A Synthesis View of Counterfactuals

Sarah Moss
ssmoss@umich.edu

Theories of counterfactuals can be naturally classified according to how they explain a handful of intuitive judgments. First, *Sobel sequences* such as (1) are felicitous:[2]

(1) a. If Sophie went to the parade, she would see Pedro.
b. But if Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.

Relatedly, *Antecedent Strengthening* seems invalid:[3]

(2) a. If Sophie went to the parade, she would see Pedro.
b. #Therefore, if Sophie went to the parade and got stuck behind a tall person, she would see Pedro.

Meanwhile, the following *Heim sequence* is infelicitous:[4]

(3) a. If Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.
b. #But of course, if she went to the parade, she would see Pedro.

The two most prominent views of counterfactuals explain these judgments in different ways. On one side of the debate, variably strict conditional theorists say that the infelicity of (2) reflects the fact that Antecedent Strengthening is indeed an invalid rule of inference.[5] On the other side, strict conditional theorists maintain that Antecedent Strengthening is valid. They say that (2) doesn't present a genuine challenge to Antecedent Strengthening. Rather, the argument equivocates, since the context shifts when (2-b) is uttered. Furthermore, according to these theorists, the context shifts in just the same way when (3-a) is uttered, and (3-b) sounds bad because it's false in that shifted context.[6]

1. For helpful discussion, thanks to Dorothy Edgington, Paolo Santorio, and Eric Swanson, as well as audiences at Oxford University, the 2023 Formal Epistemology Workshop, the 2022 Formal Rationality Forum, the ILLC EXPRESS Seminar, and the 2022 Philosophical Linguistics and Linguistical Philosophy Conference.
2. Lewis 1973 introduces these sequences to the literature, crediting them to J. Howard Sobel.
3. Antecedent Strengthening is the rule that one may infer from 'If p, would q' to 'If p and r, would q.'
4. Sequences such as (3), also known as "reverse Sobel sequences," are originally due to Irene Heim; I follow von Fintel 2001 in calling them "Heim sequences."
5. Stalnaker 1968, p. 48; Lewis 1973, p. 31.
6. This view of Heim sequences is defended by von Fintel 2001, Gillies 2007, Ichikawa 2011, Klecha 2015, Williamson 2020, Sandgren & Steele 2021, and Greenberg 2021, among others.

This paper defends a third view of counterfactuals, one that reaps the benefits of both views just described while avoiding their pitfalls. In §1, I give an overview of the debate as it currently stands. In §2, I steel man the case for a view that I ultimately reject—namely, the strict conditional view of Heim sequences defended by von Fintel 2001. On von Fintel's behalf, I respond to concerns that have been raised for his account of Heim sequences. Then in §3, I raise a more serious concern for von Fintel and other strict conditional theorists, including Gillies 2007, Ichikawa 2011, Hájek 2014, Williamson 2020, and Greenberg 2021. I argue that these theorists fail to make sense of judgments about probabilistic variants of Heim sequences. Similar problems arise for other extant views of counterfactuals, including views defended by Križ 2015, Klecha 2015, and Lewis 2018. In §4, I consider and reject attempts to explain away our probabilistic judgments about counterfactuals, raising several problems for a proposal in this spirit defended by Bennett 2003 and Hájek 2021.

Having spelled out problems for several existing views, I introduce an alternative semantics and pragmatics for counterfactuals. In §5, I argue that strict conditional theorists have been too quick to assimilate the context sensitivity of counterfactuals to the context sensitivity of nominal quantifiers such as 'all' and 'every'. In fact, the gradable adjective 'nearby' provides a much better model for the way in which the truth conditions of counterfactuals depend on context. The synthesis view that I defend incorporates a key insight of variably strict accounts—namely, that the antecedent of a counterfactual often influences what worlds are relevant to its truth conditions at a given context. But unlike variably strict accounts, my synthesis view preserves a strict conditional semantics according to which Antecedent Strengthening is valid. For instance, as I explain in §6, there is no single context in which both sentences of a Sobel sequence are true. By developing a better understanding of the pragmatics of counterfactuals, we can endorse a strict conditional semantics for counterfactuals, while still capturing the full range of our intuitive judgments about these sentences.

1 A brief recap of the debate between strict and variably strict views

Strict conditional and variably strict conditional theorists agree that (4) is context sensitive:

(4) If Sophie went to the parade, she would see Pedro.

According to strict conditional theorists, context contributes an accessibility relation to the truth conditions of a counterfactual, a function that maps each world of evaluation to a domain of accessible worlds. 'If p, would q' is true at a world w just in case every p world accessible from w is a q world. For instance, (4) is true just in case every accessible world

where Sophie goes to the parade is a world where she sees Pedro.[7]

This strict conditional semantics is motivated by an important observation about negative polarity items in counterfactuals. Roughly speaking, negative polarity items are expressions that are licensed only in the scope of negation and in other negative linguistic environments. Examples include 'ever', 'at all', and 'give a damn', which sound bad in sentences like the following:

(5) #Sophie ever ran a marathon.

(6) #Sophie paid any attention at all.

(7) #Sophie gives a damn about baseball.

These same expressions sound fine when they occur in the scope of negation:

(8) Sophie hasn't ever run a marathon.

(9) Sophie didn't pay any attention at all.

(10) Sophie doesn't give a damn about baseball.

Negative polarity items are also licensed in the restrictors of universal quantifiers. For instance, the following sentences sound fine:

(11) Every person who ever ran a marathon was exhausted afterwards.

(12) Every student who paid any attention at all got an A on the exam.

(13) The World Series is watched by everyone who gives a damn about baseball.

The traditional explanation for our judgments about sentences like (5)–(13) is that negative polarity items are licensed in *downward-entailing environments*—that is, in linguistic environments where replacing an expression with a semantically stronger expression would result in a valid inference.[8]

How do these facts bear on the dialectic between strict conditional and variably strict conditional views? The key observation is that negative polarity items are licensed in the antecedents of counterfactuals:

(14) If Sophie ever ran a marathon, she would be exhausted afterwards.

(15) If Sophie had paid any attention at all, she would have gotten an A on the exam.

7. A few housekeeping notes: Strictly speaking, the term 'counterfactual' is a misnomer for the sentences under discussion, which include some conditionals with true antecedents. Throughout this paper, in discussions of simple counterfactuals like (4), 'the counterfactual domain' refers to the value of the accessibility function at the world of utterance, and 'accessible' is used for the worlds in this domain.

8. This generalization is due to Ladusaw 1979. See §8.4 of Israel 2011 for an introductory discussion of Ladusaw's theory, as well as a survey of various refinements of the theory by subsequent authors.

(16) If Sophie gave a damn about baseball, she would be watching the World Series.

Strict conditional theorists can easily explain this observation. According to strict conditional theorists, Antecedent Strengthening is valid, which is just to say that counterfactual antecedents are downward-entailing environments. As a result, strict conditional theorists predict that negative polarity items are licensed in (14)–(16). By contrast, variably strict conditional theorists deny that counterfactual antecedents are downward-entailing environments, which makes it difficult for them to explain why (14)–(16) sound fine. Theorists have used this argument—among others—to motivate a strict conditional semantics for counterfactuals.[9]

In this section and the next, I will focus on evaluating the strict conditional view developed in von Fintel 2001.[10] According to von Fintel, counterfactuals share a general feature of many natural language quantifiers—namely, they carry an existence presupposition with respect to their restricted domain. For instance, (3-a) carries the presupposition that there are some accessible worlds in which Sophie goes to the parade and gets stuck behind a tall person:

(3) a. If Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.
b. #But of course, if she went to the parade, she would see Pedro.

This presupposition is not yet satisfied when a speaker utters (1-a)—the first sentence of our initial Sobel sequence—which is why this sentence can be truly uttered before (1-b). But when a speaker utters (3-a), context is adjusted to accommodate its presupposition, and the domain of accessible worlds expands to include some worlds where Sophie is stuck behind a tall person. (3-b) is false as uttered in this later context, which explains why it sounds bad.

We can elucidate von Fintel's account of (1) and (3) by comparing these sequences with analogous sequences containing universal quantifiers.[11] Consider the following example:

> *Pet Store*: Pets-R-Us is a small pet store that sells only cats, dogs, and hamsters. Unfortunately, the store is located near a stagnant pond, so there are many mosquitoes flying around the neighborhood, including some inside the store.

9. This argument is originally due to von Fintel 2001, p. 132–3. For sympathetic discussion, see Nichols 2017, p. 625–6 and Boylan & Schultheis 2021, p. 378. For additional arguments in favor of the strict conditional view, see chapter 10 of Williamson 2020. These arguments provide further motivation for the semantics that I defend in §5.
10. I begin with von Fintel for ease of exposition. As I explain in §3, my arguments challenge several accounts of counterfactuals, including the dynamic strict conditional view developed in Gillies 2007.
11. Among strict conditional theorists, it is common to assimilate the expansion of the counterfactual domain to quantifier domain expansion. For instance, Ichikawa 2011 explains his account of Sobel sequences by noting that 'no one is in the library' may be true even though "an utterance of 'there is a librarian in the library' would, annoyingly, expand the domain to include him" (306). For similar remarks, see Heller 1995, p. 100; Williamson 2020, p. 225; Sandgren & Steele 2021, p. 6; and Greenberg 2021, p. 21.

A customer walking into Pets-R-Us could say the following:

(17) a. Every animal in this store is expensive.
b. But of course, every mosquito in this store is free.

By contrast, it sounds bad to say:

(18) a. Every mosquito in this store is free.
b. #But of course, every animal in this store is expensive.

These judgments are easy to explain. Before anyone mentions mosquitoes, 'every animal in this store' is naturally interpreted as ranging over the animals that are for sale. But after a speaker utters (18-a), our interpretation of this quantifier phrase expands to include the mosquitoes in the store. (18-b) is false as uttered in this later context, which is why it sounds bad. According to von Fintel, (3-b) sounds bad for a similar reason.

The main rival of the strict conditional view is the variably strict conditional view defended by Stalnaker 1968 and Lewis 1973. Stalnaker and Lewis famously disagree about the details, but very roughly, the variably strict view says that (4) is true just in case the closest world(s) in which Sophie goes to the parade are worlds where she sees Pedro. Variably strict theorists do not say that the context shifts as speakers utter Sobel or Heim sequences. On their view, (1) sounds fine because both sentences in this sequence can be true as uttered at the same context. On behalf of variably strict theorists, I have argued that we should embrace a pragmatic account of why (3-b) sounds bad. As I explain in Moss 2012, (3-b) is infelicitous not because it must be false when it is uttered after (3-a), but merely because the speaker is not in a good enough epistemic position to assert it.[12]

Which account should we prefer? Moss 2012 presents two worries for von Fintel's strict conditional account of (3). The first worry is that some Heim sequences are felicitous. Here is one example:

> *Proposal:* John and Mary are our mutual friends. John was going to ask Mary to marry him, but chickened out at the last minute. I know Mary much better than you do, and you ask me whether Mary might have said yes if John had proposed. I tell you that I swore to Mary that I would never actually tell anyone that information, which means that strictly speaking, I cannot answer your question. But I say that I will go so far as to tell you two facts. (574)

With this setup, it sounds fine to say:

(19) a. If John had proposed to Mary and she had said yes, he would have been really happy.
b. But if John had proposed, he would have been really unhappy.

12. For further sympathetic discussion of this pragmatic account of Heim sequences, see Nichols 2017, §5.

Hence von Fintel's diagnosis of (3-b) seems too strong. According to von Fintel, (3-b) sounds bad because the first sentence contains a presupposition trigger that expands the domain of accessible worlds. However, (19-a) contains the same sort of presupposition trigger, and (19-b) sounds fine.

A second worry raised in Moss 2012 is that there are close cousins of Heim sequences in which the second sentence of the sequence sounds bad, but the first sentence does not contain any presupposition trigger that prompts the counterfactual domain to expand. For example, consider the following sequence:

(20) a. Sometimes when people go to parades, they end up getting stuck behind a tall person and missing the main attraction.
b. #But if Sophie had gone to the parade, she would have seen Pedro.

The infelicity of (20-b) suggests that von Fintel's diagnosis of (3-b) is not only too strong, but also too weak. It seems reasonable to pursue a unified account of why (3-b) and (20-b) sound bad. But unlike (3-a), (20-a) does not presuppose that there is an accessible world in which Sophie goes to the parade and gets stuck behind a tall person. To sum up, the presence of a presupposition trigger is neither necessary nor sufficient for a sentence like (3-b) to sound bad. According to Moss 2012, von Fintel's account overgenerates to predict that all Heim sequences are infelicitous, and his account isn't general enough to capture all instances of the relevant phenomenon. These worries have motivated a number of theorists to pursue alternative accounts of (3) and other Heim sequences.[13]

2 A limited defense of von Fintel's account

Ultimately, we should reject von Fintel's account of Heim sequences. But we should reject this account for the right reasons. In this section, I argue that these reasons *do not* include the aforementioned worries that I put forward in Moss 2012. In other words, (19) and (20) do not give us any reason to reject the central idea of von Fintel's account—namely, that (3-b) sounds bad because (3-a) carries a presupposition that prompts the counterfactual domain to expand, causing (3-b) to be false in the resulting context.

Let's examine (20) first. If 'would' behaves like a universal quantifier, as von Fintel suggests, then one can expect its domain to be sensitive to the same sorts of contextual features as other universal quantifier domains, which can expand for a variety of reasons, even in the absence of any presupposition trigger. For example, consider the following discourse as uttered in the context of *Pet Store*:

(21) a. Mosquitoes are free.
b. #But of course, every animal in this store is expensive.

13. For instance, see de Jager 2009, p. 91ff.; Nichols 2017; Lewis 2018; and Loewenstein 2021.

(21-a) does not presuppose that there are mosquitoes in the store. Nevertheless, mentioning mosquitoes in (21-a) ensures that our interpretation of 'every animal' in (21-b) includes the mosquitoes in the store. With this example in mind, von Fintel could say that (20-b) sounds bad for a similar reason. Even though (20-a) does not presuppose that there are accessible worlds in which Sophie goes to the parade and gets stuck behind a tall person, it can still prompt the counterfactual domain to expand to include such worlds, thereby creating a context in which (20-b) is plainly false. There is nothing about von Fintel's semantics that forces him to say that "[t]he only sentences that effect any context change are counterfactuals."[14] In fact, von Fintel's own account should lead him to deny this claim, since it would be like claiming that the domain of 'every animal' can only be expanded by the utterance of a universal quantifier, which is obviously false. Given von Fintel's guiding analogy between counterfactuals and natural language quantifiers, we should expect to find infelicitous sequences like (20).

How should von Fintel explain our judgment that (19) sounds fine? Here again, we can invoke the same general strategy that we used with (20)—namely, comparing this sequence of counterfactuals with analogous sequences containing universal quantifiers. As mentioned above, von Fintel adopts the assumption—originally due to Strawson 1952—that a universal quantifier triggers the presupposition that its restricted domain is non-empty.[15] For example, (22) presupposes that some girl likes Archie:

(22) Every girl who likes Archie is coming to his birthday party.

Accordingly, uttering (22) usually makes it common ground that some girl likes Archie. However, as Geurts 2007 discusses at length, there are unusual contexts in which uttering (22) does not have this effect on the common ground. We often presuppose that the domain of a universal quantifier is non-empty, given our "strong default presumption that the empty set is an uninteresting, and therefore less likely, topic of conversation" (270). But in some contexts, this default presumption is overruled, and universally quantified sentences are vacuously true. Here is one example:

> *Party:* Archie has always had trouble making friends. This year, he moved to a new school, and you ask me whether he had made friends with any of the students there. I tell you that I swore to Archie that I wouldn't directly answer that question, but I say that I will go so far as to tell you two facts:
>
> (23) a. Every student who likes Archie is coming to his birthday party.
> b. No student is coming to his birthday party.

14. As a matter of fact, von Fintel does say this—it's a direct quote from von Fintel 2001, p. 138—but the comment should be dismissed as an unforced error, as it's in tension with his own account.
15. Diesing 1992 defends this assumption as a general claim about quantifier phrases. For critical discussion and a detailed overview of relevant literature, see Heim & Kratzer 1998, p. 162–77.

The point of (23) is clear. I want to convey that no student likes Archie. But rather than asserting this proposition directly, I assert two propositions that entail it. In this context, I use (23) to convey that the existence presupposition of (23-a) is false. We can construct a similar sequence of universally quantified sentences in the context of the pet store example:

> *Pet Store, Cont'd:* As it happens, I am a manager at a local pest control company, and Pets-R-Us has just hired our company to get rid of all the mosquitoes in their store. After the pest exterminators finish, you ask me whether they really managed to get rid of every single mosquito, or whether there are still a few mosquitoes left. I explain that our company has a client confidentiality agreement that forbids me from directly answering your question, but I say that I can tell you two facts:

(24) a. Every mosquito currently in the store is free.
b. Every animal currently in the store is expensive.

I want to convey that there are no mosquitoes in the store. Again, rather than asserting this proposition directly, I assert two propositions that entail it. Both sentences of (24) are true, and together they convey that the existence presupposition of (24-a) is false.

Returning to our discussion of counterfactuals, we see that von Fintel could say that (19) works in just the same way:

(19) a. If John had proposed to Mary and she had said yes, he would have been really happy.
b. But if John had proposed, he would have been really unhappy.

The speaker of (19) indirectly conveys that the existence presupposition of (19-a) is false. That is, she conveys that there are no accessible worlds where John successfully proposes to Mary—or in other words, that John would never have successfully proposed. As von Fintel 2001 points out, Heim sequences often sound fine if the speaker interjects after the first sentence, "But of course, that would never happen" (140). This content is exactly what is conveyed by a felicitous Heim sequence—namely, that there are no accessible worlds in which the antecedent of the first sentence is true.

There are some striking similarities between the contexts of (19) and (24). When the speaker utters (24), it's assumed that the speaker knows whether there are mosquitoes in the store, and it's common ground that the speaker must convey this information indirectly. This helps defeat the default presumption that the existence presupposition of the first sentence is satisfied. In the context of (19), it's assumed that the speaker knows whether Mary would have said yes to John, and it's common ground that the speaker must convey this information indirectly. In short, (24) appears to be a promising model for a strict conditional account of felicitous Heim sequences. By drawing an analogy between (19) and (24), von Fintel can answer the objection that his account fails to make

sense of our judgments about the former.

The account just described is *not* the account of felicitous Heim sequences that most theorists expect von Fintel to give. It is commonly assumed that strict conditional theorists will account for these sequences by saying that the domain of accessible worlds somehow *contracts* when the second sentence is uttered.[16] Greenberg 2021 develops this idea in detail, arguing that "both expansions and contractions of the modal domain occur smoothly in normal conversation as a result of accommodation, albeit only when accompanied by the appropriate linguistic signals" (21). Greenberg argues that we should compare (19) with the following:

(25) a. There is only a ketchup bottle and a can of beer in the fridge.
b. But really, there is *nothing* in the fridge.

According to Greenberg, the domain of 'nothing' contracts smoothly in (25-b), and the counterfactual domain can contract smoothly for just the same reason. Unfortunately, many ordinary speakers report that (25-b) sounds bad. This puts some pressure on the idea that (25-b) provides a good model for an account of why (19-b) sounds fine. Fortunately, I have argued that von Fintel can account for our judgment about (19) without appealing to tenuous judgments about contracting quantifier domains.

To sum up, (19) and (20) do not threaten von Fintel's account of Heim sequences. According to this account, we should expect 'would' to behave like natural language universal quantifiers. So far, this is just what we have found. The domain of a universal quantifier may expand for a variety of reasons, which explains why we find infelicitous sequences like (20). Sometimes the existence presuppositions of universal quantifiers are not accommodated, which explains why we find felicitous Heim sequences like (19). The strict conditional account defended by von Fintel has more resources at its disposal than its opponents—and even its fans—have recognized.

3 A remaining problem for extant strict conditional accounts

Unfortunately for von Fintel and other strict conditional theorists, a more difficult problem remains. Recall that according to von Fintel, (3-b) sounds bad because it's false:

(3) a. If Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.
b. #But of course, if she went, she would see Pedro.

16. As Gillies 2017 says in response to Moss 2012, "the sort of thing that needs saying is clear: resetting happens, but it is not as smooth as expanding the counterfactual domain" (416). For similar comments, see Lewis 2018, p. 487; Moss 2012, p. 21; and Nichols 2017, p. 638.

Again, the idea is that the domain of accessible worlds expands when (3-a) is uttered, and (3-b) is plainly false in the resulting context. This semantic diagnosis of (3-b) is central to von Fintel's account, and it is widely endorsed by strict conditional theorists. Here are some representative discussions:

> [A]n expansion of the set of relevant worlds... can be described by saying that the conversational score changes. Given the change in score, ['If I were invited to the party, I would go'] is *now false*.[17]

> So there is just *no way for [(3-b)] to be true* here, given the score as it stands after interpreting [(3-a)]... Successful interpretation of the first conjunct creates a context in which interpreting the second is doomed to failure.[18]

> Once the possibility that the Count finds a man and is shot dead is put on the table, ['If the Count had found a man, he would have become violent' is] *false*.[19]

> One response is to side-line these puzzles to the domain of conversational pragmatics: what does and does not sound right in these contexts need not track the truth or falsity of the propositions expressed. Others, us included, seek a semantic treatment of these puzzles.[20]

Unfortunately for these accounts, there is a problem with saying that (3-b) is plainly false. This diagnosis of (3-b) is at odds with our *probabilistic* counterfactual judgments. For example, consider the following variant of (3):

(26) a. If Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.
b. But more likely than not, if she went to the parade, she'd see him.

Although (3-b) sounds bad, (26-b) sounds fine. This fact presents a problem for the strict conditional accounts quoted above. According to these accounts, (3-b) is plainly false after (3-a). But in that same context, we're happy to say that the content of (3-b) is likely, and we don't normally go around saying that plainly false contents are likely. Similarly, consider the following sentences:

(27) But I'd be willing to bet that if she went to the parade, she'd see him.

(28) But we can be pretty confident that if she went to the parade, she'd see him.

(29) But it's at least .9 likely that if she went to the parade, she'd see him.

All of these sentences sound fine after (3-a). But it's hard to explain why they sound fine

17. Heller 1995, p. 100; my emphasis.
18. Gillies 2007, p. 339; my emphasis.
19. Ichikawa 2011, p. 299; my emphasis.
20. Sandgren & Steele 2021, p. 17–18.

if the embedded counterfactual is plainly false as uttered in this context.

To sharpen the point, consider a discourse that is analogous to (26) but with quantified sentences in place of counterfactuals. Suppose that someone walks into Pets-R-Us and says:

(30) a. Every mosquito in this store is free.
b. #But more likely than not, every animal in this store is expensive.

The sentence (30-b) sounds bad, and it's not hard to see why. After a speaker utters (30-a), 'every animal in this store' is interpreted as ranging over the mosquitoes in the store. It's plainly false that every animal in this domain is expensive, so it sounds bad to express confidence in this claim. The sharp contrast in our judgments about (26-b) and (30-b) is a genuine problem for von Fintel and other strict conditional theorists. The sentence (30-b) sounds bad because after the relevant domain expands, the sentence under the probability operator is plainly false. According to von Fintel, (26-a) expands the counterfactual domain in just the same way, which suggests that (26-b) should sound bad for just the same reason. But in fact, (26-b) sounds fine.

At this point, von Fintel could insist that the counterfactual domain somehow contracts in the probabilistic Heim sequence (26), even though it does not contract in our original Heim sequence (3). But this move would be ad hoc. In §2, when we explained our judgments by assuming that the counterfactual domain evolved in a certain way, we were able to find the domains of nominal quantifiers evolving in just the same way—for instance, expanding without the presence of any presupposition trigger. By contrast, when it comes to probabilistic judgments, counterfactuals do not behave like nominal quantifiers. After the counterfactual domain expands in (26-a), speakers are still willing to assert a hedged version of what they said before. After the domain of the universal quantifier expands in (30-a), speakers are *unwilling* to assert a hedged version of what they said before. There is indeed a significant disanalogy between the pragmatics of counterfactuals and the pragmatics of universal quantifiers.

Let's broaden our critical discussion and consider a second account of Heim sequences, an alternative to the account defended by von Fintel and the strict conditional theorists quoted above. Every account of Heim sequences is trying to explain a certain asymmetry—namely, that it's relatively easy for a sentence like 'If Sophie went to the parade, she would see Pedro' to start sounding bad, and it's harder for it to start sounding good again. So far, we have discussed strict conditional theorists who want to explain this asymmetry by appealing to a familiar fact about how quantifier domains evolve—namely, that it's easier to expand domains than to contract them. Klecha 2015 and Lewis 2016 propose to explain the same asymmetry by appealing instead to a fact about *standards of*

precision—namely, that it's easy to raise contextually determined standards of precision for interpreting loose speech, while it's comparatively difficult to lower them.[21] For example, it's easy to raise our standards for interpreting loose speech about the time, as in the following discourse:

(31) a. The concert started at 8:00.
b. But of course, it didn't start at exactly 8:00 on the dot.

By contrast, the following sequence sounds significantly worse:

(32) a. The concert didn't start at exactly 8:00 on the dot.
b. #But of course, it started at 8:00.

The contrast between (31-a) and (32-b) is easy to understand. Before anyone starts talking about precise times, '8:00' can be used for roughly any time around 8:00. That's why (31-a) is true when it's uttered. But uttering (32-a) raises the contextually determined standard of precision for interpreting this sentence. Hence (32-b) conveys that the concert started at exactly 8:00, which is false, and that's why (32-b) sounds bad.[22]

According to Klecha and Lewis, (3-b) sounds bad for just the same reason. Before anyone starts talking about Sophie getting stuck behind a tall person, this sentence can be true. But uttering (3-a) raises the contextually determined standard of precision for interpreting this sentence, so that (3-b) comes out false:

(3) a. If Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.
b. #But of course, if she went to the parade, she would see Pedro.

As Lewis 2016 puts it, "the semantic content of a counterfactual is sensitive to the standards of precision in the conversation. A useful comparison here is the case of absolute gradable adjectives like *flat*" (291–2). Klecha 2015 says that Heim sequences like (3) sound bad because "whoever takes the side of the higher standard of precision tends to 'win'. This is not to say that the going in the other direction is impossible; it's just much more difficult" (139). Just as (32-b) is false in the high-standards context in which it's uttered, the same goes for (3-b).

Unfortunately, this account of (3) suffers from the same problem as von Fintel's—namely, it fails to make sense of our probabilistic counterfactual judgments. When speak-

21. For additional discussion of standards of precision in connection with Sobel and Heim sequences, see Hájek 2014, §10 and Horn 2021, p. 15. Although it does not matter for our purposes, it should be noted that Klecha distinguishes sequences like (3) from "reverse true Sobel sequences," which are not covered by his loose speech account.
22. For a more detailed theoretical account of the contrast between (31) and (32), see Carter 2021.

ers use loose speech to make false claims in high-standards contexts, they are *not* inclined to say that these false claims are likely. For example, (33-b) sounds bad:

(33) a. The concert didn't start at exactly 8:00 on the dot.
b. #But more likely than not, it started at 8:00.

By contrast, recall that (26-b) sounds fine:

(26) a. If Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.
b. But more likely than not, if she went to the parade, she'd see him.

This contrast spells trouble for the loose speech account of (26). (33-b) sounds bad because the sentence under the probability operator is plainly false after (33-a) raises our standard for interpreting it. According to the loose speech account, (26-a) raises our standard for interpreting counterfactuals, which suggests that (26-b) should sound bad for just the same reason. But (26-b) sounds fine.

Let's consider one more account of Heim sequences. In addition to the strict conditional semantics that we have discussed so far, there is an alternative semantic theory that validates Antecedent Strengthening. According to this theory, counterfactuals make claims about pluralities of possible worlds.[23] For instance, 'If Sophie went to the parade, she would see Pedro' does not say that Sophie sees Pedro in *every accessible world* where she goes to the parade, but rather that Sophie sees Pedro in *the accessible worlds* where she goes to the parade. Križ 2015 endorses this semantics, and he aims to explain the behavior of Sobel and Heim sequences by analogy with similar sequences of sentences containing plural definite descriptions.[24] For Križ, one important fact is that plural definite descriptions generally exhibit exception tolerance. For instance, the following sequence sounds consistent:

(34) a. The professors are smiling.
b. But of course, Professor Smith isn't smiling; he always has a dour expression.

However, this exception tolerance decreases when exceptions are explicitly mentioned. For instance, the following sequence sounds bad:

(35) a. Professor Smith isn't smiling; he always has a dour expression.
b. #But of course, the professors are smiling.

23. For arguments in favor of the view that *if*-clauses are plural definite descriptions, see Schein 2001, p. 337ff.; Schlenker 2004; and Bhatt & Pancheva 2006.
24. For details, see Križ 2015, §7.1.5. In a similar spirit, Horn 2021 compares Sobel and Heim sequences with sequences of generic bare plurals, observing that both counterfactuals and generic bare plurals generally exhibit exception tolerance, but only when exceptions are not salient.

Before anyone mentions Professor Smith, 'the professors are smiling' can be used to convey a true claim—roughly, that pretty much all of the professors are smiling. But after (35-a) is uttered, we interpret (35-b) as having a stronger content, so this sentence is no longer true.[25]

Križ argues that these facts about plural definite descriptions can help us make sense of the contrast between Sobel and Heim sequences. According to Križ, the Sobel sequence (1) is paraphrased by the following sequence:

(36) a. In the worlds where Sophie goes to the parade, she sees Pedro.
b. But of course, in the worlds where she goes and gets stuck behind a tall person, she doesn't see Pedro.

By contrast, the Heim sequence (3) is paraphrased by the following sequence:

(37) a. In the worlds where Sophie goes to the parade and gets stuck behind a tall person, she doesn't see Pedro.
b. #But of course, in the worlds where she goes to the parade, she sees Pedro.

When a speaker utters (37-a), they mention an exception to the claim that Sophie sees Pedro in the accessible worlds where she goes to the parade. In the resulting context, (37-b) is false, and that's why it sounds bad. According to Križ, the second sentence of the Heim sequence (3) sounds bad for just the same reason.

Unfortunately, this account of Heim sequences suffers from the same problem as the other accounts we have considered in this section. After an exception is mentioned, speakers are not only reluctant to utter the same plural sentences as before, but also reluctant to utter hedged variants of these sentences. For example, it sounds bad to say:

(38) a. Professor Smith isn't smiling; he always has a dour expression.
b. #But more likely than not, the professors are smiling.

Here again, we have a significant disanalogy with (26), our probabilistic Heim sequence. The hedged sentence (38-b) sounds bad because after an exception is explicitly mentioned, the sentence under the probability operator sounds false. On Križ's account, (26-b) should sound bad for the same reason—but again, (26-b) sounds fine.

All of the accounts considered in this section suffer from the same fundamental flaw. These accounts agree that the first sentence of an infelicitous Heim sequence changes the context in some way—whether it's by expanding the counterfactual domain, raising the relevant standard of precision, or mentioning an exception to plural predication—and

25. Križ 2015 suggests that (35-b) lacks a truth value, whereas Križ & Spector 2021 defend a more sophisticated view on which (35-b) could be false. The difference between these hypotheses does not matter for our purposes; for simplicity, I assume that (35-b) is false once relevant exceptions are made salient.

they agree that in the resulting context, the second sentence of the Heim sequence sounds bad because it is plainly false. But if (3-b) is plainly false, it is a mystery why ordinary speakers are happy to say that its content is likely. By contrast, the pragmatic account of Heim sequences defended in Moss 2012 can easily make sense of this probabilistic counterfactual judgment. As discussed in §2, I got some things wrong in my 2012 paper. But here's something that I got right: (3-b) sounds bad because the speaker isn't in a good enough epistemic position to assert its content. This diagnosis of (3-b) leaves open the possibility that the speaker is in a good enough position to say that its content is likely. To sum up, probabilistic variants of Heim sequences help us pull apart semantic and pragmatic hypotheses. These judgments succeed in challenging the traditional strict conditional view of Heim sequences, where the judgments discussed in §2 did not.

Probabilistic variants of Heim sequences are an instance of a more general challenge. As standardly developed, the strict conditional view has trouble making sense of other intuitive probabilistic judgments, too. For example, consider the following question:

(39) Which is more likely—that this match would light on fire if you were to strike it after soaking it in water, or that it would light on fire if you were to strike it?

The intuitive answer to this question is that (40) is significantly less likely than (41):

(40) If you were to soak the match and strike it, it would light.

(41) If you were to strike the match, it would light.

According to von Fintel and friends, merely asking (39) affects the context so that the domain of accessible worlds expands to include worlds where you soak the match before striking it. As uttered in this context, (41) entails (40), which is inconsistent with our intuitive judgment that the former is more likely than the latter.

Again, von Fintel might insist that the counterfactual domain contracts at just the right moment, excluding worlds where you soak the match from the domain of the second counterfactual in (39), so that our intuitive judgments are vindicated. But this move is ad hoc when offered in the context of von Fintel's account, precisely because the domains of natural language quantifiers do not contract in this way. To see this, consider the following question as uttered in the context of our *Pet Store* example:

(42) Which is more likely—that every mosquito in this store is asleep, or that every animal in this store is asleep?

After someone asks this question, (43) entails (44):

(43) Every animal in this store is asleep.

(44) Every mosquito in this store is asleep.

This result is perfectly consistent with our intuitive probabilistic judgments. Intuitively, (44) is indeed more likely than (43). The natural interpretation of 'every animal' remains broad in (42), which makes it hard for von Fintel to insist that the counterfactual domain contracts over the course of the allegedly parallel sequence (39). Again, we have seen that when it comes to our likelihood judgments, counterfactuals do not behave like universal quantifiers. Strict conditional theorists need a better model for the way in which the truth conditions of counterfactuals depend on context.

A quick clarification about the broader dialectic: I have argued that existing strict conditional views make bad predictions about probabilistic Heim sequences, since these views are designed to deliver a semantic diagnosis of the infelicity of (3-b). In addition, probabilistic judgments make trouble for some variably strict conditional views. For instance, Lewis 1973 fails to predict our probabilistic judgments about some counterfactuals that he considers to be simply false.[26] The arguments in this section are not meant to vindicate all variably strict theories, but rather to discourage theorists of any sort from pursuing a semantic diagnosis of (3-b), which is the diagnosis that is widely endorsed by defenders of strict conditional views.

4 An alternative explanation of probabilistic counterfactual talk?

So far in this paper, I have been assuming that when a rational speaker utters (45),

(45) More likely than not, if Sophie went to the parade, she'd see Pedro.

she has high credence in the content of (46):

(46) If Sophie went to the parade, she'd see Pedro.

Given this assumption, we have a compelling reason to reject accounts on which (46) is plainly false as uttered in some contexts where ordinary speakers are happy to utter (45), since rational speakers don't have high credence in plainly false claims.

Faced with this argument, one might be tempted to reject the assumed connection between asserting (45) and having high credence in the content of (46). In this spirit, Jonathan Bennett and Alan Hájek argue that (46) is false, but that sentences like (45) are nevertheless assertable, because speakers do not interpret these sentences as saying that a false counterfactual claim is likely. Rather, ordinary speakers interpret (45) as if the probability operator were embedded in the consequent of the conditional. According to Bennett and Hájek, when speakers appear to be making probabilistic judgments about

26. For further discussion of this objection, see Edgington 1995, §4.5; Edgington 2008, p. 9–10; Moss 2013, §1; Schulz 2014, §1; and Schulz 2017, §4.1.

counterfactuals, they are actually making judgments about counterfactual probabilities.[27] Hájek 2021 explains:

> I can also explain away the view from the other side, which attributes probability 1/2 to 'if I were to toss the fair coin, it would land heads' and to 'if I were to toss the fair coin, it would land tails'. Here's what's true: if I were to toss the fair coin, the probability of it landing heads would be 1/2. . . The probabilities that are 1/2 take narrow scope. (195)

Hence Bennett and Hájek claim that (47) does not express a probabilistic judgment:

(47) It is .5 likely that if I were to flip this coin, it would land heads.

Rather, (47) states a fact about counterfactual chances—namely, the fact stated in (48):

(48) If I were to flip this coin, it would have .5 objective chance of landing heads.

According to Bennett and Hájek, the fact that we believe the content of (48) explains why we are willing to assert (47).

Unfortunately, there are several problems for Bennett and Hájek's strategy for explaining away our probabilistic judgments about counterfactuals. For starters, consider the following example:

> *Mixed Urn:* There is an urn containing 100 coins. You happen to know that 50 of the coins are fair and 50 are double-headed. A coin is selected at random from the urn and kept hidden from view. Your friend is deciding whether to flip the mystery coin. She must pay one dollar to flip the coin, but if she flips the coin and it lands heads, she will win two dollars.

Suppose that your friend doesn't know anything about the setup of the case. She asks you to take your best guess about what would happen if she flipped the mystery coin. Given your evidence, it would make sense for you to advise your friend, "Pay the dollar and flip the coin! The odds are in your favor." By way of elaboration, you could say:

(49) Given my evidence, it's more likely than not that if you flipped the coin, you would end up winning two dollars.

(50) To be more precise, it's .75 likely that if you flipped it, it would land heads.

(51) More likely than not, it would land heads if you flipped it.

Just like other probabilistic judgments about counterfactuals, (50) and (51) present a prima facie challenge for traditional strict conditional views. After all, it seems that you can use these sentences to express confidence in the following statement about the coin:

(52) If you flipped it, it would land heads.

27. See Bennett 2003, p. 251 and Hájek 2021, p. 195.

But according to Bennett and Hájek, you shouldn't be confident of (52). Both Bennett and Hájek are clear about what it takes for a coin to be such that it would land heads if you flipped it—namely, such a coin must be double-headed, not fair.[28] Since you merely have .5 credence that the coin is double-headed, you should have .5 credence in (52), and so it's hard to explain why you can express confidence in this claim.

Can Bennett and Hájek explain away the assertability of (50) and (51)? Adopting the paraphrase strategy described above, one might attempt to reinterpret these sentences as stating the following facts about counterfactual objective chances:

(53) If you were to flip the coin, it would have .75 objective chance of landing heads.

(54) If you were to flip the coin, the objective chance of it landing heads would be greater than the objective chance of it not landing heads.

But unfortunately for Bennett and Hájek, their creative reinterpretation strategy fails here. Since you know that the coin is either fair or double-headed, you know that (53) is false, and so you shouldn't assert it. The sentence (54) is also unassertable, since you merely have .5 credence that it is true. Hence Bennett and Hájek can't explain away the assertability of (50) and (51) by appealing to the assertability of (53) or (54). This example illustrates a general problem for Bennett and Hájek's reinterpretation strategy: When your credence in a counterfactual is an expectation informed by multiple hypotheses about the counterfactual objective chance of the consequent, you may not have any full belief about what the objective chance of the consequent would be if the antecedent of the conditional were true. Hence we cannot explain away the former sort of judgment by appealing to full beliefs about counterfactual objective chances.

Similarly, we can't always explain away the assertability of (45) by saying that it states a known fact about counterfactual objective chances:

(45) More likely than not, if Sophie went to the parade, she'd see Pedro.

For instance, suppose we fill in the details of the parade example as follows:

> *Red Sox Parade:* Sophie is indecisive when it comes to deciding how to get around Boston. She fills an urn with 100 pieces of paper, half of which say 'car' and half of which say 'subway'. Then she randomly selects a piece of paper from the urn, without looking at it. Sophie still hasn't decided whether she'll go to the Red Sox parade, but she resolves that if she goes, she will take whatever mode of transportation is named on the paper that she picked.
>
> As it happens, the objective chance that Sophie would see Pedro at the parade depends on whether she would get to the parade by car or by subway. If she drove her car to the

28. Hájek 2021 writes, "What is the probability that if I were to toss the randomly chosen coin, *it would land heads*? I say that that's the probability of picking the two-headed coin" (195). See also Bennett 2003, p. 240.

> parade, she would only have .5 chance of making it to the parade in time to see Pedro. But if she took the subway, she would be almost certain to see Pedro if she went.

With these additional details, our parade example has the same structure as *Mixed Urn*. If we know these details, we can assert (45). However, we cannot assert:

(55) If Sophie went to the parade, the objective chance of her seeing Pedro would be greater than the objective chance of her not seeing Pedro.

Just like (54) in our *Mixed Urn* example, the sentence (55) is unassertable because we merely have .5 credence that it is true. Hence Bennett and Hájek can't explain away the assertability of (45) by appealing to the assertability of (55).

A second problem for Bennett and Hájek is illustrated by the following example:

> *Coin Flips:* There are 100 fair coins scattered on a table. You decide to play a game in which you flip the coins one at a time until one of the coins lands tails, at which point the remaining coins are automatically destroyed.

In the context of this example, we could gesture at one of the coins on the table and assert:

(56) It's .5 likely that if you flipped this coin first, it would land heads.

We could say just the same thing about the next coin, and the next, and so on for each of the coins. A bit of elementary statistics will lead us to conclude:

(57) About half of the coins would land heads if you were to flip them first.

The assertability of (57) presents a prima facie challenge for strict conditional theorists like Bennett and Hájek. According to Bennett and Hájek, since all the coins are fair, (58) is false, no matter what coin we are talking about:

(58) If you were to flip this coin first, it would land heads.

Hence it would seem that we should reject (57) and instead conclude:

(59) No coin is such that if you were to flip it first, it would land heads.

Can Bennett and Hájek explain away the assertability of (57)? There aren't any probability operators in (57), so we can't easily reinterpret (57) as stating some fact about counterfactual objective chances. On behalf of Bennett and Hájek, we could try to brainstorm alternative paraphrases of (57). Here are two natural candidates:

(60) If you had flipped every coin first, about half of them would have landed heads.

(61) If you had flipped every coin, about half of them would have landed heads.

Unfortunately for Bennett and Hájek, these paraphrases are inadequate. The sentence (60) is infelicitous, because it doesn't make sense to suppose that you flip every coin first—i.e., before every other coin. The sentence (61) is false, since it is part of the setup of the case that as soon as any coin lands tails, the remaining coins are automatically destroyed. By saying that ordinary counterfactuals like (58) are simply false, Bennett and Hájek fail to capture the roles that these sentences play in our reasoning about statistical claims like (57). Their paraphrase strategy for counterfactuals embedded under probability operators does not extend to explain away our judgments about sentences in which counterfactuals are embedded under quantifiers.

A third problem for Bennett and Hájek is brought out by the following example:

> *Two Urns:* There are two urns in front of us, one labeled 'Fair Coins' and one labeled 'Double-Headed Coins'. You believe that the urns are accurately labeled. Coin A and Coin B are both drawn from the urn labeled 'Fair Coins' and then hidden from view.

Since you believe that Coin A came from the urn containing fair coins, you can assert:

(62) It is .5 likely that if Coin A were flipped, it would land heads.

In addition, we can easily fill in the details of the example so that you can assert:

(63) Whether Coin A would land heads if it were flipped is independent of whether Coin B would land heads if it were flipped.

(64) Supposing that Coin B would land heads if it were flipped, it's still .5 likely that Coin A would land heads if it were flipped.

Taken at face value, (63) and (64) concern the relationship between the following claims:

(65) If Coin A were flipped, it would land heads.

(66) If Coin B were flipped, it would land heads.

For instance, (63) expresses that (65) and (66) are probabilistically independent. Formally speaking, propositions P and Q are independent relative to a probability function f just in case $f(P) = f(P|Q)$. The propositions expressed by (65) and (66) are independent relative to your credences. Supposing that Coin B would land heads if flipped, your credence that Coin A would land heads if flipped will remain unchanged—that is, you have .5 conditional credence that Coin A would land heads if flipped, given that Coin B would land heads if flipped. A natural proposal is that (64) expresses this probabilistic belief.

Of course, Bennett and Hájek must reject this proposal about (64). According to Bennett and Hájek, (65) is plainly false, and so you shouldn't have .5 credence in its content, nor should you have .5 conditional credence in its content, conditional on the

proposition expressed by (66). Can Bennett and Hájek give an alternate explanation for the assertability of (64)? Following their reinterpretation strategy, we could try saying that (64) does not express a conditional probabilistic belief, but rather the following conditional belief about objective chance facts:

(67) Supposing that Coin B would land heads if it were flipped, it's still the case that if Coin A were flipped, the objective chance of it landing heads would be .5.

However, this paraphrase is inadequate. According to Bennett and Hájek, we shouldn't be willing to assert the content of (67) in the context of the example described above. Again, Bennett and Hájek think that the antecedent of (67) is true only if Coin B is double-headed. But supposing that Coin B is double-headed, the most likely hypothesis is that the urns are mislabeled, and that Coin A and Coin B both came from the urn containing double-headed coins. Hence on the supposition that Coin B would land heads if it were flipped, you do not believe that Coin A is fair. Since (67) is unassertable, we can't explain away the assertability of (64) by saying that it expresses the same content as (67).

In addition to the foregoing challenges, there is a fourth argument against the reinterpretation strategy which is more theoretical in nature. Like other strict conditional theorists, Hájek claims that the semantics of counterfactuals closely resembles the semantics of other universal quantifiers in natural language. For instance, when discussing a certain pattern of judgments involving counterfactuals, Hájek 2021 writes:

> Universal quantification follows a similar pattern... So does necessity... The parallel is made explicit in modal logic, which analyses necessity as universal quantification over a suitable set of worlds. I think that it is no surprise that the parallel extends to counterfactuals. A number of philosophers think that the semantics for counterfactuals involves universal quantification: 'if *A* would *C*' is true iff all the contextually relevant *A*-worlds are *C*-worlds. I think this too. (196-7)

This assimilation of counterfactuals to other universal quantifiers raises a puzzle. There are plenty of natural language sentences where epistemic probability operators seem to take scope over restricted universal quantifiers. Here are a few examples:

(68) It's .5 likely that if you parked on the street, you must pay a fine.

(69) It's .5 likely that every student passed the exam.

(70) It's .5 likely that whenever Jones goes to the movies, she always gets popcorn.

However, we don't naturally interpret any of these sentences as stating facts about objective chances. These sentences are not naturally interpreted as saying:

(71) If you parked on the street, it must be the case that there's a .5 objective chance

that you pay a fine.

(72) Every student is such that there's a .5 objective chance that they passed the exam.

(73) Whenever Jones goes to the movies, it's always the case that there's a .5 objective chance that she gets popcorn.

These judgments highlight yet another unsolved mystery for Bennett and Hájek—namely, why are we forced to interpret probability operators that take scope over counterfactuals as stating facts about objective chances, when parallel readings of probability operators over other universal quantifiers are not even available? Absent any explanation, it seems implausible that the semantics of counterfactuals would sharply diverge from the semantics of other universal quantifiers in just this respect. At least for now, it seems worth investigating alternatives to Bennett and Hájek's strategy, exploring whether we can account for the assertability of probabilistic Heim sequences without resorting to reinterpreting probabilistic judgments about counterfactuals as stating facts about counterfactual objective chances.[29]

5 A new and improved strict conditional account

Let's take stock. We've examined several accounts of counterfactuals, each corresponding to a different paraphrase of (1-a):

(1-a) If Sophie went to the parade, she would see Pedro.

So far, we have found each of the following paraphrases to be problematic:

(74) In the closest world(s) where Sophie goes to the parade, she sees Pedro.

(75) In every accessible world where Sophie goes to the parade, she sees Pedro.

(76) In the accessible worlds where Sophie goes to the parade, she sees Pedro.

On the one hand, (74) suggests that Antecedent Strengthening is invalid, which makes it hard to explain why negative polarity items are licensed in the antecedents of counterfactuals. Meanwhile, (75) and (76) suggest that 'If Sophie went to the parade, she would see Pedro' is plainly false when uttered at the end of a Heim sequence, which makes it hard to explain why speakers express confidence in its content in that same context.

In this section, I develop a strict conditional account that solves both of these problems. On my account, Antecedent Strengthening comes out valid, which explains why

29. For further critical discussion of Bennett 2003, see Edgington 2008, p. 10; Moss 2013, p. 259–60; and Schulz 2017, p. 217–8.

negative polarity items are licensed in the antecedents of counterfactuals. But unlike the strict conditional accounts described in §3, my account can make sense of our probabilistic counterfactual judgments. Here is my preferred paraphrase of (1-a):

(77) In every nearby world where Sophie goes to the parade, she sees Pedro.

To spell out the details of this account, we need to make a short detour to examine some relevant literature on adjectives like 'nearby'. More specifically, my account of the semantics and pragmatics of counterfactuals is modeled on the semantics and pragmatics of context-dependent intersective adjectives.[30] An adjective is *intersective* just in case it denotes a set of individuals, and when it modifies an expression that denotes another set of individuals, the resulting expression denotes the intersection of those sets. For example, '80-year-old' is an intersective adjective. The denotation of '80-year-old museum' is just the intersection of the set of 80-year-old individuals and the set of museums. By contrast, 'closest' is not an intersective adjective. The denotation of 'closest museum' is not merely the intersection of the set of closest individuals and the set of museums.

When an adjective is intersective, it contributes the same set of individuals to the truth conditions of a sentence at a given context, regardless of what noun it modifies. This fact yields a simple diagnostic test for whether an adjective is intersective.[31] Generally speaking, an adjective F is intersective just in case one can validly infer:

(78) a. A is an FG.
b. A is an H.
c. Therefore, A is an FH.

The adjective '80-year-old' is intersective, since we can validly infer:

(79) a. The Guggenheim is an 80-year-old museum.
b. The Guggenheim is a building.
c. Therefore, the Guggenheim is an 80-year-old building.

By contrast, we cannot validly infer:

(80) a. The Guggenheim is the closest museum.[32]
b. The Guggenheim is a building.
c. #Therefore, the Guggenheim is the closest building.

The invalidity of (80) indicates that the adjective 'closest' is not intersective.

30. For an introduction to the semantics and pragmatics of intersective adjectives, see §2.2.1 of Morzycki 2016.
31. Parsons 1970, p. 322; Clark 1970, p. 334.
32. A technical note: The substitution of a definite for an indefinite in (80-a) and (80-c) could be avoided by stipulating that there are multiple closest museums and multiple closest buildings.

What about 'nearby'? At first glance, it does not appear to be intersective. Consider the following example:

> *Fifth Avenue*: Jones is walking down Fifth Avenue, several blocks away from the Guggenheim. Although the Guggenheim is much closer to Jones than most other museums in New York City, there are hundreds of buildings between Jones and the museum.

It appears that we cannot validly infer:

(81) a. The Guggenheim is a nearby museum.
b. The Guggenheim is a building.
c. #Therefore, the Guggenheim is a nearby building.

In other words, 'nearby' appears to behave more like 'closest' than like '80-year-old'. Just as the Guggenheim can be the closest museum without being the closest building, it seems that the Guggenheim can be a nearby museum without being a nearby building, and so it is tempting to conclude that 'nearby' is not intersective.

However, the prevailing view among semanticists is that we should reject this tempting conclusion. In fact, 'nearby' is intersective.[33] At a given context, 'nearby' has the same denotation, regardless of what noun it modifies. However, using 'nearby' together with a particular noun often has a significant impact on the context that a speaker is in. As Hans Kamp and Barbara Partee explain,

> [A]n adjective can be intersective but context-dependent, and may then appear to fail the test [i.e., (78)] simply by virtue of the influence of the noun on the context. . . adjectives like *tall*, *heavy*, and *old* are context-dependent as well as vague, with the most relevant aspect of context a comparison class which is often, but not exclusively, provided by the noun of the adjective-noun construction.[34]

The adjective 'nearby' appears non-intersective because its immediate *linguistic* context influences how its denotation is resolved at a given *conversational* context. When we are talking about nearby museums, 'nearby' may denote a different set of individuals than when we are talking about nearby buildings. The denotation of 'nearby' can easily change as we use it to modify different nouns, precisely because our context changes along with those nouns. The same goes for a wide variety of adjectives that initially appear non-intersective, including 'tall', 'expensive', and perhaps even 'skillful'.[35] I will focus on

33. For an early defense of this claim, see Siegel 1976, p. 8, 115ff. For a detailed survey of relevant literature, see §2.2.3 of Morzycki 2016.
34. Kamp & Partee 1995, p. 142. To motivate this view, it is useful to note that even when 'nearby' is combined with a particular noun, the resulting expression can still depend on context for its denotation. For instance, the denotation of 'nearby target' will vary depending on whether we are discussing an amateur archery match or the Summer Olympics.
35. For arguments in favor of intersective theories of these adjectives, see Partee 1995, p. 330ff.; Kennedy 2007, p. 11ff.; and Lassiter 2015, p. 147, respectively.

'nearby' for present purposes, as it provides an especially apt model for my account of counterfactuals, but the relevant insight is a general claim—namely, that the apparently non-intersective behavior of an expression can be explained by an intersective semantics, together with a pragmatic account according to which the linguistic context of the expression strongly influences its interpretation at a context.

Back to the semantics of counterfactuals. As mentioned above, my view is that (1-a) is best paraphrased by (77):

(1-a) If Sophie went to the parade, she would see Pedro.

(77) In every nearby world where Sophie goes to the parade, she sees Pedro.

Having discussed the semantics and pragmatics of adjectives like 'nearby', we can now state this idea with greater precision. Semantically, counterfactuals are strict conditionals. The truth conditions of counterfactuals are just those endorsed by von Fintel 2001 and other traditional strict conditional theorists. Formally, the truth of a counterfactual is defined relative to a world w and an accessibility relation f:

$[\![P \mathrel{\square\!\!\rightarrow} Q]\!]^{w,f}$ is true if and only if $\forall w' \in f(w) \bigcap [\![P]\!]^{w,f}, w' \in [\![Q]\!]^{w,f}$

The accessibility relation f is determined by context; it is a function that maps each world to a set of nearby worlds. At a given context, simple counterfactuals like (1-a) quantify over a single domain of worlds—informally, those that count as being the *nearby P worlds*.

This strict conditional semantics has familiar consequences for the logic of counterfactuals. For starters, Antecedent Strengthening is valid. This marks a sharp contrast between my view and variably strict accounts of counterfactuals. Recall that variably strict theorists maintain that (2) is invalid:

(2) a. If Sophie went to the parade, she would see Pedro.
b. #Therefore, if Sophie went to the parade and got stuck behind a tall person, she would see Pedro.

By contrast, on my view, we should compare (2) with valid inferences like (81):

(81) a. The Guggenheim is a nearby museum.
b. The Guggenheim is a building.
c. #Therefore, the Guggenheim is a nearby building.

Of course, speakers may be reluctant to utter sequences of sentences like (81), since context readily shifts throughout a discourse in which 'nearby' is used with different adjectives. But (81) is not a genuine challenge to the claim that 'nearby' is intersective, since the ar-

gument equivocates. As long as context is held fixed, 'nearby' will denote a single set of individuals, which is why (81) is a valid inference. Similarly, speakers may be reluctant to endorse apparent instances of Antecedent Strengthening, since context readily shifts throughout a discourse containing counterfactuals with different antecedents. But arguments such as (2) are not genuine challenges to the claim that Antecedent Strengthening is valid, since these arguments equivocate. As long as context is held fixed, unembedded counterfactuals uttered at that context will quantify over a single domain of nearby worlds, which explains why Antecedent Strengthening is valid.

Although we are mainly restricting our attention to simple counterfactuals in this paper, it is worth briefly discussing the semantics of embedded counterfactuals.[36] Just as the set of objects selected by 'nearby' can shift, the domain of worlds selected by f can shift when this element is embedded under index-shifting operators. By analogy, suppose that we are standing next to a cheap restaurant in Denver. As uttered in our context, 'All nearby ski resorts are such that all nearby restaurants are expensive' may be true while 'All nearby restaurants are expensive' is false. In the former sentence, 'nearby restaurants' denotes restaurants that are near the expensive ski resorts, not restaurants that are near the speaker. In just the same way, as uttered in a given context, 'If Alice had come to the party, then if Bob had come, we would have had fun' may be true while 'If Bob had come, we would have had fun' is false. In the former sentence, the embedded counterfactual quantifies over worlds that are near worlds in which Alice comes to the party, whereas the unembedded counterfactual quantifies over worlds that are near the world of the context.

In addition to Antecedent Strengthening, my account validates Contraposition and Transitivity, while explaining why speakers are often reluctant to endorse apparent instances of these inference rules.[37] The same goes for Import:

(82) a. If P, would (if R, would Q).
b. Therefore, if P and R, would Q.

A number of authors have challenged the validity of (82). Here is an alleged counterexample due to Mandelkern 2021:

(83) a. If the die had been thrown and landed four, then if it hadn't landed four, it would have landed two or six.
b. #Therefore, if the die had been thrown and landed four and not landed four, it would have landed two or six.

36. Thanks to an anonymous referee for encouraging me to include this discussion.
37. See §1.8 of Lewis 1973 for discussion of apparent counterexamples to Contraposition and Transitivity, and see §2.1 of Starr 2019 for discussion of the relationship between these rules and Antecedent Strengthening.

The premise (83-a) sounds fine, while (83-b) sounds bad. Hence at first glance, (83) appears invalid.[38] However, as with other rules of inference, appearances can be deceiving. Recall that we naturally interpret (2-a) as quantifying over a modest domain of worlds, while we interpret (2-b) as quantifying over a much larger domain. Similarly, we may naturally interpret (83-a) as quantifying over a restricted domain of worlds, while we interpret the counterpossible (83-b) as quantifying over a larger domain, perhaps even the domain of all metaphysically possible worlds. Hence the infelicity of (83-b) does not establish that (83) is a genuine counterexample to Import.[39]

Although I have endorsed a strict conditional semantics, my view of the pragmatics of counterfactuals sharply diverges from the views of other strict conditional theorists. On my view, our interpretation of a counterfactual is strongly guided by its antecedent, in just the same way that our interpretation of an adjective like 'nearby' is strongly guided by the noun that it modifies. Hence compared with existing accounts, my view makes better predictions about how counterfactual domains evolve. As explained in §3, many strict conditional theorists agree that the domain of a counterfactual can easily shift throughout a discourse. It's easy to expand the domains of quantifiers, raise the standards of precision for interpreting loose speech, and decrease the exception tolerance of plural definite expressions. The problem is that all of these shifts are asymmetrical. It's significantly harder to contract quantifier domains, lower standards of precision, or increase the exception tolerance of plural definite descriptions. As a result, traditional strict conditional theorists end up endorsing a semantic account of infelicitous Heim sequences. By contrast, on my view, there is no significant asymmetry in the way that the domain of a counterfactual evolves throughout a discourse. It's easy to go from talking about nearby buildings to talking about nearby museums, but it's just as easy to go in the reverse direction. Similarly, it's easy to shift back and forth between talking about nearby worlds where Sophie goes to the parade and nearby worlds where she goes and gets stuck behind a tall person. Because the antecedent of a counterfactual strongly influences which function serves as the accessibility relation f used to interpret counterfactuals at a given context, my view allows that the domain of worlds selected by that function can easily expand and just as easily contract.

38. For additional examples, see Etlin 2008, §3.6.3; Starr 2019, §2.4; and Santorio 2025a, §5.2.
39. Since there are no metaphysically possible worlds where the die lands four and does not land four, some authors argue that (83-b) is trivially true. A detailed discussion of counterpossibles is beyond the scope of this paper, but see Kocurek 2021 for a helpful survey of relevant literature.

6 Applying the synthesis view of counterfactuals

Let's see my §5 account in action. In the rest of this paper, I explain how my synthesis view accounts for our intuitive judgments about counterfactuals, where more traditional views have failed. Recall our initial alleged counterexample to Antecedent Strengthening:

(2) a. If Sophie went to the parade, she would see Pedro.
b. #Therefore, if she went to the parade and got stuck behind a tall person, she would see Pedro.

On my account, we should expect (2) to pattern with similar sequences of sentences containing context-dependent intersective adjectives. Here is a useful example:

> *Midnight Blizzard*: We are walking past the local public library in the early hours of the morning. A major blizzard has just hit the city, and the streets are deserted. Thankfully, the city has opened its warming centers, public buildings that are designated to stay open overnight in order to provide shelter during extreme weather conditions.

In this context, it sounds bad to say:

(84) a. All nearby buildings are closed.
b. #Therefore, all nearby warming centers are closed.

As uttered in the same context, (84-a) entails (84-b).[40] But when the speaker starts talking about warming centers, the context shifts so that 'nearby' applies to an expanded set of buildings. Hence our natural interpretation of the second sentence does not follow from our natural interpretation of the first. The same goes for (2). Antecedent Strengthening is a valid rule of inference. As uttered in the same context, (2-a) entails (2-b). But when the speaker starts talking about Sophie getting stuck behind a tall person, the context shifts so that the counterfactual domain expands, and (2-b) is false.

So far, my account gives the same explanation for our judgments as the standard strict conditional views described in §3. But my account gives a different explanation of our judgments about Heim sequences such as:

(3) a. If Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.
b. #But of course, if she went to the parade, she would see Pedro.

Again, we should understand (3) by comparing it with a similar sequence of 'nearby' sentences. Initially, it could sound perfectly fine for speakers in the context of *Midnight*

40. Strictly speaking, we need the implicit premise that all warming centers are buildings; readers should add this assumption throughout.

Blizzard to assert that all nearby buildings are closed. But as soon as we start talking about warming centers, it will become salient that we can't rule out that the library is a warming center, which is why the following sequence will be infelicitous:

(85) a. All nearby warming centers are open.
b. #But of course, all nearby buildings are closed.

Here it is important to note that (85-b) is not infelicitous because it is plainly false. The denotation of 'nearby' shifts when we start talking about warming centers in (85-a), but it shifts back just as easily in (85-b). In fact, if the library isn't a designated warming center, (85-b) may well turn out to be true. (85-b) sounds bad for pragmatic reasons. In just the same way, the counterfactual domain shifts when we start talking about tall people in (3-a), but it shifts back just as easily in (3-b). It may well turn out that Sophie *wouldn't* get stuck behind a tall person if she went to the parade, in which case (3-b) may well turn out to be true. When it comes to infelicitous Heim sequences, it is the variably strict conditional theorist who gives the correct diagnosis: (3-b) sounds bad not because it is plainly false, but because the speaker isn't in a good enough epistemic position to say it.

This pragmatic diagnosis of Heim sequences brings us to one of the main advantages of my strict conditional account—namely, that it can make sense of our judgments about probabilistic Heim sequences, where extant strict conditional accounts fail. Again, 'nearby' sentences provide a helpful model. Although (85) sounds bad in the context of *Midnight Blizzard*, the following sequence sounds fine:

(86) a. All nearby warming centers are open.
b. But more likely than not, all nearby buildings are closed.

Since our interpretation of 'nearby' is strongly influenced by linguistic context, the extension of 'nearby' contracts in (86-b), so that this sentence concerns the same set of nearby buildings that is used to interpret (84-a). Even if we can't rule out that the library is a warming center, we can rationally believe that it probably isn't a warming center, which is why (86-b) sounds fine. The same goes for similar sequences of counterfactuals. Recall that the following sequence sounds fine:

(26) a. If Sophie went to the parade and got stuck behind a tall person, she wouldn't see Pedro.
b. But more likely than not, if she went to the parade, she'd see him.

Since our interpretation of counterfactuals is strongly influenced by linguistic context, the counterfactual domain contracts in (26-b), so that this sentence concerns the same domain of nearby parade worlds that we use to interpret (1-a). Even if we can't rule out that

Sophie would get stuck behind a tall person at the parade, we can rationally believe that she probably wouldn't get stuck, and so we can rationally believe (26-b).

This account of probabilistic Heim sequences relies on an assumption that is shared by the theories of counterfactuals that I am aiming to reconcile—namely, that we interpret counterfactuals like (1-a) relative to a detailed similarity relation according to which worlds where Sophie gets stuck behind a tall person are farther away than the closest worlds where she goes to the parade and sees Pedro.[41] In fact, Stalnaker, Lewis, von Fintel, and Gillies would agree that (1-a) does not concern worlds where Sophie gets stuck behind a tall person at the parade. These theorists use different formal frameworks to model the detailed similarity relation that obtains among worlds: Stalnaker 1968 uses selection functions, Lewis 1973 uses systems of spheres, von Fintel 2001 uses modal horizons, and Gillies 2007 uses counterfactual hyperdomains. But when it comes to ordinary counterfactuals like (1-a), the upshot of each theory is the same—namely, worlds where Sophie gets stuck behind a tall person count as fairly distant possibilities. On my account, the domain of (26-b) includes just those worlds that would be distinguished by the selection function, inner sphere, member of the counterfactual hyperdomain, or modal horizon that is provided by the context of (1-a), and it is unlikely that this domain includes worlds where Sophie is stuck behind a tall person.

There is an alternative viewpoint—endorsed by Hájek 2021, among others—according to which counterfactuals are necessarily evaluated relative to similarity orderings that do not make such fine distinctions between worlds. As Hájek explains, "von Fintel and Gillies think that... 'If A would C' is true iff all the contextually relevant A-worlds are C-worlds. I think this too—I'm just inclusive about which A-worlds are relevant, and that's what drives my skeptical arguments" (196-7). According to Hájek, there is no principled reason to exclude worlds where Sophie gets stuck behind a tall person from the domain of the counterfactual operator in (87) as uttered in ordinary contexts:

(87) If Sophie went to the parade, she would see Pedro.

Hájek denies that (87) is often interpreted relative to a domain of nearby worlds where Sophie goes to the parade and sees Pedro in every world in this domain. In his view, it is hard to make sense of why some worlds where Sophie gets stuck behind a tall person should not count as being just as nearby as any of these worlds. This alternative view has been a subject of lively debate, with more traditional theorists defending accounts of the similarity relation according to which worlds where Sophie is stuck behind a tall person would fail to count as nearby worlds.[42] Within the scope of this paper, I am not aiming to

41. Thanks to an anonymous referee for encouraging me to make this assumption explicit.

42. Accounts of the similarity relation used to interpret counterfactuals were first developed in response to Fine 1975. For a detailed survey of traditional accounts of the similarity relation, see §4 of Santorio 2025b. For a

settle this debate. Rather, I am adjudicating between—and ultimately, synthesizing—strict conditional and variably strict conditional views that accept that we often interpret (87) relative to a set of nearby worlds that excludes worlds where Sophie gets stuck behind a tall person. Accordingly, I adopt that same working assumption when giving my account of probabilistic Heim sequences. In addition, I accept another point made by a variety of strict conditional and variably strict conditional theorists—namely, that ordinary speakers often talk and form beliefs as if there are facts about what would happen if the antecedent of a counterfactual were true. When we have .5 credence that a fair coin would land heads if flipped, for instance, we act as if there is some fact of the matter of which we are ignorant—namely, how the coin would land if it were flipped. According to my view, that is just to say that we act as if there is some way that the coin lands in every nearby world where it is flipped.[43] In short, ordinary speakers are implicitly opinionated about matters of metaphysics; our probabilistic judgments reflect our willingness to countenance an abundance of facts about what would be or would have been the case, had various propositions obtained.

In addition to accounting for our judgments about probabilistic Heim sequences, my account solves the problem introduced at the end of §3. Recall that other strict conditional theorists compare (39) with (42):

(39) Which is more likely—that this match would light on fire if you were to strike it after soaking it in water, or that it would light on fire if you were to strike it?

(42) Which is more likely—that every mosquito in this store is asleep, or that every animal in this store is asleep?

As (42) demonstrates, it is hard to contract a quantifier domain that has just expanded. Intuitively, the domain of the second quantifier in (42) contains every mosquito in the store, which is why the first disjunct of (42) is more likely than the second. Similarly, von Fintel and many other strict conditional theorists predict that it should be hard for the counterfactual domain to contract in (39). Hence they predict that the first disjunct of (39) is more likely than the second, which is a counterintuitive result. By contrast, my account compares (39) with the following question:

(88) Which is more likely—that all nearby warming centers are closed, or that all nearby buildings are closed?

detailed defense of the view that the domain of (87) generally includes worlds where Sophie is stuck behind a tall person, see Loewenstein 2021.

43. At a high level of abstraction, this assumption resembles the uniqueness assumption in Stalnaker 1968 and the homogeneity presupposition in von Fintel 1997.

If the adjective 'nearby' had the same expanded denotation throughout (88), then the second disjunct in (88) would entail the first, and the intuitive answer to (88) would be that the first disjunct is more likely. But in a context where a major blizzard has just hit our city, the intuitive answer to (88) is that the first disjunct is less likely than the second. According to my account, the same goes for (39). Since our interpretation of counterfactuals is strongly influenced by linguistic context, it is easy for context to shift so that the second counterfactual in (39) quantifies over worlds that are nearby in a stronger sense, which explains our ordinary judgment that the first counterfactual is less likely than the second.

In conclusion, we began our investigation by identifying problems for many traditional views of counterfactuals. Strict conditional theorists have traditionally defended a problematic diagnosis of Heim sequences—namely, that the counterfactual domain expands to make simple counterfactuals come out false. Variably strict conditional theorists argue that the sentences of a Heim sequence are consistent and merely unassertable. Each of these views gets something right. The standard strict conditional theorist is right to say that Antecedent Strengthening is valid. As uttered at the very same context, (2-a) does indeed entail (2-b). Meanwhile, the variably strict conditional theorist is right that (3-b) can turn out to be true after (3-a), and that Heim sequences are often infelicitous for pragmatic reasons. In order to make sense of our probabilistic counterfactual judgments, strict conditional theorists must incorporate a key insight of the variably strict conditional account—namely, that the antecedent of a counterfactual strongly influences the worlds that the counterfactual quantifies over. It's just that for the strict conditional theorist, this influence is mediated by the conversational context. Just as speakers can use 'nearby' to modify a particular noun and thereby affect our interpretation of that very use of 'nearby', speakers can utter a counterfactual with a particular antecedent and thereby affect our interpretation of the conditional itself.

Having developed the synthesis view and discussed its advantages, I want to end by mentioning some other views that are worthy of consideration. There has been a recent outpouring of interest in predicting our probabilistic judgments about counterfactuals, including several theories published while the present paper was under construction. Schulz 2017 proposes to capture our probabilistic judgments by giving a semantics of counterfactuals in terms of arbitrarily chosen worlds where the antecedent is true. On behalf of strict conditional theorists, Williamson 2020 defends an error theory of our probabilistic judgments, arguing that they are produced by the misfiring of generally reliable heuristics. In recent work inspired by Edgington, Stalnaker 2021 argues that some counterfactuals have well-defined probability values, even though they lack truth values. Khoo 2022 aims to predict probabilistic judgments using a nonfactualist theory

according to which counterfactuals encode inferential dispositions. Willer 2025 defends a strict conditional semantics for indicative conditionals, and he suggests that his semantics might eventually be extended to a theory that would predict our probabilistic judgments about counterfactuals. In light of these ongoing developments, I want to acknowledge that the balance of reasons may eventually favor some theory other than mine. But in order to make progress in this debate, it is important to appreciate the dialectical import of our intuitive probabilistic judgments, and it is useful to understand how and why strict conditional views can deliver a pragmatic diagnosis of infelicitous Heim sequences. By embracing just the right synthesis of semantic and pragmatic accounts of counterfactuals, we can resolve several challenges that have made trouble for a variety of traditional views.

References

Bennett, Jonathan. 2003. *A Philosophical Guide to Conditionals*. Oxford University Press, Oxford.

Bhatt, Rajesh & Roumyana Pancheva. 2006. "Conditionals." In *The Blackwell Companion to Syntax*, Martin Everaert & Henk van Riemsdijk, editors, 638–87. Blackwell, Malden, MA.

Boylan, David & Ginger Schultheis. 2021. "How Strong is a Counterfactual?" *Journal of Philosophy*, vol. 118 (7): 373–404.

Carter, Sam. 2021. "The Dynamics of Loose Talk." *Noûs*, vol. 55 (1): 171–98.

Clark, Romane. 1970. "Concerning the Logic of Predicate Modifiers." *Noûs*, vol. 4 (4): 311–35.

Diesing, Molly. 1992. *Indefinites*. MIT Press, Cambridge.

Edgington, Dorothy. 1995. "On Conditionals." *Mind*, vol. 104 (414): 235–329.

—. 2008. "Counterfactuals." *Proceedings of the Aristotelian Society*, vol. 108 (1): 1–21.

Etlin, David. 2008. *Desire, Belief, and Conditional Belief*. Ph.D. thesis, Massachusetts Institute of Technology.

Fine, Kit. 1975. "Critical Notice: *Counterfactuals*." *Mind*, vol. 84 (335): 451–58.

von Fintel, Kai. 1997. "Bare Plurals, Bare Conditionals, and *Only*." *Journal of Semantics*, vol. 14 (1): 1–56.

—. 2001. "Counterfactuals in a Dynamic Context." In *Ken Hale: A Life in Language*, Michael Kenstowicz, editor, 123–52. MIT Press, Cambridge.

Geurts, Bart. 2007. "Existential Import." In *Existence: Semantics and Syntax*, Ileana Comorovski & Klaus von Heusinger, editors, 253–71. Springer, Netherlands.

Gillies, Anthony. 2017. "Conditionals." In *A Companion to the Philosophy of Language*, Bob Hale & Crispin Wright, editors, 401–36. Blackwell Publishers, Ltd., Oxford.

Gillies, Thony. 2007. "Counterfactual Scorekeeping." *Linguistics and Philosophy*, vol. 30 (3): 329–60.

Greenberg, Gabriel. 2021. "Counterfactuals and Modality." *Linguistics and Philosophy*, vol. 44 (6): 1255–80.

Hájek, Alan. 2014. "Most Counterfactuals are False." Ms., Research School of the Social Sciences, Australian National University.

—. 2021. "Contra Counterfactism." *Synthese*, vol. 199 (1–2): 181–210.

Heim, Irene & Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Blackwell, Malden, MA.

Heller, Mark. 1995. "Might-Counterfactuals and Gratuitous Differences." *Australasian Journal of Philosophy*, vol. 73 (1): 91–101.

Horn, Laurence R. 2021. "Ceteris Paribusiness: On the Power of Salient Exceptions." In *Inquiries in Philosophical Pragmatics*, Fabrizio Macagno & Alessandro Capone, editors, 7–32. Springer, Cham.

Ichikawa, Jonathan. 2011. "Quantifiers, Knowledge, and Counterfactuals." *Philosophy and Phenomenological Research*, vol. 82 (2): 287–313.

Israel, Michael. 2011. *The Grammar of Polarity : Pragmatics, Sensitivity, and the Logic of Scales*. Cambridge University Press, Cambridge.

de Jager, S. T. 2009. *"Now that you mention it, I wonder…": Awareness, Attention, Assumption*. Ph.D. thesis, Institute for Logic, Language and Computation.

Kamp, Hans & Barbara Partee. 1995. "Prototype Theory and Compositionality." *Cognition*, vol. 57: 129–91.

Kennedy, Christopher. 2007. "Vagueness and Grammar: The Semantics of Relative and Absolute Gradable Adjectives." *Linguistics and Philosophy*, vol. 30 (1): 1–45.

Khoo, Justin. 2022. *The Meaning of 'If'*. Oxford University Press, Oxford.

Klecha, Peter. 2015. "Two Kinds of Sobel Sequences: Imprecision in Conditionals." *Proceedings of the 32nd West Coast Conference on Formal Linguistics*, 131–40.

Kocurek, Alexander. 2021. "Counterpossibles." *Philosophy Compass*, vol. 16 (11): 1–22.

Križ, Manuel. 2015. *Aspects of Homogeneity*. Ph.D. thesis, University of Vienna.

Križ, Manuel & Benjamin Spector. 2021. "Interpreting Plural Predication: Homogeneity and Non-Maximality." *Linguistics and Philosophy*, vol. 44 (5): 1131–78.

Ladusaw, William. 1979. *Polarity Sensitivity as Inherent Scope Relations*. Ph.D. thesis, University of Texas at Austin.

Lassiter, Daniel. 2015. "Adjectival Modification and Gradation." In *The Handbook of Contemporary Semantic Theory*, Shalom Lappin & Chris Fox, editors, 143–67. Wiley-Blackwell, Oxford.

Lewis, David K. 1973. *Counterfactuals*. Basil Blackwell Ltd., Malden, MA.

Lewis, Karen. 2016. "Elusive Counterfactuals." *Noûs*, vol. 50 (2): 286–313.

—. 2018. "Counterfactual Discourse in Context." *Noûs*, vol. 52 (3): 481–507.

Loewenstein, Yael. 2021. "Heim Sequences and Why Most Unqualified 'Would'-Counterfactuals Are Not True." *Australasian Journal of Philosophy*, vol. 99 (3): 597–610.

Mandelkern, Matt. 2021. "If p, then p!" *Journal of Philosophy*, vol. 118 (12): 645–79.

Morzycki, Marcin. 2016. *Modification*. Cambridge University Press, Cambridge.

Moss, Sarah. 2012. "On the Pragmatics of Counterfactuals." *Noûs*, vol. 46 (3): 561–86.

—. 2013. "Subjunctive Credences and Semantic Humility." *Philosophy and Phenomenological Research*, vol. 87 (2): 251–78.

Nichols, Cory. 2017. "Strict Conditional Accounts of Counterfactuals." *Linguistics and Philosophy*, vol. 40 (6): 621–45.

Parsons, Terence. 1970. "Some Problems Concerning the Logic of Grammatical Modifiers." *Synthese*, vol. 21 (3/4): 320–34.

Partee, Barbara. 1995. "Lexical Semantics and Compositionality." In *An Invitation to Cognitive Science, Second Edition.* Daniel Osherson, general editor; in Part I: Language, Lila Gleitman and Mark Liberman, eds., 311–60. Massachusetts Institute of Technology, Cambridge.

Sandgren, Alexander & Katie Steele. 2021. "Levelling Counterfactual Scepticism." *Synthese*, vol. 199 (1–2): 927–47.

Santorio, Paolo. 2025a. "Probabilities of Counterfactuals are Counterfactual Probabilities." Forthcoming in the *Journal of Philosophy*.

—. 2025b. "The Semantics and Logic of Counterfactuals." In *The Oxford Handbook of Contemporary Philosophy of Language*, Ernie Lepore & Una Stojnić, editors, 441–75. Oxford University Press, Oxford.

Schein, Barry. 2001. "Adverbial, Descriptive Reciprocals." In *Proceedings of Semantics and Linguistic Theory (SALT) 11*, R. Hastings, editor. CLC Publications, Ithaca.

Schlenker, Philippe. 2004. "Conditionals as Definite Descriptions." *Research on Language and Computation*, vol. 2 (3): 417–62.

Schulz, Moritz. 2014. "Counterfactuals and Arbitrariness." *Mind*, vol. 123 (492): 1021–55.

—. 2017. *Counterfactuals and Probability*. Oxford University Press, Oxford.

Siegel, Muffy. 1976. *Capturing the Adjective*. Ph.D. thesis, University of Massachusetts, Amherst.

Stalnaker, Robert. 1968. "A Theory of Conditionals." In *Ifs: Conditionals, Belief, Decision, Chance, and Time*, William L. Harper, Robert Stalnaker & Glenn Pearce, editors, 41–55. D. Reidel Publishing Company, Dordrecht.

—. 2021. "Counterfactuals and Probability." In *Conditionals, Paradox, and Probability: Themes from the Philosophy of Dorothy Edgington*, Lee Walters & John Hawthorne, editors, 100–121. Oxford University Press, Oxford.

Starr, W. 2019. "Counterfactuals." In *The Stanford Encyclopedia of Philosophy*, Edward N. Zalta, editor. Available at `https://plato.stanford.edu/entries/counterfactuals/`.

Strawson, P. F. 1952. *Introduction to Logical Theory*. Methuen, London.

Willer, Malte. 2025. "Credences for Strict Conditionals." *Philosophy and Phenomenological Research*, vol. 110 (1): 23–50.

Williamson, Timothy. 2020. *Suppose and Tell*. Oxford University Press, Oxford.