or atelic (does not have an endpoint and is compatible with *for an hour*); is the verb (or is it not) acceptable in the progressive? States are unique in that they are atelic and are unacceptable in the progressive: they have no internal structure that is not equivalent to the whole of the state. See Vendler and Moens

and Steedman 1988 for more information about internal aspect. I will be assuming that states, or statives, have a structure that includes a duration of the state denoted holding.

I will pursue here a new (to my knowledge) explanation for why statives license both EMC and NC syntax conditionals in backtracking counterfactuals. The answer has to do with the internal make up of states. States are homogeneous and durative: they have no internal states that are different from the whole of the state, and a state that holds now extends into the past as well.

All of the statives BTCFs that I have found acceptable with both EMC and NC syntax, and I will remind the reader of another example in an attempt to convince him/her, have stative verbs that are the result state of the verb in the consequent. That is, when the event denoted by the verb phrase in the consequent is completed, the stative verb in the antecedent will be true for a certain duration. Looking back to (59), being a member of something is the result state of having been recruited. In (60), repeated here from Chapter 3, knowing is the result state of learning. Similarly I could construct examples from loving and falling in love, being engaged and popping the question, etcetera.

(60)   Magic has been outlawed in Camelot, and so right now, no one knows how to prac-
        tice it except for the Great Dragon, who learned long before it was illegal. Merlin
        was accused of performing magic this morning, but has since been cleared. In hy-
        pothesizing about Merlin doing magic, it's become clear that that would only be
        possible is if the Great Dragon taught him, and they only just met last week.

        a.   If Merlin had known magic this morning, the Great Dragon *would have to have*
              taught him sometime over the past week.
        b.   If Merlin had known magic this morning, the Great Dragon **would have** taught
              him sometime over the past week.

Therefore, what is unique about statives, or at least the statives that work for both EMC and NC syntax, is that the "event" of the antecedent is construed as extending backward in

time to at least the time of the event denoted by the consequent, and so all close-enough worlds with a past counterpart to the actual world past in which the antecedent is true will necessarily be consequent worlds. Therefore, with the appropriate contexts I've presented, stative backtrackers will be true with either NC or EMC syntax. Allow me to show another example that makes this assumption completely explicit. You'll note that both EMC and NC syntax are good, and furthermore, the assumption that the state extends back to the time of the antecedent is challengeable by an interlocuter:

(61)   Imagine that all newly married couples are required to attend a seminar the first month they are married about how to navigate marriage. The following conversation could arise:

A: I had lunch with Milo yesterday, and he's married!

B: That's not possible. If he had been married, we would (have to) have attended the marriage seminar last week, but he wasn't there.

A: No, he only just got married two days ago.

This shows that in asserting the stative backtracking counterfactual, Speaker B is assuming that the marital state extends to last week. Speaker A, then, can adjust or contradict Speaker B's assumptions.

Let me show a derivation of the NC syntax with a walk-through of the details to show how the states differ from the events:

(62) a. If Jayne had been a member of the Alliance this morning, he would have been recruited in the last month.

b. *Where t_i is a non-past time,*

⟦If Jayne had been a member of the Alliance this morning, he would have been recruited in the last month.⟧^{h,w_0} = 1 iff

c. ∀ IDEAL-w' [∃t'[$t' \approx past_0$ & $t' \triangleleft w'$] &

Jayne was a member of the Alliance this morning t_i in w'] →

[he was recruited in the last month in w' at t_i]]

As usual, the derivation shows that the worlds accessible to the actual world are ones that have a counterpart to the actual world past in which the antecedent is true. This modal base will include propositions like the following: {*Jayne hates the Alliance, Jayne will do anything for money, The Alliance was paying people to join their team over the last month*}. Thus, in all of these worlds, the only way to reconcile the conflicting information that Jayne hates the Alliance and that he is a member of their team is for him to have been recruited for money in the last month. That is, all of the antecedent worlds will be consequent worlds. And so the conditional is true, as anticipated. Allow me to show this with another diagram.

(63)

185
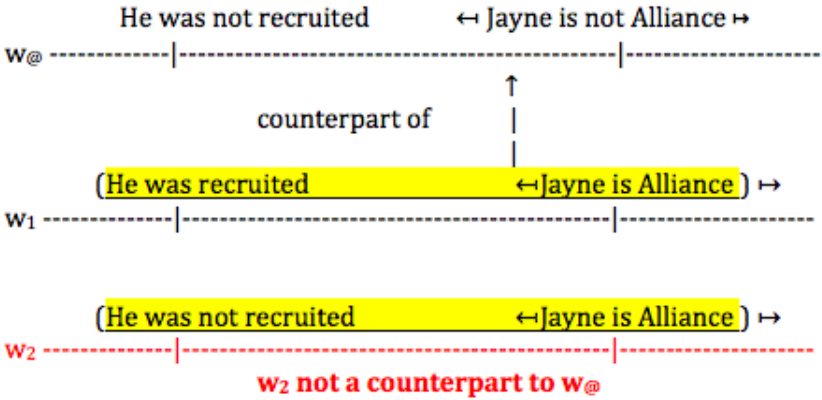
The arrows and highlighted portions represent the duration of the state. Essentially, if Jayne is Alliance, then he must have been so since the time of his recruitment. Therefore, all counterpart worlds will have to be worlds in which the state of his Alliance membership extends back to the time of his recruitment. As such, worlds like w_2 will not even qualify as counterpart worlds, or at least not as close enough counterpart worlds, because of the lack of similarity to facts of the actual world, regardless of the closer similarity to the actual world past. The EMC syntax will be true as well since the *have to* ordering source will have access to the rule {*Jayne only joins the Alliance for money*}, and there is no semantic competition for epistemic rules. I've been showing the locus of the rescue for backtracking with syntax trees, and I will do so again now, but there is a major difference. While *have to* is acceptable, it is not what makes backtracking acceptable in stative antecedent BTCFS. The backtracking licensor is actually within the antecedent, in the internal aspect of the antecedent verb. Therefore, unlike the backtrackers presented earlier in the chapter, these backtrackers don't need a special ordering source to rescue them from unacceptability in any way.

(64)   Stative Antecedent Backtracker
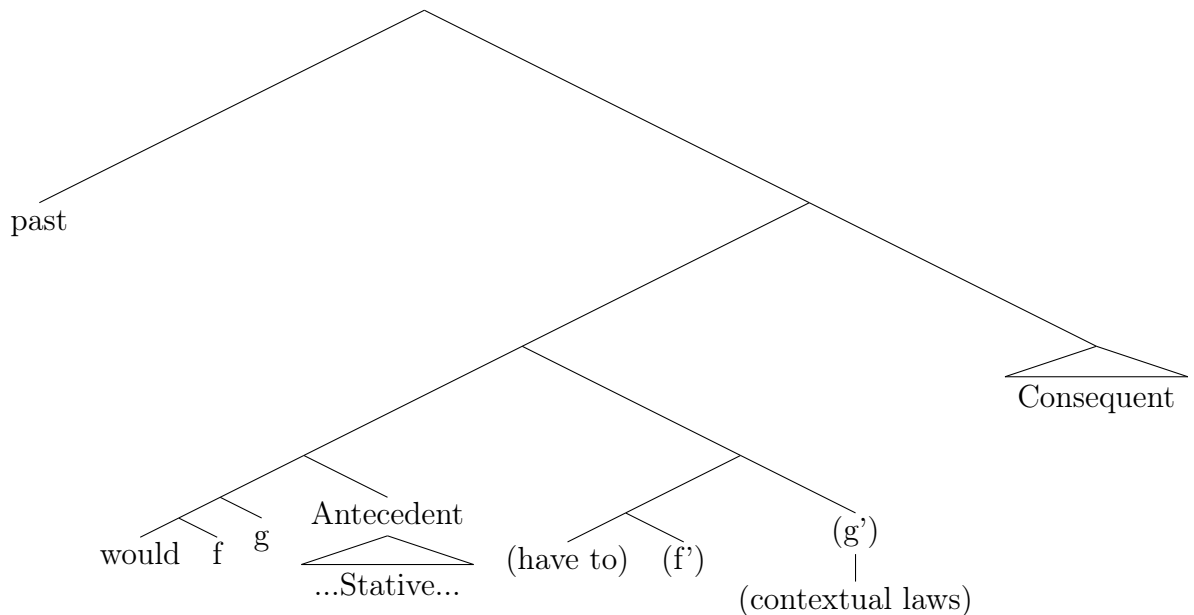
It is the nature of the verb in the antecedent that allows conditionals of the sort represented in this tree to be acceptable backtracking counterfactuals. In particular, the *have to* modal is completely optional – it neither creates a conflict with some other element of the conditional nor does it saves the BTCF.

Therefore, the account of statives falls out directly from assumptions already given about the nature of the adversity reading, the denotation of EMC and NC syntax conditionals, and the internal structure of stative verbs. Before concluding this chapter, I will present some new data that I will not account for, but rather call the reader's attention to as an area of future research.

5.6   Dialect Differences

While I've presented analyses for all of the data I set out to account for in Chapter 3, there are two additional interesting details that I will lay out here. I will not attempt an analysis at the moment, but will instead hint at potential direction and leave these data points as avenues of future research. Both pieces of new data pertain to dialect differences among native speakers of English in North America.[5]

The first dialect difference is probably not a severe issue for the theory of conditionals in general, and instead is a problem particular to backtracking. It involves a difference in the structure of the consequent of a backtracking counterfactual. Many speakers accept both of the following two options, while others strongly prefer one to the other. As far as I'm aware, no speaker outright rejects either one, but if one is to be preferred, it is usually (65b).

(65)   a.   If Harry had asked Sam for help today, there would have to have been no fight yesterday.
       b.   If Harry had asked Sam for help today, there would have had to have been no fight yesterday.

---

[5]I have not investigated any other dialects of English.

The only difference between the two conditionals in (65) is whether or not there is an additional perfect aspect-marking *have* in the consequent of the conditional. I have several possible theories as to why there might be an additional non-modal *have*. It seems possible that this is an example of harmony or agreement, and that speakers want the modals to have the same tense. A second option is that speakers are uncomfortable with a modal with a past tense time argument for its modal base/accessibility relation, as has been argued by Arregui, Ippolito, and now me, and instead want the overt tense on the modal to reflect the tense that we are already assuming dominates the modal. Yet another possibility is that it prevents processing issues like the garden path effect. When people read a backtracking counterfactual with a consequent like *would have to have*, the first instinct tends to be to interpret the first *have* as a perfect, not a modal. Therefore, it requires a second look and reanalysis to make the conditional work. This problem is alleviated by making the first *have* perfect, and having modal *have to* follow the perfect, such that every *have* in the consequent of the conditional it is unambiguous between modal and non-modal *have*.

I will not explore a solution here, but I believe that the analysis that I've presented thus far is amenable to accounting for data like (65b). I do not think, though, that it in any way explains why one or the other of the two is preferred. I find (b) better, personally, but have decided not to insert an extra *have* in any of my example sentences in the body of my dissertation. This is because the standard literature uses *would have to have* as the backtracking EMC syntax, and so I have followed suit. If any reader prefers *would have had to have*, please use the appropriate consequent for your dialect to judge the scenarios and conditionals, and I leave it as a project for the future to ensure that this dialect is appropriately accounted for in my theory.

The second dialect difference is a larger problem for the semantics of conditionals. There is a faction of English speakers who accept the simple past in the antecedent of a conditional for counterfactual conditionals. For example the following is an acceptable counterfactual in their usage.

(66)   If Donna asked Tanya for help today, there would have to have been no fight yester-
         day.

Furthermore, the famous president example first presented in Bennett 1984 uses a simple
past in its antecedent:

(67)   a.   If Stevenson were President in February 1953, he would have to have been
              elected in November 1952 (but we know Eisenhower won that year).
         b.   If Stevenson were President in February 1953, he would have been elected in
              November 1952 (but we know Eisenhower won that year).

This seems problematic since the way that the semantics of *would* achieves true past coun-
terfactuals is for the perfect in the antecedent to place the antecedent event in the past of the
non-past – that is, the antecedent can occur at any time that the context makes available.
But if the antecedent uses the simple past, then this past is simply a morphological reflex,
and so the antecedent should have to occur in the present or future, but this is not the
intuition of speakers of this dialect.

This is also a problem under Arregui's analysis of perfects and perfectives, since the
simple past is meant to be perfective and thus anchor the event counterpart relation in the
actual world. This does not appear to be the case for all speakers, and so there must be
some other difference that allows modal access to non-actual world events. It is interesting
to note that all speakers of the dialect that allows the simple past in the antecedent of a true
counterfactual that I have found (they are less common than the standard dialect speakers
by far) are younger people. However, not all young people accept it. Moreover, the same
type of data was presented in 1984, and as far as I can tell, not challenged. All discussion of
Bennett's example uses his same morphological choices, and does not seem to find a problem.

I feel that it is possible that language is changing right now with respect to access to
possible worlds for counterfactual reasoning. I do not have an answer any more interesting

than that at the moment, as this dialect presents a genuine problem for not just Arregui's analysis and mine, but also Ippolito 2003, Iatridou 2000, and anyone else who uses the extra layer of past in the antecedent to achieve counterfactuality in some way. This dialect, therefore, is something linguists concerned with conditionals should keep an eye on. If it survives to the next generation of speakers, then we will need to seriously rework our approach to modern counterfactuals.

This concludes my discussion of conditionals, backtracking, and *have to*. I have shown that backtracking, even in the new forms and differences I have presented, are not a problem for a unified theory of conditionals. I have further shown that *have to* is not a magical fix for backtracking, but rather a straightforward rule-based universal modal that has a singular denotation in every context, and it just so happens to be a modal that can occasionally help with backtracking. Furthermore, *have to* presents the option (or obligation, depending on which scenario the speaker is in) of an adversity reading, based on semantic competition between deontic-rule-satisfying conditionals. I have accounted for all of the divisions in the data of counterfactuals presented in the chart at the beginning of this chapter and done so in a way that allows for a unified approach to all conditionals. In the remaining chapter, I will conclude and offer some direction for future research.
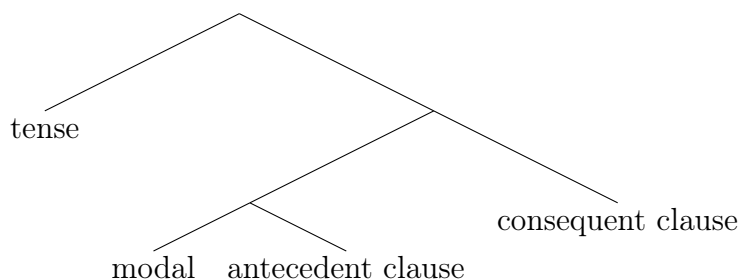
CHAPTER 6

Conclusion

In this dissertation, I have defended the view that there is nothing extraordinary about backtracking counterfactuals. With an appropriate confluence of semantics and the right context, BTCFs are acceptable conditionals. Furthermore, no part of a BTCF requires a BTCF-specific denotation – all of the parts of a BTCF have the same denotation that they have elsewhere in the grammar of English. In this last chapter, I will summarize the key facets of my analysis, highlight the contributions of this dissertation and present some problems and areas of future research, some of which have been mentioned elsewhere in this dissertation.

6.1   Key Facets of My Analysis

The analysis that I have presented has many pieces, and so I will summarize the key pieces here. The fundamental assumptions that I need in order for my account to function are the basic syntax in (1), a referential theory of tense with a sequence of tense style zero tense in the antecedent of conditionals, and a theory of counterparts that allows for an analysis of conditionals that cares about close enough accessible possible worlds, rather than closest accessible possible worlds.

(1)   Basic Syntax for Any Conditional

```
                              /\
                             /  \
                            /    \
                           /      \
                      tense        \
                                    \
                            /\       \
                           /  \       \
                          /    \       consequent clause
                    modal   antecedent clause
```
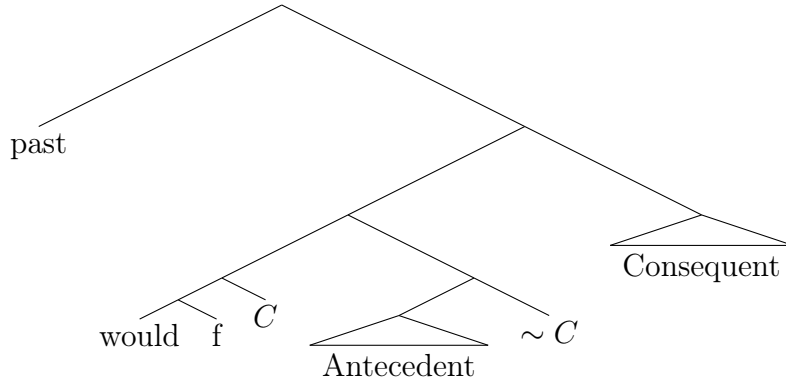
A key piece of this theory is that the modal *woll* includes a clause that requires that the accessible possible worlds have a counterpart history to the actual world past. Therefore, I arrived at the following denotation of *woll* as a shortcut for when there is no focus in the antecedent clause.

(2) $[\![\text{woll-}t_i]\!]^{h,w_0} : \lambda P_{\langle i,\langle s,t\rangle\rangle}\lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t\forall w' \in \text{BEST}(f(w_0), g(w_0))$

$[\exists t'[t' \approx t \ \& \ t' \lhd w'] \ \& \ P(h(t_i))(w') \to Q(h(t_i))(w')]$

where h is an assignment function, and $h(t_i)$ is restricted to non-past times.

However, I have also shown that focus in the antecedent orders worlds that make the antecedent proposition true while making all of its focus alternatives false, and therefore I introduced a Roothian (1992) focus semantics as the ordering source for *woll* conditionals, even though I suppressed this detail when it would only add semantic clutter to a denotation or tree. The following tree and denotation represent the analysis of a *woll* conditional with focus in the antecedent.

(3)

(4) $[\![\text{woll-}t_i]\!]^{h,w_0} : \lambda P_{\langle i,\langle s,t\rangle\rangle}\lambda Q_{\langle i,\langle s,t\rangle\rangle}\lambda t\forall w' \in (f(w_0))$

$[\exists t'[t' \approx t \ \& \ t' \lhd w'] \ \& \ P(h(t_i))(w')$

$\& \ P \in C \ \& \ \forall A \in C[A \neq P \to \neg A(h(t_i))(w')] \to Q(h(t_i))(w')]$

where h is an assignment function, and $h(t_i)$ is restricted to non-past times, and C is a set of contextually salient alternatives of P.

The last two major pieces of the analysis are the fact that the entailment patterns that give rise to scalar implicatures can be generalized such that NC syntax non-BTCFs entail EMC syntax BTCFs, which leads to the general infelicity of using an EMC syntax non-BTCF when an NC syntax conditional is also true. The following shows that this implicature is cancelable.

(5)   If John goes to the concert Thursday, he will have to write his paper on Friday. In fact, he has time! He WILL write his paper on Friday.

The final important piece of my analysis is the fact that stative antecedents assume that the state that denotes the antecedent eventuality extends backward in time to the time of the consequent. This assumption can be challenged, which will lead to a counterfactual formerly judged true being judged false. Example (6) repeats the example of this phenomenon from Chapter 5.

(6)   (7)   Imagine that all newly married couples are required to attend a seminar the first month they are married about how to navigate marriage. The following conversation could arise:

A: I had lunch with Milo yesterday, and he's married!

B: That's not possible. If he had been married, we would (have to) have attended the marriage seminar last week, but he wasn't there.

A: No, he only just got married two days ago.

The assumption that the antecedent clause extends back to the time of the consequent clause licenses NC syntax backtrackers. This summary accounts for the major assumptions and claims of my theory. In the next section I will remind the reader of some open questions and present a couple additional questions as well. In the final section I will mention the two major contributions of this dissertation.

6.2   Open Questions

I am adopting a theory of tense in conditionals that uses a sequence of tense style past in the antecedent of the conditional. As I explored in Chapter 4, this causes problems for languages that are not typically considered SOT languages that nonetheless show past tense morphology in the antecedent of a counterfactual conditional. Languages that fall under the non-SOT, but antecedent past tense morphology include Hebrew (Yael Sharvit, p.c.), data in Chapter 4, and Russian (Schulz 2007). It seems clear that further research is needed to see which other languages exhibit the same behavior, and what they have in common that might license SOT-style tense only in counterfactuals. It could also be the case that tense in counterfactuals in these languages acts completely differently, and the availability and kinds of backtracking counterfactuals that each language allows would be an excellent way to test the theory presented here.

A second problem that I discussed in some detail at the end of Chapter 5 is the fact that there are dialects of English that allow the simple past in antecedent of counterfactual conditionals, as in (8).

(8)   If James asked Katie for help this morning, there would have to have been no fight yesterday.

This is still interpreted as a BTCF, but under the theory that I have presented here, the antecedent should only be able to be interpreted as a present or future event, since the past that shows up morphologically on the antecedent is a zero tense, and the time of the antecedent is provided by the modal as a non-past time. However, the conditional in (8) can be a strictly past counterfactual, in which the antecedent event occurred before the speech time. This is not predicted to be possible. However, this data point poses a major problem for many current theories of conditionals. Any theory that relies on the past in the antecedent to license counterfactuality will have a problem. I cannot possibly hope to answer this problem here, but it is clear that this area needs more research. If language is changing such that counterfactuals like (8) are generally acceptable, then many theories of conditionality will have to undertake a drastic overhaul to account for this change in the semantics of current native speakers of English.

Another question that requires attention is what all of the methods for rescuing backtracking counterfactuals that I have presented in this dissertation have in common. Naturally they have in common that they can incidentally license backtracking, but why? I have shown the *have to*, focus, and stative antecedents all license backtracking, but these phenomena do not, on the surface, form a natural morphological, semantic, or syntactic natural class. Moreover, what other phenomena should or could belong on this list?

In my discussion of extra layers of modality in Chapter 4 I mentioned several other semantic phenomena that have been accounted for by positing extra ways to constrain the domain of quantification of the modal. One example of this was weak necessity. It seems like

a natural question to ask if the secondary ordering required for weak necessity can license backtracking by getting rid of non-consequent close enough worlds. Unfortunately, thus far the results show that this is not a successful backtracking strategy.

(9)   a. *If she had eaten the pudding, it should have been made without gelatin.

         b. *If she had eaten the pudding, it ought to have been made without gelatin.

However, this result might show only that the type of ordering source that weak necessity uses is not of the right kind to license backtracking.

Another attempt would be to overtly express the ordering sources that I claim rescue backtracking counterfactuals. This strategy is successful: when the salient laws (10) or *instead of* clauses (11) are made overt, backtracking is possible without *have to* and focus, respectively (I've bolded the overt ordering sources).

(10)   If James had asked Katie for help today, and **if he followed his general rule of never asking for help after a fight**, then there would have been no fight yesterday.

(11)   If James had asked Katie for help today **instead of yesterday**, there would have been no fight yesterday.

These examples show that by overtly doing what the ordering sources have done in my analysis – that is, excluding close enough worlds in which the consequent is not true – then backtracking is possible with normal conditional syntax. As of writing, I still do not know what precisely my three phenomena have in common except that all exclude unwanted antecedent worlds. I anticipate future work looking into what all of these processes have in common.

6.3 Concluding the Conclusion – The Major Contributions

I see this dissertation as having two crucial contributions. First, it presents data for never before explored contrasts in backtracking counterfactuals. Since conditionals are a continually hot topic in semantics, it seems important that conditional phenomena be described as thoroughly as possible. In this dissertation I have shown that backtracking is a more accessible phenomenon than was previously thought. I have also shown that for each strategy there are restrictions on how and when each strategy can rescue backtracking. *Have to*, as has been previously explored, needs a salient law in the context. Focus needs a relevant past focus alternative to the antecedent proposition – temporal adverbials are the easiest thing to focus for *instead of* backtrackers, but other elements of the antecedent can be focused as well. Lastly, stative antecedents need to have the assumption that the antecedent state has a duration that includes the consequent time – often the antecedent state is the result state of the consequent event.

I have also shown that the other principal definition of backtracking is not the ideal way of viewing backtracking. If the only cases that counted as backtracking counterfactuals were those that have backward causation, then there would be no unifying theory of when focus allows the antecedent event time to follow the consequent event time. There would also be no predictions or facts about how *instead of* focus interacts with *have to*. Even more importantly, though, with a backward causation theory, the stative data that I've presented is particularly surprising. Stative antecedent conditionals **do** involve backward causation, and yet NC syntax is licensed. Therefore, backtracking cannot simply be viewed as backward causation that is rescued by EMC syntax. The data is far more complex than that, and backtracking licensors use many separate, but ultimately similar, ways of rescuing a backtracking counterfactual.

To summarize, then, while backtrackers have long been problematic data for analyses of conditionals, Arregui's analysis perfectly captures initial backtracking data, and my new data suggests that the reality is more complex. In particular, *have to* is not a magical

backtracking licenser, and its denotation is unified across all of its uses in the semantics of English. By restructuring Arregui's analysis to include focus semantics ordering sources, appealing to the special properties of internal aspect, and using implicature to capture the adversity reading, all of the data fits neatly into a unified theory of conditionals. I've shown that a unified approach to counterfactuals must take into account aktionsart classes and focus stress and alternatives, while simultaneously maintaining the critical components of Arregui's analysis. Plenty of work remains, but I am confident that all conditionals can be accounted for in a single, albeit complex, theory of conditionality.

APPENDIX A

Appendix for Chapter 3:

Tables Compatible with Printing

This appendix provides tables equivalent to those in Chapter 3 that are more printer friendly. Table 3.1 is compatible with black and white printing as is, but since I will be reformatting the rest of the tables from Chapter 3, I will update Table 3.1 as well.

Table 3.1: Chapter 3 Summary Table 1

Conditional Type	Regular Scenario	*instead of* Scenario
Backtracking	EMC	*EMC
Counterfactual	*NC	NC

Table A.1: Printable Summary Table 1

Conditional Type	Regular Scenario		*instead of* Scenario	
	NC	EMC	NC	EMC
Backtracking CF	X	✓	✓	X

Table 3.2: Chapter 3 Summary Table 2

Conditional Type	Regular Scenario	*instead of* Scenario
Backtracker	*EMC* *NC	***EMC** **NC**
Forwardtracker *knowing*	*EMC* *NC	*EMC* *NC
Forwardtracker *not knowing*	***EMC** **NC**	***EMC** **NC**

Table A.2: Printable Summary Table 2

Conditional Type	Regular Scenario		*instead of* Scenario	
	NC	EMC	NC	EMC
Backtracker	X	✓	✓	X
Forwardtracker *knowing*	X	✓	X	✓
Forwardtracker *not knowing*	✓	X	✓	X

Table 3.3: Chapter 3 Summary Table 3

Conditional Type	Regular Scenario	*instead of* Scenario
Backtracking CF	*EMC* **NC*	***EMC** **NC**
Forwardtracking CF *knowing*	*EMC* **NC*	*EMC* **NC*
Forwardtracking CF *not knowing*	***EMC** **NC**	***EMC** **NC**
BT Possibitional *knowing*	*EMC* **NC*	*EMC* **NC*
BT Possibitional *not knowing*	***EMC** **NC**	***EMC** **NC**
FT Possibitional *knowing*	*EMC* **NC*	*EMC* **NC*
FT Possibitional *not knowing*	***EMC** **NC**	***EMC** **NC**

Green = [*EMC, NC]; *Blue* = [EMC, *NC]

Table A.3: Printable Summary Table 3

Conditional Type	Regular Scenario		*instead of* Scenario	
	NC	EMC	NC	EMC
Backtracker	X	✓	✓	X
Forwardtracker CF *knowing*	X	✓	X	✓
Forwardtracker CF *not knowing*	✓	X	✓	X
BT Possibitional *knowing*	X	✓	X	✓
FT Possibitional *not knowing*	✓	X	✓	X
BT Possibitional *knowing*	X	✓	X	✓
FT Possibitional *not knowing*	✓	X	✓	X

Table 3.4: Chapter 3 Summary Table 4

Conditional Type	Regular Scenario	Instead of Scenario
Backtracking CF	EMC *NC	***EMC** **NC**
Forwardtracking CF Knowing	*EMC* *NC*	*EMC* *NC*
Forwardtracking CF Not Knowing	***EMC** **NC**	***EMC** **NC**
BT Possibitional Knowing	*EMC* *NC*	*EMC* *NC*
BT Possibitional Not Knowing	***EMC** **NC**	***EMC** **NC**
FT Possibitional Knowing	*EMC* *NC*	*EMC* *NC*
FT Possibitional Not Knowing	***EMC** **NC**	***EMC** **NC**

Green = [*EMC,NC]; *Blue* = [EMC,*NC], adversity; Grey = [EMC,*NC], non-adversity

Table A.4: Printable Summary Table 4

Conditional Type	Regular Scenario		*instead of* Scenario		Adversity
	NC	EMC	NC	EMC	
Backtracker	X	✓	✓	X	X
Forwardtracker CF *knowing*	X	✓	X	✓	✓
Forwardtracker CF *not knowing*	✓	X	✓	X	
BT Possibitional *knowing*	X	✓	X	✓	✓
FT Possibitional *not knowing*	✓	X	✓	X	
BT Possibitional *knowing*	X	✓	X	✓	✓
FT Possibitional *not knowing*	✓	X	✓	X	

Table 3.5: Chapter 3 Final Summary Table

Conditional Type	Regular Scenario	Instead of Scenario
Backtracking CF	EMC *NC	***EMC** **NC**
Forwardtracking CF Knowing	*EMC* **NC*	*EMC* **NC*
Forwardtracking CF Not Knowing	***EMC** **NC**	***EMC** **NC**
BT & FT Possibitional Knowing	*EMC* **NC*	*EMC* **NC*
BT & FT Possibitional Not Knowing	***EMC** **NC**	***EMC** **NC**
Analytical BTCF	EMC NC	EMC NC
Stative BTCF	EMC NC	EMC NC

Green = [*EMC,NC]; *Blue* = [EMC,*NC], adversity;
Grey = [EMC,*NC], non-adversity; Fuchsia = [EMC, NC]

Table A.5: Printable Final Summary Table

| Conditional Type | Regular Scenario | | instead of Scenario | | Adversity |
	NC	EMC	NC	EMC	
Backtracker	X	✓	✓	X	X
Forwardtracker CF *knowing*	X	✓	X	✓	✓
Forwardtracker CF *not knowing*	✓	X	✓	X	
BT Possibitional *knowing*	X	✓	X	✓	✓
FT Possibitional *not knowing*	✓	X	✓	X	
BT Possibitional *knowing*	X	✓	X	✓	✓
FT Possibitional *not knowing*	✓	X	✓	X	
Analytical BTCF	✓	✓	✓	✓	X
Stative BTCF	✓	✓	✓	✓	X

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