

Clearly, it must be...:

An analysis of theories surrounding clarity and epistemic *must*

Teal Patterson

Swarthmore College, Department of Linguistics

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Introduction

In linguistics, modals are terms dealing with such concepts as necessity and possibility. More broadly, they can be defined as means of discussing situations that are not necessarily real (Portner 2009). This is perhaps most easily understood with an appeal to the modal logic notion of possible world semantics. This idea, dating back to Leibniz and most famously formalized by Saul Kripke, holds, in general terms, that there are any number of possible worlds in existence, the one in which we are living, the actual world, is one of these possible worlds, and all the others differ from this world in some way, be it ever so slight, or incredibly radical. If a proposition is true, it holds in the actual world, and if it is false it doesn't. If it is possible, it holds in at least some of the possible worlds, so that if I make a statement expressing possibility, such as *It might be raining*, there are some possible worlds in which it is raining, but it is not established whether or not the actual world is a part of that set. If I express necessity, as in *It absolutely must be snowing outside*, I am stating that in *all* possible worlds it is snowing outside, that any world in which it isn't snowing is utterly inconceivable. Thus, sentences using modal terms make reference to worlds that are not "real,"¹ but that we can conceptualize and talk about.

¹ Some theories, notably David Lewis' Modal Realism propose a distinction between *real* and *actual* worlds. This paper does not espouse this view, and uses "real" in the more traditional sense, which Lewis reserves for "actual."

Modal logic, while useful, does not set out to necessarily encompass all the nuance of modal usage in natural language. Logicians' formalizations, particularly one as simplified as I have just described, do not always encapsulate the way we use modals in everyday speech. They make use of abstracted notions of necessity and possibility, but these idealizations do not always line up perfectly with our use of words. This paper, in fact, uses as its basis one such discord: that pertaining to the word *must*. *Must* is often considered a canonical example of a necessity operator, but at the same time, it does not always seem to function in speech according to the definition of logical necessity. If I saw someone walk inside carrying a wet umbrella, turned to the person next to me, and said *It must be raining*, it would seem, at least at first glance, like I was making a conjecture, and not like I was absolutely certain that it was raining, at least not necessarily. With *must* in particular, this issue poses enough of a problem that many propose stripping it of its status as a necessity operator entirely, but even in less controversial cases, the rigidity of formal logic does not always manage to account for every usage found in speech. That said, however, the building blocks of linguistic formalizations of modality tend to draw from the frameworks established by logicians, so it nonetheless remains worthwhile to examine modality in general terms from a logical perspective.

As implied in the first paragraph (and was stated outright in the case of *must*), *might* and *must* are both modal terms. Other English modals include *maybe*, *possibly*, *should*, *could*, *necessary*, *possible*, and *probable*. As it should be clear at this point, modals can take a variety of shapes including verbs, adverbs, and adjectives. In syntax, modal auxiliary verbs such as *can*, *will*, *must*, *could*, *should*, and *may* are emphasized, but it is important to realize that these do not constitute all the means of modal expression in English. As previously mentioned, the definition of modality currently relevant to us is not syntactic, but semantic, signifying the contribution

made to the meaning of a phrase by these elements, not their physical position within the sentence.

Must and Epistemic Modality

Though I have just drawn your attention to the great variety of possible modal expressions, this paper will focus primarily on only one: *must*, and specifically the epistemic uses of *must*. There are a variety of different uses of modals, in which the major division is between epistemic and deontic. The difference between the two is exemplified below:

- (1) a. It must be raining.
- b. You must be home by midnight.

As it can be seen, epistemic modality pertains to assertions about what is known or believed about the world in which the discourse is taking place. Sentence (1a) states, essentially, that the speaker is certain that it is currently raining. Deontic modality is often described as pertaining to morality, though often in only an extremely broad sense. While sentences such as *You must not lie* are moralistic in the way we traditionally understand it, and are certainly deontic uses, sentences like (1b) are also deontic insofar as they pertain to what should or should not be done according to the speaker. Certain modal terms favor specific types of interpretations, while others, such as *must*, allow for both epistemic and deontic readings, depending upon context. In modal logic, the definition of necessity and possibility remains constant for both epistemic and deontic interpretations, with the difference being expressed through changes in the accessibility relation between possible worlds. It is the epistemic situations that interest us at present. Classically, in order to obtain an epistemic reading, accessibility must be reflexive, meaning that each world, including the real world, accesses itself. Since p must be true in every world accessed by the real world for *necessarily*(p) to hold, p must therefore be true in the real world,

meaning that under an epistemic reading, *necessarily(p)* entails *p*. While this definition is quite straightforward, it remains unclear whether terms such as *must* actually do behave in this way, a I will demonstrate throughout this paper. In (1a), “it be [is] raining” is *p*, but as mentioned earlier, the assertion of (1a) does not seem to imply with one-hundred percent certainty that it is, in fact, raining, and therefore *p* is not entailed. Much work in linguistic modality has been done looking specifically at epistemic constructions, largely because they possess certain peculiarities of interests to semanticists.

The questions surrounding the analysis of *must* that are the focus of this paper can be traced to Lauri Karttunen’s (1972) work in which he observes that while the inclination of theorists had been to treat *must* as a necessity operator, his intuition also indicated that structures using epistemic *must* are actually weaker than the use of the simple proposition embedded in the *must* statement. Namely, that (3) is not as forceful an assertion as (2).

(2) It is raining.

(3) It must be raining.

These two intuitions are incompatible with one another, since as we have established, a traditional view of *must* dictates that (3) entails (2), and is therefore not weaker—in fact, it is stronger, since (2) speaks only of the real world, while (3) accounts for both the real world and any other possible worlds accessible from it. But this is simply not the feeling one gets when they hear the two sentences. Thus, finding a way to reconcile this contradiction has been a theme of inquiry into the semantics of *must* ever since.

The most prominent theory of *must* comes from Angelika Kratzer. Her basic theories of modality, as outlined in her 1977 work, line up fairly straightforwardly with the possible worlds-based logical framework that we have already seen. Her 1991 tactic for dealing with *must* is to

weaken it—that is, not give it the force of true necessity. In order to do so, Kratzer posits an ordering among the possible worlds accessible from the real world. This ordering reflects how normal, or typical, the worlds are. *Must*, then, quantifies only over the set of worlds that have a certain level of normalness, thus, it is essentially saying that, all things being reasonably typical, *p* is necessarily the case. However, it is possible that we are living in an improbable world, and that the real world thus falls outside of the set of worlds over which *must* has scope. In cases such as these, meanings such as “*must(p)* but not *p*” arise, meaning the former does not entail the latter according to Kratzer.

Such interpretations of *must*, in which it does not entail the embedded proposition, line up with the fact that it is difficult in general to embed epistemic modals. Those who believe that the epistemic modal fails to carry propositional force say that these embedded constructions require a proposition within them, and the *must* phrase fails to fulfill that role. (Papafragou, 2006).

In their 2010 paper, Kai von Stechow and Anthony Gillies set out to counter this traditional model of *must*, arguing generally that *must* must remain strong, and that intuitions about its weakness stem from the fact that it serves to mark knowledge via indirect evidence. They outline Kratzer’s theory, as well as theories espoused by Kant and Frege, which take *must* to signal indirect evidence, but to not have any contentful/propositional force. The authors argue against both of these options, favoring instead one in which *must* remains classified as a traditional necessity operator, albeit one with an additional task of signaling indirect evidence.

In formulating their argument against the so-called “mantra” of weak *must* they begin by underlining the fact that indirectness does not necessarily indicate weakness, and yet previous work arguing that *must* is weak tend to use only the fact that it is indirect as their evidence. They,

on the contrary, believe that “indirect knowledge is still knowledge;” when we know something indirectly, we still know it, and can assert its truth.

Having established that indirectness is not an adequate litmus test for weakness, von Fintel and Gillies go on to show that by their examples, *must* is not, in fact, weak. Before asserting that *must* is never weak, they go through the intermediate stage of making it clear that *must* need not always be weak. While their examples do not strike me as outright incorrect, I am somewhat dubious as to whether they really hold water. In their first example, a girl, Chris, knows with absolute certainty that her ball is in one of three boxes, A, B, or C, but not which one. After opening A and B without finding it, she is then able to assert *It must be in C*, even though she is completely certain, and thus could also state *It is in C*. I have a difficult time, though, being certain that I can truly envision what would be acceptable in this highly unnatural situation. I sense that despite technically establishing that she has no uncertainty, some level of uncertainty is so inherent in any similar real-life situation that it is nearly impossible to put myself mentally in Chris’ shoes. I suspect that even though I can tell myself that she’s absolutely certain it’s in C, I’m deriving my intuitions of grammaticality not from a point of true certainty, but rather projecting them from the more realistic situation in which there is some doubt. However, it is certainly possible that von Fintel and Gillies feel more confident in their intuitions for these sentences than I do. Regardless, their third example is more convincing:

- (4) A: They said it was going to rain. I wonder whether it has started.
 B: I don’t think so, it was still dry when I came in 5 minutes ago.
 A: Look, they’re coming in with wet umbrellas. There is no doubt at all. It must be raining now.

In this case, they encode the absolute certainty directly into the dialogue, rather than setting up an abstract situation in which the reader must imagine themselves having a particular and unusual knowledge set, and it is thus easier to see with relative certainty that *must* is

permissible even when there is no doubt. The question that arises with this example, though, is whether *must* in this case is asserting precisely the same thing that it is in more traditional epistemic *must* sentences. For while I agree with von Fintel and Gillies that in this sentence, *must* is committing the speaker to *it be raining*, the sentence does not have quite the same subjective feel as the isolated *It must be raining*. They have proven here, then, that *must* is capable of working in the way they want it to, but it is not yet clear that their analysis is valid for all uses of *must*, or even for most uses of *must* that have been addressed by Karttunen, Kratzer, and others.

The next step, then, for von Fintel and Gillies was to explain why *must* is actually never weak. This is necessary if they wish to entirely debunk the mantra, because an intermediate option, in which *must* is sometimes but not always weak could also be tenable, as we have addressed above. This is also difficult, because the intuition of weakness is so strong. While watching *Jeopardy!* several months ago, I was quite excited when a brief interaction between host Alex Trebek and a contestant spoke to precisely this sentiment. The contestant, upon landing on a daily double question, and being asked how much he wished to wager, responded thusly, leading to the following exchange:

- (5) Contestant: I have to make it a true daily double.
Trebek: You don't have to, but you choose to.
Contestant: I must.
Trebek: You must.

The contestant says he "has to" wager all his money, meaning that he feels compelled to, since he is lucky enough to be given the opportunity (many contestants express such a sentiment.) Trebek clarifies that the contestant is not technically required to do this, taking issue with his use of "have to." The contestant, in an attempt to better convey the nuance of meaning he wished to express, alters his phrasing to use *must*. Trebek then accepts this rephrasing as an adequate display of the contestant's understanding of the rules. It is this final acceptance by

Trebek that I found most telling, and most difficult for those who wish to consider *must* identical to other expressions of necessity. For Trebek, while choosing to consider a meaning of 'have to' in which obligation was truly necessary, considered the same sentiment, expressed with *must*, to be clear in its less stringent necessity. This seems to imply that for the contestant, and particularly for Trebek, a conscious differentiation in degree of necessity between "have to" and "must" exists, which it should not if *must* is strong.

Regardless, von Fintel and Gillies continue to try to demonstrate that *must* is never weak. In order to do this, rather than enumerating instances where *must* can function as strong, since these could be infinite, they show that contradictions arise in situations where *must* is used in a sentence in an explicitly weak way. One such test is to show that *must(p)* is incompatible with *possibly(~p)*, since if the former did not entail the latter, they ought not be contradictory. Fortunately for von Fintel and Gillies, sentences such as (5) below are fairly bad.

(6) #It must be raining but it might not be raining.

This series of rebuttals serves to debunk the Kratzer paradigm, but it has only shown that *must(p)* entails *p*, not that it is equivalent to *necessarily(p)*. It could be, à la Kant/Frege, purely a “comment” outside the realm of truth-conditions, making *must(p)* simply identical to *p*. In order to eliminate this possibility, they draw evidence from embedding, arguing that despite the difficulties with it that we have previously seen, there are situations in which it can be embedded, such as under negation, in which it becomes clear that the two are not equivalent. This argument, however, is quite brief, and not as rigorously outlined as their arguments contra the Kratzer model, which is frustrating given that they emphasize it’s numerous correct assumptions and positive attributes, making it all the more necessary for them to clearly state why it falls short of being an appropriate response.

After having clarified their reasons for rejecting the mantra, von Fintel and Gillies move to outlining their alternative theory for the semantics of *must*, the foundation of which being that in addition to the propositional content, *must* also carries with it a marker of indirect evidence, which in turn creates the illusion of weakness. They state that their ideal interpretation would involve a Gricean pragmatic analysis using conversational (not conventional) implicature, because the evidential signal attached to the expression of epistemic necessity is found cross-linguistically. They do not specify which, or how many, languages they are taking into account when they say that they have not found a language that fails to fit this model, but since their analysis is hindered rather than helped by this fact, I don't see this as a major flaw in their argument. Regardless, they are unable to find a tenable approach in that vein, so they resort to building the evidential component directly into the semantics of *must*. This is not ideal, since there is no external motivation for it, and, as mentioned, it must be done independently in each language in which it applies. Nonetheless, they go ahead with formulating an analysis that they believe works for English. In their model, each discourse has a set of propositions that make up the privileged information, or what "a speaker treats as direct trustworthy evidence," which they label the *kernel*. This kernel, however, is not the only information that the modal quantifies over, the entirety of which they call the *modal base*. The von Fintel and Gillies model hinges on the fact that the kernel taken in its entirety can entail *p*, even if nothing in the kernel directly settles the question of *p*. And in fact, *must* is licensed exclusively in these cases, in which *p* is entailed, but is not explicitly present in the kernel, making the evidential signal a presupposition, or something that is taken for granted as common knowledge in the discourse.

Deontic modality is also not discussed at all by von Fintel and Gillies, so it is entirely unclear whether their account is able to encompass these uses of *must*, as Kratzer's does, or

whether their intention is to treat the epistemic and deontic uses as needing entirely separate analyses. The latter possibility is obviously not particularly appealing, though not necessarily damning provided enough evidence that their analysis was superior in most other ways. The degree to which a strong division between epistemic modals and other modals poses a problem depends largely upon one's more general theoretical leanings with regard to the position of epistemics in relation to other modals, which is a hotly debated question in and of itself.

Historically, there have been a number of accounts of modality which assume that different subtypes of modality must be analyzed differently, either by stating as much explicitly, or by offering an analysis that is only applicable to one particular sort of modality, and implying that its lack of scope does not pose a theoretical problem (Hacquard, 10.) These types of models assume that modals are doubly lexically encoded, and are thus ambiguous, with "epistemic *must*" and "deontic *must*" representing separate lexical items. In support of this strategy is the fact that certain modals, such as *might* do not allow for both epistemic and deontic readings, and therefore are well-served by models in which it is not necessary to account for why they lack an alternative interpretation. However, it is cross-linguistically common for modal words to display this duality of meaning, and it is improbable that such a trend would occur by chance. This implies that there is likely some semantic element unifying the different types of modals.

One of the reasons why Kratzer's model for modals is seen as particularly appealing lies in the fact that it is able to account for all types of modals under one umbrella. For Kratzer, context serves to distinguish between which interpretation of a modal is selected. This context is often implicit in regular speech, but it can be expressed explicitly through the use of a phrase beginning with *In view of*.... As it stands, sentence (7) below is ambiguous with regard to whether it ought to be read epistemically or deontically.

(7) Joy should get home before midnight.

However, adding on a statement specifying the context of the utterance removes this ambiguity, and thereby makes it clear which sort of modal interpretation is desired:

- (7') a. In view of what time her train is supposed to arrive, Joy should get home before midnight.
b. In view of her parents rules, Joy should get home before midnight.

According to Kratzer, rather than having two truly distinct *shoulds* in our lexicon, we have one *should* that is unspecified for modal type, but which can be made more explicit through the use of context. This context, or *conversational background* provides the accessibility relation between possible worlds, and therefore defines how the modal functions, rather than having this information inherent in the lexical structure of the word. Kratzer's model therefore lines up closely with the more basic modal logic interpretation of natural language modals, but manages to better encapsulate their real-world characteristics.

Clarity

I. Clarity According to Barker

A group of constructions that is often compared and contrasted with *must* are clarity constructions. Assertions of clarity are, perhaps predictably, sentences like those below:

- (8) a. It is clear that it is raining.
b. Clearly, it is raining.

For the purposes of this paper, these two constructions will be treated as equivalent, and our analysis of clarity expressions will be restricted to them. (8a) is what will be considered the default clarity construction, however, there are circumstances in which it can become stilted sounding, in which case we will have recourse to (8b). There are also other, similar, terms such as *obvious(ly)*, which will be considered separately.

It is well established that clarity constructions and *must* often convey very similar meanings, but also have critical differences in usage. The distinctions between the two will be examined in greater detail later in this paper. However, these similarities and differences have led to differences in opinion over whether the two sorts of constructions ought to be analyzed in a parallel manner, or whether they work in entirely separate ways.

Chris Barker has spent significant time on the issue of clarity, and his analyses take the latter position, arguing that clarity behaves in a manner fundamentally different from *must*. I will primarily be outlining his 2009 paper, as it represents his most recent work, though I will also make reference to Barker and Taranto (2003), in which he takes a slightly different approach that he has since moved away from.

The overall analysis of Barker (2009) states that clarity constructions do not entail the embedded proposition, and in fact have no “main effect,” that is, make no truth-conditional statement about the world. Rather, they function exclusively on the level of the discourse. Specifically, he asserts that the clarity construction serves to establish that the evidence present in the world is adequate to assert the proposition contained by the bare prejacent, i.e. the assertion made by the sentence when stripped of the modal. Note that it does not mean that this proposition is being asserted, but rather is merely signaling that one could assert it, given the evidence present in the discourse. You may note that this analysis is rather similar to the one the von Stechow and Gillies discuss, and reject, for *must* that is espoused by Kant and Frege. It is, however, distinct, in that Kant/Frege claim that p is entailed by $must(p)$, there simply aren't additional entailments made by *must*—that is, the comment goes on top of the prejacent, which is still being asserted. For Barker's *clearly(p)*, p is not entailed, and the entire content of the

sentence is on the comment level. It should be quite evident at this point that Barker's analysis for clarity differs significantly from von Fintel and Gillies' analysis for *must*.

Barker (2009) begins by outlining briefly the typical paradigm in which clarity can be asserted. His archetypical example involves photographs of two women, Nawal and Abby, in which Nawal is wearing casual clothes, while Abby is wearing a white lab coat with a stethoscope. He asserts that

(9) It is clear that Nawal is a doctor.

is infelicitous, because, even if we know Nawal to be a doctor, nothing in the photograph indicates that this is so. On the other hand,

(10) It is clear that Abby is a doctor.

is, at least in many situations, a reasonable statement based upon her attire. This assessment of the two statements fits with general intuitions about when the clarity construction is appropriate, and at this juncture, that is an adequate measure.

The first potential theoretical framework Barker discusses is the belief theory, the one which he previously espoused in Barker and Taranto (2006), in which asserting clarity depends upon the speaker believing the propositional content of the prejacent based upon the publicly available evidence. Note that by this model, the proposition is still not being asserted, and thus is not entailed—the speaker does not claim that *p* is true, only that he believes it to be true. However, it differs from his current proposal, because, according to his present thought, belief is not sufficient for clarity. That is, there are situations in which a person can believe something, even on the basis of present evidence, but in which it is nonetheless unacceptable to assert clarity. The example he gives is of “considering the intricate complexity of the octopus' eye,” and drawing from that a belief that God exists. The person in this situation believes God exists,

and drew that conclusion based upon public evidence, but he cannot rightfully assert, according to Barker, that *It is clear that God exists*. My intuition dictates that Barker is somewhat off in this assertion, and that many people, if convinced that the complexity of the octopus' eye must have divine origins, would, in fact, say it is clear. However, I will concede that it is possible to hold the belief while simultaneously acknowledging that it might not be generally regarded as clear. This therefore eliminates the possibility that belief is sufficient to assert clarity, though it does not rule out that belief may still be necessary. In fact, Barker says, belief is, if not absolutely necessary, a natural result of “competent assertions of clarity” (256.) But while this fact—that clarity entails belief—is interesting, any thorough explanation of clarity must be able to pick out the situations in which it is felicitous to use clarity, and when it is not, even though belief may be present. It is this question that Barker attempts to resolve in his 2009 paper.

After explaining why he had to abandon Belief Theory, Barker discusses von Fintel and Gillies' proposal for *must*, which he labels the “Missing Entailment Hypothesis.” He accepts their analysis for *must*, but argues that while there are certain situations in which clarity and *must* seem to pattern similarly with regard to meaning, such as:

- (11) a. Abby must be a doctor.
- b. It is clear that Abby is a doctor.

which make a Missing Entailment analysis of clarity enticing, there are significant differences in the usage of the two constructions that warrant them getting different analyses. His argument hinges upon two critical differences between *must* and clarity: public evidence, and gradability.

The first of these differences is that clarity can only be asserted when there is public evidence, whereas *must* can be used even if the evidence is private to the speaker and unknown to other participants in the conversation. On first glance, statements such as (12) below might seem to contradict the assertion that public evidence is required.

(12) It is clear *to me* that Abby is a doctor.

The speaker's need to be explicit that the clarity applies only to her and not necessarily the addressee seems to imply that the evidence need not be available to all participants. However, Barker points out that these expressions of personal clarity are at least as likely to be used in situations in which the evidence is shared, but the epistemic standard of judgment may not be. One could, for example, utter (12) in a situation where she and another person had just seen the photo of Abby that has been discussed previously. The speaker would not sound odd making this statement, because she would be saying, essentially *Based upon this picture, I think it's clear that Abby is a doctor, but I recognize that perhaps you're more skeptical*. Basically, they demonstrate that access to the evidence is not sufficient for all parties to assert clarity, even if some can, but they do not prove that it isn't necessary. Of course, this explains many uses of sentences such as (12), but does not answer the question of why (12) is appropriate even when the evidence is not available to the addressee. This issue will be addressed in the example below.

Barker gives another example that seems to contradict the need for public evidence, but once again it can be shown that this is not actually the case. He describes a situation in which a department chair, returning from a meeting, says to her secretary *It is clear that the next chancellor will be Jones*. In this case, the secretary clearly is not party to the evidence being used by the professor. But Barker does not say that the evidence needs to be available to the addressee, only that in order to make an assertion of clarity, you must be using public evidence. Even though the department chair does not explicitly use an expression of personal clarity in her statement, it is clear from the context that it is restricted such that it excludes her secretary, whether it be *to me* or *to all in the meeting*. We can presume, then, that she is likely basing her statement off of evidence that is public to her, and to anyone else who she believes it to be clear

to. Note that the last portion of the previous sentence is critical. For while I said previously that the speaker must have access to the public evidence, this is not necessarily true. Since all of our examples have thus far been in the first person, this has been the case, but clarity statements can also be restricted to a third party, such as *It is clear to Caitlin that Abby is a doctor*. In that case, the evidence need not be public to the speaker, but it must be to Caitlin. Barker does not make this paradigm explicit, but these examples do not necessarily call into question the assertion made by Barker that this distinction surrounding the need for public evidence is key in why, according to him, *must* can have a main truth-conditional effect, while clarity constructions cannot. The other fact that is important to glean from the above paradigm is that it practically begs for a Kratzerian analysis, as it draws attention to the potential usefulness of her structure in analyzing clarity. Here, as previously seen with *must*, there is an element of the sentence that need not be explicitly verbalized that serves to restrict the scope of *must/clearly*, just as Kratzer makes use of context to differentiate between different sorts of modals.

Barker's other reason for differentiating between clarity and *must* is that *must* is less gradable than clarity. Some of the precise examples he uses are extremely dubious due to confounding syntactic factors--he notes, for example, *very clear* versus **very must*. The reason why the latter is terrible has very little to do with gradability. Nonetheless, looking at his more general arguments, and some of his other examples, such as the fact that clarity is susceptible to soritical reasoning, and thus its applicability lacks distinct boundaries, demonstrates that the general principle is valid.

Due to these two differences between clarity and *must*, Barker is convinced that they cannot be analyzed as functioning in the same way. Having thus rejected both Belief Theory and the Missing Entailment Hypothesis, he proposes a third solution, in which asserting clarity is

seen as making a comment on the epistemic standards of the discourse. In saying *It is clear that p*, the speaker does not commit himself to *p*, but rather is saying that ‘the evidence available in the current discourse is adequate for asserting *p*.’

II. Clarity according to Bronnikov

George Bronnikov, on the other hand, maintains in his 2008 paper that analyzing clarity using the same framework that von Fintel and Gillies use for *must* is, in fact, the best way to go. It is important to note that this is not to say that he thinks clarity constructions have precisely the same meaning as *must*—he outlines several ways in which they differ. However, he does not think that their differences are so fundamental that they are operating on different levels of the discourse.

His argument is in most direct opposition to Barker and Taranto (2003), but the proposals of Barker (2009) are best classified as a refinement on the 2003 theory, so Bronnikov’s rebuttals remain relevant to our present discussion. Bronnikov begins by pointing out that his intuition says that clarity constructions ought to entail the embedded proposition. His strategy is thus similar, in a way, to that of von Fintel and Gillies, in that it ultimately argues for an interpretation that preserves the validity of our most basic intuitions, while rebutting other theories that try to deny these intuitions based upon some other problem. Perhaps it is unsurprising, then, that he chooses to adopt the Missing Entailment (or Inference, as he labels it) Hypothesis, which is modeled off von Fintel and Gillies’ work with *must*, and which Barker rejects for clarity.

Bronnikov finds many faults in Barker and Taranto’s theories, the first being that *Clearly p* can be shown to entail *p*, not just as a vague intuition, but with actual data. Specifically, Barker points to the grammaticality of

(13) It is clear that Abby is a doctor, but in fact she is not.

to demonstrate that the speaker is not really asserting that Abby is a doctor. In the first place, judgments vary about the acceptability of (13), but even if we are to accept it as felicitous, this can be attributed to an interpretation in which the second clause is effectively retracting the first, since it is happening in real time. If the sentence is put into past tense, as in (14), it becomes more definitively bad by Bronnikov's judgment.

(14) #It was clear that Abby was a doctor, but in fact she was not.

This is because the pragmatic conditions are different, and the sort of retraction seen in (13) is no longer possible, since the speaker definitively knows from the start of the utterance that it was not the case that Abby was a doctor. Notably, clarity does not pattern like belief here, which Barker and Taranto believe it should, since they liken the functions of the two, saying that both are non-factive—of course, this particular argument is weakened somewhat following Barker (2009), as he acknowledges therein that belief is not sufficient for clarity, so conceivably this could result from a difference between the two other than factivity. However, if we assume that Barker intends to maintain that (15) is acceptable because it is non-factive, and not for some other reason, then (14) ought to be acceptable as well, since for Barker, it, too, remains non-factive. As in (15) below, similar constructions asserting belief are perfectly acceptable.

(15) We believed Abby to be a doctor, but in fact she was not.

(16) *Abby was a doctor, but in fact she was not.

Of course, simply asserting p in the first clause yields infelicity, as in (16). Thus, clarity patterns more like (16), in which p is entailed, than like (15), in which it is not, lending credence to the notion that clarity constructions entail p .

Bronnikov's second argument against the Barkerian framework attacks directly what it claims the effects of clarity assertions are. His critique is based on a rather elaborate scenario that I will reproduce below as example (17).

(17) *A and B are sitting in an emergency room. A woman in a lab coat (X) walks along the corridor.*

A: This is clearly a doctor.

A man (Y) walks by in the opposite direction. He wears a lab coat as well. He also has a stethoscope around his neck and carries a medical record under his arm.

A: Clearly, this is another doctor.

The reason why Bronnikov asserts that this scenario is a problem for Barker's model is that according to Stalnaker, the epistemic standard for justification can only ever be lowered once it is set. In (17), once A has made her first statement, we know that wearing a lab coat is adequate evidence in the discourse to assert doctorhood. If Barker's interpretation is correct, the entire reason why A made her first statement was to eliminate any possible worlds in which a lab coat was not seen as enough evidence. But A's second statement is only capable of eliminating a subset of those same worlds, since if the coat plus the stethoscope plus the medical record are not evidence enough, the coat alone certainly isn't. So, all of the possible worlds A's second statement would be eliminating have already been eliminated by her first statement, and thus there is absolutely no motivation for her to make the second one if you're Barker and Taranto (2003). As Bronnikov points out, though, the scenario is not at all weird, and thus there must be some other motivation underlying A's ability to make both of her statements. Bronnikov does not include what such an alternative motivation would be, but presumably the desire to assert *is a doctor* for both X and Y would be a perfectly reasonable one, and, if you accept, as Barker does, that the embedded proposition is entailed by clarity, a perfectly possible one.

Bronnikov gives one more argument against Barker and Taranto, and that is that there need not be any vagueness surrounding the epistemic standard of justification in order for clarity

constructions to be licensed. Though I did not go into detail about the discussion of vagueness in Barker's (2009) paper, suffice to say that he does continue to assert that clarity is vague, and this plays into his argument surrounding gradability, as vagueness is also required for a sorites sequence to be developed. The example Bronnikov gives is of mathematics, in which the following pair of sentences is clearly felicitous, but should not be for Barker and Taranto, since there is no vagueness regarding the divisibility of numbers:

(18) Take an integer divisible by 9. Clearly, this integer is also divisible by 3.

Having established all this, Bronnikov moves on to outline his proposal for how one ought to treat clarity constructions. As has been already mentioned, his treatment parallels that of von Fintel and Gillies for *must*. However, simply saying that does not give a very good indication of precisely what he actually plans to do, so I will outline his proposal further. At the crux of it is the notion that clarity constructions point to the fact that the speaker is making an inference of some sort. This resolves (17), for example, because A is making an inference each time she speaks, even though the inferences used are very similar, and the acceptability of (18) becomes obvious. Another benefit to his proposal is that it accounts for the utility of the optional *to X* part of sentences using clarity constructions. Namely, when a person is specified, it is that person who is making the inference, while if it is left out, every participant in the conversation ought to be able to make the same inference, and the speaker ought to be aware that they are all capable of doing so. Though Bronnikov does not make this explicit, this last bit explains why Barker (2009) assumed that public evidence was so critical—in order for all the participants to be able to make an identical inference, and for this to be known to the speaker, it is essentially necessary that there be some sort of public evidence, even though it is not, in itself, a motivating factor.

Having established his position, Bronnikov returns to his critique of Barker and Taranto, since they explicitly rule out the interpretation that Bronnikov wishes to promote. He must then, therefore, show why the objections posed by Barker are not valid. In order to cover the situations in which it seems that the embedded proposition is not actually entailed by the sentence, he proposes that the inference used by the speaker may be defeasible, thus avoiding strict entailment. I find this to be a bit of a cheat, Bronnikov trying to have his cake and eat it, too, since it appears that he is actually allowing for the embedded proposition to not be entailed, even though he wishes to argue that it is. This is not enough to reject his hypothesis, as his fix is workable, but it is nonetheless unsatisfying. He also offers situations in which his theory appears to give incorrect results because the inference being used is exceptionally simple. His solution, then, is to say that the inference must be adequately substantial. He supports the notion that some inferences are so straightforward as to be trivial based upon example (19):

(19) John ate a sandwich and drank a glass of beer. ?Therefore, he ate a sandwich.

The second sentence in example (19) comes across as quite weird, because realizing that A&B entails A is so very basic we resist even acknowledging that it involves an inference. Since these inferences fail to be acknowledged as such in other contexts, it is reasonable that they also might fail to license clarity constructions.

Barker's other major argument against the missing entailment/inference hypothesis is that of the gradability of clarity constructions, and it is not resolved quite as neatly under Bronnikov's paradigm as the others. However, he is able to offer a plausible explanation for how gradability could arise under his model. Namely, the inferences used vary. While the ones we just saw were extremely simple to the point of triviality, some can be much more difficult. Also, they vary as to their degree of certainty—absolute mathematic reasoning versus inferences involving heuristics,

for example. Thus, speakers are not always equally confident that the inference they are making is valid, and this uncertainty about the validity of their inference yields a lower level of clarity. Conversely, if they feel outstandingly certain about the inference they've made, they could say something is "crystal clear." Ergo, it is confidence in the inferences used that is truly gradable, as well as what is vague, when it comes to clarity constructions.

Kratzer Meets Clarity

Thus far, this paper has outlined various competing analyses of *must* and of clarity, paying attention to the ways in which these varying interpretations interact with one another. However, as we have seen, none of the models discussed are without flaws, or at the very least, questionable elements. Both *must* and clarity carry with them an extensive list of varying ways in which they can be used, and this abundance of usages makes it very difficult to extricate precisely how the two are internally uniform, yet distinct from one another. In this final section of my paper, I will briefly explore a combination that has thus far been ignored in the works that I have studied: the application to clarity of a theory modeled after Kratzer's modality model. In doing so, I will also briefly outline various issues and examples that remain unresolved, or unexamined, and which, if more thoroughly explored, could potentially lead to a better understanding of the interplay between *must* and clarity.

Both Barker and Bronnikov use a model for *must* as a jumping-off point for their investigation into clarity, though to different conclusions. Namely, they use the model proposed by von Stechow and Gillies, and they do so based upon certain apparent similarities between the usage of clarity and that of *must*. However, von Stechow and Gillies' theory for *must* is not the only

theoretically viable one present in the current literature, and it is worth considering whether uniting a different theory for epistemic modals could dovetail even more nicely with clarity.

An example briefly mentioned in a footnote by von Steupel and Gillies highlights the profound link between the two domains. The sentences in question were brought to their attention by a reviewer, and are drawn from an online review of a book.

(20) If it's New Orleans and the novel's main characters have been dead for years but are still walking around terrorizing people, it must be an Anne Rice adventure. But it isn't [...].

This excerpt uses *must*, but then immediately denies the proposition under the scope of *must*. The authors suggest that this is simply a rhetorical flourish, and that such retractions for effect can be performed on statements that undeniably assert the proposition that is ultimately negated, such as bare prejacent, so there is no need to believe that it poses a problem for their analysis. This is certainly a reasonable conclusion, but the example remains noteworthy because it appears that the use of *must* in this example exactly parallels the use of clarity as conceived by Barker. The person who wrote this review sets up a paradigm in which the evidence available is adequate to conclude that Anne Rice wrote the work, but then goes on to say that actually, despite this fact, the book is not by Rice after all. Thus, *must* can be retracted just as clarity can be, because the embedded proposition (*It is an Anne Rice adventure*) has not actually been asserted. This parallelism is somewhat paradoxical, as it simultaneously calls for *must* and clarity to be analyzed in tandem, while also most apparently employing a technique proposed for clarity to the exclusion of *must*.

I have already observed that there is a particular characteristic of clarity constructions that naturally seems to parallel the structure that Kratzer proposes for modals. It is this that I will use as the foundation of my analysis. According to Kratzer, the different functions of modals can

be distinguished by context, which is generally implicit, but which can be specified in order to resolve an ambiguity, and which thereby distinguishes between different types of modals. Similarly, the addition of a particular sort of context, namely the contribution of the relevant perspective, can differentiate different uses of the clarity construction. Just as stating *In view of...* into a modal sentence serves to define the accessibility relation between possible worlds, specifying *to X* in a clarity construction defines a relationship regarding the accessibility of the information being used to draw the conclusion of clarity. At the present moment, I have not drawn out a formalized semantic model for clarity that makes use of a structure of this type. It is also necessary to note that this component does not, in and of itself, answer the question of what licenses one to use a clarity construction in the first place. It is therefore possible that it would prove most useful when supplemented by or put in conjunction with another model, such as one that has been discussed here.

An additional example that relates to the present analysis is one that is mentioned by both Barker and Bronnikov in their articles, but which I believe has not been adequately explored. Both authors mention and immediately dismiss the following example as being utterly ungrammatical. In it, someone sees the picture of Abby, and says:

(21) ?It is clear that Abby is wearing a stethoscope.

Both authors reject this usage, saying that clarity is not licensed in situations where the observation is too obvious, either because the inference is too elementary (Bronnikov), or because there is absolutely no question about whether the evidence is adequate to assert that she is wearing a stethoscope (Barker.) However, while I agree that (21) sounds quite bad in isolation, I was easily able to construct a situation in which it could be made acceptable:

(21') It is clear that Abby is wearing a stethoscope, but what you may not have noticed is that she is also wearing fake vampire teeth, indicating that she is in a costume, not her

actual work attire.

In (21'), the previously unacceptable phrase is now perfectly all right, and this is due to the fact that the expression of clarity seems to be being used to quite a different effect than in the situations given by Barker and Bronnikov. In this case, it serves to make salient the fact that Abby is wearing a stethoscope. Even though this fact is obvious to everyone present, they might not be explicitly taking note of it, and (21') forces them to do so. There is always the possibility that this usage is best analyzed entirely separately from the one explored by Bronnikov and Barker. It would, however, generally be more parsimonious to avoid this. Besides which, such a tactic would create its own problems, namely determining how people know which of the two readings to assign a clarity construction when they hear one. The most elegant resolution would be to somehow reconcile the use seen in (21') with one of the theories we're already investigating. This problem plays perfectly into my attempt to describe clarity using a Kratzerian model, since resolution of seemingly disparate meanings and subsequent elimination of lexical ambiguity are precisely what make her model so appealing. However, it is not clear how my efforts to employ such an analysis, as they currently, could actually be used to resolve this problem.

Ultimately, there are a tremendous number of uses for both *must* and clarity, and neither I, nor most others who have previously worked on these constructions, have even begun to cover them all. However, it is my hope that this paper has illustrated certain threads of commonality and contrast in the treatment of these two types of constructions, and that I have also been able to shed some light on previously ignored circumstances.

Works Cited

- Barker, Chris. (2009), Clarity and the Grammar of Skepticism. *Mind & Language*, 24: 253–273. doi: 10.1111/j.1468-0017.2009.01362.x
- Barker, Chris and Taranto, Gina. (2003) The Paradox of Asserting Clarity. In P. Koskinen (ed.), *Proceedings of the Western Conference on Linguistics (WECOL) 2002*, Volume 14. Fresno, CA: Department of Linguistics, California State University, 10 – 21.
- Bronnikov, George. (2008). The paradox of clarity: Defending the missing inference theory. *Proceedings of Semantics and Linguistic Theory 18*, Ithaca, NY: CLC. doi:1813/13031.
- von Fintel, Kai and Anthony S. Gillies. Must...Stay...Strong! *Natural Language Semantics*. 2010.
- Hacquard, Valentine. (*to appear*). 'Modality', in C. Maierborn, K. von Heusinger and P. Portner (eds.) *Semantics: An International Handbook of Natural Language Meaning*. Berlin: Mouton de Gruyter.
- Karttunen, Lauri. Possible and Must. (1972). IN Kimball, J. (ed.) *Syntac and Semantics*, volume 1. New York: Academic Press. 1-20.
- Kratzer, Angelika. What must and can must and can mean. (1977). *Linguistics and Philosophy*, 1(1): 337-55.
- Kratzer, Angelika. Modality. (1991). In von Stechow, A. and Wunderlich, D. (eds), *Semantik/Semantics: An International Handbook of Comtemporary Research*, 651-6. Berlin: de Gruyter.
- Papafragou, Anna. (2006). Epistemic Modality and Truth Conditions. *Lingua* 116 (10):1688-1702.
- Portner, Paul. *Modality*. (2009). Oxford: Oxford University Press.