Generics and Weak Necessity

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Abstract

A prevailing thought is that generics have a covert modal operator at logical form. I claim that if this is right, the covert generic modality is a weak necessity modal. In this paper, I provide evidence for this claim and I sketch a theory. In particular, I will show that there are some important distributional parallels between generics and sentences with overt weak necessity modals: both sorts of sentences share behavior in nonmonotonic reasoning environments and also lack genuine epistemic readings. Acknowledging these parallels and the connection here is in the service of both our understanding of genericity and of weak necessity. Finally, I propose an understanding of generics as involving a covert weak necessity modal and argue that this is a promising path to pursue in relation to different issues related to the interpretation of generics.

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1 Introduction

This paper is about bare plural constructions such as:

(1)   a. Ravens are black.

        b. Birds fly.

        c. Tigers are striped.

The most salient reading of the sentences in (1) is the generic reading. Each of the sentences in (1) are true even in the face of counterinstances and seem to have a kind of quasi-universal flavor. In this paper, I refer to sentences such as those in (1) as generics. The investigation in this paper, in particular, concerns the underlying form of generics. There are good motivations going back to, for instance, Heim (1982) that generics involve a covert modal element. This paper challenges the standard version of the modal analysis of generics and argues that if we want to analyze generics in modal terms, we had better hold that the covert generic modality is a weak necessity modal.

A generally plausible thought concerning the semantics of generics is that they involve something covert at the level of logical form. One suggestion to begin with is that the covert element is something along the lines of an adverbial quantifier. Indeed, a standard test for whether or not a sentence is a generic involves adverbial quantifier insertion. This test, at least *prima facie*, gives reason to believe that generics involve something covert. Krifka *et al.* (1995) propose the following: check whether the addition of such adverbs results only in the slightest change of meaning. If so, we can take the sentence without the adverbial quantifier to be a generic. Consider, then, the following:

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(2) Birds fly.

And combine with an adverb of quantification:

(3) a. Birds *usually* fly.

   b. Birds *normally* fly.

   c. Birds *typically* fly.

The additions of *usually*, *normally*, and *typically* seem merely to cause a slight change in meaning compared to (2).[1] Any sort of difference between the examples in (2) and (3) appears to be due to the former examples being somehow weaker–at least in the sense that the examples in (3) explicitly advertise their exception-grantingness.[2]

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[1]Note, however, that not just any adverbial quantifier insertion will work to capture the genericity of (2). Consider:

(4) a. Birds *rarely* fly.
   b. Birds *occasionally* fly.
   c. Birds *invariably* fly.

The adverbial quantifier test–at least on one way of understanding its import–tells us that if there is something hidden at the level of logical form, it is something which behaves like an adverbial quantifier of a certain kind.

[2] Note that the exception-granting property here may be witnessed by the following examples:

(5) a. Birds *usually* fly, but some/many don't.
   b. Birds *normally* fly, but some/many don't.
   c. Birds *typically* fly, but some/many don't.

Somehow, the sentences in (5) appear more natural than:

(6) Birds fly, but some/many don't.

Three points. First, I take it that there is a difference between (5) and (6). This should be expected, for these adverbial quantifiers mentioned explicitly indicate the exception-granting character of the sentences in (3). Second, the many-readings in (5) sound slightly better when we think of them along the lines of 'It's normal for birds to fly, but many actually don't'. Third, it is worth noting that capacity readings are salient here; see Schubert & Pelletier (1989) as well as Nickel (2016, ch. 4) and Sterken (2015a) for further discussion. Thank you to an anonymous reviewer for asking me to clarify these points.

A related avenue to pursue might be to consider some other insertions which combine (2) with various modal auxiliaries and semimodal verbs. It is worth seeing what we might gather from this and whether any such insertions capture the generic nature of (2). We can start by considering the strong necessity insertions.

(7) Birds *must* fly.

(8) Birds *have to* fly.

These appear a bit odd. The oddness of both (7) and (8) is that they seem as though to be too strong: these paraphrases somehow fail to take into account the thought that 'Birds fly' admits of exceptions. Perhaps the oddness here is due to the oddness of the following:

(9) Birds *must fly*, but some/many don't.

(10) Birds *have to fly*, but some/many don't.

These sound odd because they appear to be, in some sense, instances of contradictory conjunctions.[3] At least one lesson to learn from attempting to formulate a contradictory conjunction is whether the modals in (7) and (8) sound appropriate for capturing the putative exception-granting property of 'Birds fly'. For another insertion, consider *might* and *must*:

(11) Birds *might* fly.

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[3]For further discussion of contradictory conjunction effects with generics, see Sterken (2013, 2015a).

(12) Birds *may* fly.

Both (11) and (12) clearly fail to capture the strength of 'Birds fly'. They simply appear far too weak.
Now let us consider:

(13) Birds *can* fly.

Although its doubtful that (13) captures the force of generics, there are certainly circumstances where
it sounds appropriate. If we are making a list of the things that birds can do, a candidate item on that
list would be (13). It may be that (13) isolates a particular reading of 'Birds fly', one that perhaps
does not happen to be the ordinary, salient one. Let us now consider:

(14) Birds *happen to* fly.

(15) Birds are *supposed to* fly.

It appears as though both (14) and (15) respect the apparent exception-granting character of generics,
although (15) does this better. An issue with (14) is that adding *happen to* does not allow for the
reading that *flying* is something that *characterizes* birds. A familiar feature of many true generics is
that they attribute properties to noun phrases that are not merely accidental. One thing to consider is
that the following does not lead to a kind of contradictory conjunction and sounds fine:

(16) Birds are *supposed to* fly, but some/many don't.

None of the previous insertions (with the exception of (15)) are so great, but inserting a weak necessity modal looks very promising:

(17) Birds *should* fly.

(18) Birds *ought to* fly.

There appears to be a good sense in which both (17) and (18) capture the *force* associated with 'Birds fly'. That is, we do not get that some particular bird flies given (17) or (18), and this is an entirely desirable consequence. Indeed, we don't get any oddness with the following conjunctions either:

(19) Birds *should* fly, but some/many don't.

(20) Birds *ought to* fly, but some/many don't.

I should note that exploring these examples is not meant to be in the service of capturing the right modal auxiliary insertion that captures a something like a 'correct' paraphrase of all generics in the bare plural. It has been noted before that no attested language has any overt manifestation of whatever is taken to be the covert generic operator.[4] The aim here at the outset is only to perform an initial examination of whether any of these modal insertions can help us capture whatever kind of 'force' or 'flavor' we are apt to associate with generics.[5]

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[4]See Krifka *et al.* (1995) for discussion of this point.

[5]Let us even suppose that there is a decent paraphrase available outside the examples we have already discussed. Here is one to consider:

(21) Birds *nonaccidentally* fly.

When we considered (14), we saw that it was an inadequate paraphrase because we want the connection between *birds* and *fly* to be a sort of nonaccidental connection. However, (21) is extremely unhelpful and *nonaccidentally* happens to be a

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The target proposal of interest in this paper is the idea that generics involve a covert modal operator. I will briefly describe this proposal. To begin with, consider the standard tripartite rendering of the logical form of generics:

(22) $\text{GEN}[x_1 \ldots x_n; y_1 \ldots y_n](\text{Restrictor}, \text{Matrix})$

Here GEN stands for an unpronounced quantifier responsible for the genericness of generic sentences.[6] A prominent approach to GEN is to treat it as a modal operator in the setting of possible worlds semantics.[7] In particular, the idea would work something like in the following way. Start with the idea that generics resemble conditional sentences. On the restrictor theory of conditionals, the role of if-clauses are to restrict the domains of different operators associated with conditionals. Additionally, this domain restriction is present whether there is a overt operator present. If there is no overt operator, a covert operator is to be posited (Kratzer, 1986).[8]

Then, if generics resemble conditional sentences, we ought to similarly posit a covert modal operator for generics. The core of the idea is to give generics a semantics along the same lines as the covert modality of conditionals. Following Krifka *et al.* (1995), we can give an interpretation for generics as follows:

(23) $\text{GEN}[x_1 \ldots x_n; y_1 \ldots y_n](\text{Restrictor}, \text{Matrix})$ is true in w relative to a modal base f and ordering source $\leq_{g(w)}$ iff:

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sort of philosopher's jargon. Given that this term is quite unnatural, it is hard to classify it alongside other more natural quantificational expressions in natural language.

[6]See Sterken (2016) for discussion and recent defense of GEN.

[7]See Dahl (1975), Heim (1982), Kratzer (1981) as well as Krifka *et al.* (1995) and Sterken (2017) for further discussion.

[8]See also Lewis (1975), Heim (1982), Kratzer (1981, 2012)

for every $x_1 \ldots x_n$ and every w' in $f(w)$ such that Restrictor $[x_1 \ldots x_n]$ is true in w', there is a world w'' in $f(w)$ such that $w'' \leq_{g(w)} w'$, and for every world $w''' \leq_{g(w)} w''$, $\exists y_1 \ldots y_n$ Matrix$[x_1 \ldots x_n; y_1 \ldots y_n]$ is true in w'''

It is a feature of this proposal that the underlying modal component of characterizing sentences is along the lines of *must*.[9] An important virtue of this approach is that it captures the kind of restricted universal quantification over normal cases that seems as though to be associated with generics. And we get the modal source of the quantification from an an independently motivated theory of covert quantification in conditional sentences.

In this paper, however, it is argued that there is a connection between generics and *weak* necessity modals to appreciate, and, in particular, the aim is to provide some evidence for the view that generics involve covert weak necessity modals. The evidence for this view is based on some interesting and noteworthy distributional parallels between generics and sentences containing overt weak necessity modals.

This paper also provides a sketch of a theory of generics based on the proposal that generics involve covert weak necessity. To illustrate the view, I follow the account of von Fintel & Iatridou (2008). The gist of their account is as follows. Suppose the standard view that a strong necessity modal (e.g. *must*) claim is true provided the proposition under the scope of the modal is true in all of the best worlds. A weak necessity modal (e.g. *should/ought*) claim is true provided the proposition under the scope of the modal is true in the best of the best worlds. That is, weak necessity modals involve a further domain restriction measure. It is proposed that generics are doubly domain restricted in the same way, with the secondary domain restriction involving some notion of normality.

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[9]Section 2 briefly discusses the semantics of modals in natural language, but see Krifka *et al.* (1995) for relevant discussion.

We will proceed as follows. We will examine the covert structure of generics by looking at the interactions between generics and *in view of* phrases. Section 2 provides the relevant background on this matter. Next, I discuss the main distributional parallels between generics and sentences containing overt weak necessity modals. Section 3 discusses the shared features of both sorts of sentences in the environment of defeasible reasoning; Section 4 discusses the claim that both sorts of sentences do not take genuine epistemic readings. Then, the observations are turned into a theory. Section 5 sketches and discusses the theory that the covert generic modality is a weak necessity modal. Section 6 concludes.

2   Modals and *in view of* phrases

This paper investigates the covert structure of generics. The initial lens from which we examine this covert structure will be through observing the interactions between free relative *in view of* phrases and generic sentences without overt modals. This will take place from the perspective of the unified semantics for modals in natural language given in Kratzer (1977, 1981, 1991, 2012). Hence, ultimately, the task is to look at the influence of context on the meaning of generics.

2.1   *In view of* phrases and conversational backgrounds

Free relative *in view of* clauses determine a substantial portion of the meaning of modal sentences in natural language. To observe this, let us consider the following sentences with an eye on the meaning of *must* in each of them:

(24) a. Oscar the Grouch *must* have been in the trash can for at least 4 hours straight.

b. Cookie Monster *must* share his cookies.

c. Ernie *must* be home by 6pm.

d. Elmo *must* learn to use pronouns properly when he speaks.

Now, we supplement these sentences with *in view of* phrases, allowing us to unpack much of the meaning of the occurrences of *must* in (24):

(25) a. *In view of his dispositions*, Oscar the Grouch must have been in the trash can for at least 4 hours straight.

b. *In view of Sesame Street community norms*, Cookie Monster must share his cookies.

c. *In view of Bert's demands*, Ernie must be home by 6pm.

d. *In view of the norms of the English language*, Elmo must learn to use pronouns properly when he speaks.

These *in view of* phrases paraphrase much of what it is the sentences in (24) are about. The occurrences of *must* in (25) then end up being neutral occurrences of *must*. Such phrases do not tend to be linguistically realized. The relevant information typically comes from context. We need to do some reconstruction to make explicit their influence in determining the meaning of natural language modals. Given that we are engaging in some reconstruction, *in view of*, at times, can sound quite unnatural. Sometimes it might be helpful to consider some cousins of *in view of* such as *according to*, *given that*, *in light of*, and so on.[10]

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[10]For ease, I will tend to stick to *in view of* throughout, though nothing is lost if I use any alternatives. I thank an anonymous reviewer for bringing this issue to my attention.

To get a sense of the role of *in view of* phrases and matters related to Kratzer's semantics, I provide a brief overview. Modal statements have three components: a *conversational background*, a *modal particle*, and the *prejacent proposition* which the modal takes scope over.

The *conversational background* is what every sentence is uttered against–modals are interpreted with respect to conversational backgrounds. In particular, a conversational background is a function from worlds to sets of propositions. It supplies information that is usually left inexplicit. Phrases such as *in view of* determine conversational backgrounds.

Conversational backgrounds are relative to two things: a *modal base* and an *ordering source*. The role of the modal base is to tell us which worlds are accessible; the ordering source induces an ordering on the accessible worlds according to how well they satisfy the prescribed ideals. These are both functions from worlds to sets of sets of worlds (sets of propositions). The basic picture is that modals quantify over the *best* words. These are the worlds that are ideal given the ordering source in question.[11]

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[11]Where f is the modal base and where g is the ordering source, we can give the semantics for the necessity modal and the possibility modal as follows:

$$[[\text{Must } \varphi]]_{f,g,v} = \{w \mid Best(f(w), g(w)) \subseteq [[\varphi]]_{f,g,v}\}$$
$$[[\text{May } \varphi]]_{f,g,v} = \{w \mid Best(f(w), g(w)) \cap [[\varphi]]_{f,g,v} \neq \emptyset\}$$

This formalization in terms of the *Best* function follows Portner (2009) and the semantics here assumes the *limit assumption*, that is, there are always accessible ideal worlds. The *Best* function selects the most ideal worlds from its input, and obeys the ordering $\leq_{g(w)}$. That is, $w' \leq_{g(w)} w''$ iff $\{p \in g(w) \mid w'' \in p\} \subseteq \{p \in g(w) \mid w' \in p\}$. So, given a proposition in $g(w)$, w' is at least as good as w''.

2.2 Generics under *in view of*

The main idea that I would like to establish in this section is that *in view of* phrases, when combined with generics, tell us what we need to determine a conversational background for generics. So, this means that *in view of* phrases, in the case of generics, must be supplying information to a covert modal.

If *in view of* phrases are supplying information to a covert generic modal, then different *in view of* phrases will affect the genericity, in some important sense, of a given generic prejacent. We can observe such affects as follows:

(26)   a. Birds, *in view of their DNA*, fly.

         b. Birds, *in view of scientific testimony*, fly.

         c. Birds, *in view of their dispositions*, fly.

         d. Birds, *in view of what I've seen*, fly.

The examples in (26) show that a generic such as 'Birds fly' can, on different occasions, receive variable interpretations. It is important to note that Kratzer uses in view of data in the same spirit to make related points about modal sentences in general. The lesson to take away is that we should treat the variability of generics in very much the way we treat the variability associated with different readings of modal sentences.

Sterken (2015b) has recently discussed the contextual variability of generics. She claims that such variability is widespread and distinctive. The claim here is that it is helpful to look at the variability

in terms of *in view of* phrases. For instance, let's discuss one of her cases, which is taken from Nickel (2008):[12]

(27) Dobermans have floppy ears.

Dobermans are born with floppy ears, and so we can easily imagine that in a sort of evolutionary biology context that (27) sounds totally fine. However, (27) comes out as false in certain dog-breeding contexts. Consider Nickel's example text:

(28) While Labradors and Golden Retrievers have floppy ears, Dobermans don't. Dobermans have pointy ears.

These Nickel-effects can be easily recast using *in view of* phrases:

(29) Dobermans, *in view of evolutionary facts*, have floppy ears.

(30) Doberman, *in view of the practices of dog-breeders*, have pointy ears.

If we control the interpretation of (27), it is very easy to witness the variability here.[13] We could

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[12]Also see Nickel (2016).

[13]In fact, the effect here could seem more ordinary, for we can imagine something similar for 'Birds fly'. Suppose there are bird-breeders who like to inject birds with a mystery non-flying juice. We could then have the following:

(31) Birds, *in view of the injection practices*, do not fly.

(32) Birds, *in view of evolutionary facts*, fly.

We could even imagine a person growing up in Antarctica who has only seen penguins. The context in such a case would have it come out as false that birds fly. In any case, the main point to emphasize is that the background context is very important and that *in view of* phrases help reveal the variability.

even construct a sentence which suitably combines (29) and (30):

(33) Dobermans, given evolutionary facts, have floppy ears, however, given dog-breeding practices, they have pointy ears.

In this way, we see that the variability of generics can be witnessed in a systematic and principled way by supplementing them with *in view of* phrases. It appears as though the most plausible explanation of what is happening in such cases is that these *in view of* phrases make explicit the background information which informs a covert generic modal.

There are cases, however, where we have *in view of* phrases combined with non-modal, non-generic sentences. Consider such a sentence in (34) and then combined with a phrase to specify some background contextual information in (35):

(34) John danced with Sue.

(35) *Given what I've heard*, John danced with Sue.

On the basis of examples like (35) one might be skeptical that the combination of *in view of* phrases and generics tells us anything about the existence or nature of a covert generic modal, for presumably there is no such modal in more ordinary sentences like (34).[14] If *in view of* phrases provide information to a covert modal in generics, what are they doing in cases like (35)?

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[14]I am grateful to an anonymous reviewer for pressing me on various points related to *in view of* phrases.

The answer is that, in cases such as (35), we have made explicit some background evidential information.[15] English is not evidentially marked; however, the idea is that some reconstruction can tell us the source of information that a speaker possesses. Here's some reason to think that phrases like *given what I've heard* in (35) provide evidential information (presumably to a tacit epistemic modal). Following Murray (2010, 2017), evidentials contribute *not-at-issue* content to restrict the common ground. A feature of not-at-issue content is that it is not directly challengeable. The *at-issue* content, for instance the assertion that 'John danced with Sue', is challengeable. Consider the following two responses to (35):

(36) No, they didn't dance.

(37) # No, you didn't.

So, if a phrase like *given what I've heard* is providing us with not-at-issue content, then we should understand it as placing a restriction on the common ground which plays the role of providing evidential information.

Now consider *in view of* phrases which select non-doxastic conversational backgrounds to combine with non-modal, non-generic sentences. These do not combine well. Here are just a few attempts at combining with (34):

(38) a. *In view of the laws*, John danced with Sue.

   b. *In view of their DNA*, John danced with Sue.

   c. *In view of their dispositions*, John danced with Sue.

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[15]I owe this point to discussion with Josh Dever.

That such conversational backgrounds do not combine well with non-modal, non-generic sentences should be expected, for there is obviously no overt modal available to affect, nor is there good reason to think with such sentences that there is a covert modal to affect[16] (other than a tacit epistemic modal which receives evidential information).[17]

We will proceed with the hypothesis that there are certain, relevant kinds of *in view of* phrases which restrict the domain of generics. This will help us achieve some further insights concerning genericity, in particular, concerning the nature of the covert generic modal. The rest of the paper will focus on making the case that the covert generic modal is a weak necessity modal. In the next two sections, I provide some evidence to hold this view by showing some parallels between generics and sentences with overt weak necessity modals.

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[16]There is more to be said about the interactions between the evidential *in view of* phrases and generics, I come back to this issue in Section 4. There I argue, *inter alia*, that doxastic *in view of* phrases do not affect the generic covert modal at all.

[17]Additionally, it is also worth noting that not just any *in view of* phrase will affect any available modal, whether covert or overt. I thank an anonymous reviewer for bringing this to issue to my attention and I would like to consider their examples. Consider the following combinations of *in view of* phrases and generics:

(39)   a. *In view of the weather*, birds fly north.

        b. *In view of grandma's pets*, birds live in grandma's house.

If the *in view of* phrases in (39) combine well with the generics they are attached to, then there is a worry, as the reviewer rightly notes, that we can overgenerate readings for many bare plural sentences. But there is good reason to think that these *in view of* phrases do not combine well at all. Let's try adding an overt modal to the sentences in (39):

(40)   a. *In view of the weather*, birds should fly north.

        b. *In view of grandma's pets*, birds should live in grandma's house.

Now observe that when we add *should* it does not appear as though these *in view of* phrases really help unpack the meanings of the overt modals in (40). This gives us reason to believe they wouldn't be affecting a generic covert modal in the original examples, for, if we ought to respect the distributional parallels, this would confirm any discomfort with the original examples.

3 Generic defeasible reasoning

In this section, I argue that generics display very much the same behavior as sentences with overt weak necessity modals in nonmonotonic reasoning environments. This parallel gives us reason to believe that generics involve a covert weak necessity modal.

3.1 Parallel patterns of reasoning

The theorists who investigate the link between generics and defeasible reasoning are motivated by the need to account for the defeasible validity of inference patterns such as:

(41) **Defeasible Modus Ponens**

    If Tweety is a bird, (*normally*/*generally*/etc.) Tweety flies

    <u>Tweety is a bird</u>

    Tweety flies

(42) **Generic Modus Ponens**

    Birds fly

    <u>Tweety is a bird</u>

    Tweety flies

The conclusion 'Tweety flies' in both (41) and (42) follows not deductively, but given some adequate nonmonotonic consequence relation between a set of premises and a set of conclusions: $\Gamma \mathrel{|\!\sim} \varphi$.[18]

My interest here is to examine what is happening when we draw defeasible consequences from generics. In particular, we will take a look at what are the adequate ways to characterize the *conclusions* of defeasible reasoning in order to, in a sense, gauge the force of these consequences. So, suppose we have the premises of (42), namely 'Birds fly' and 'Tweety is a bird'. What we will do is look for a paraphrase that, in some sense, respects the potential for retraction that is characteristic of defeasible reasoning. Consider the following:

(43) Tweety *should* fly.

(44) Tweety *ought to* fly.

I submit that both (43) and (44) sound appropriate as conclusions of defeasible reasoning. In particular, paraphrasing things this way respects the potential for retraction:

(45) Tweety *should* fly, but doesn't.

(46) Tweety *ought to* fly, but doesn't.

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[18]Briefly, a logic is nonmonotonic if the following monotonicity property fails of its consequence relation: if φ is a consequence of Γ, then φ is a consequence of $\Gamma \cup \psi$. If the monotonicity property fails, then a conclusion can be prevented by adding further premises. The aim in these frameworks is to reach *defeasible* conclusions. An important feature of nonmonotonic logics is that they allow for retraction: given the information that 'Tweety is a bird', and that 'birds fly', we infer that 'Tweety flies'. But if we find out that Tweety has a broken wing, then we would retract our conclusion that 'Tweety flies', and instead infer that 'Tweety doesn't fly'. This is a major contrast to the situation in classical deductive formalisms where, once a conclusion is established, it remains established, for adding additional premises keeps validity intact. So it is in this sense that nonmonotonic logics allow for retraction and monotonic logics do not. Indeed, this is taken to be reason that nonmonotonic logics are held to be useful in characterizing common sense reasoning as well as the role generics play in such reasoning patterns.

So, generics appear to license defeasible consequences with, as it were, the force of weak necessity. Sentences with overt weak necessity modals license consequences in the same way. Let us consider a defeasible pattern of reasoning using a sentence with such an overt modal in the major premise.

(47) Residents of Sesame Street ought to share their cookies

Cookie Monster is a resident of Sesame Street

Cookie Monster ought to share his cookies

It would be odd to conclude that 'Cookie Monster shares his cookies'; things sound much better when we add *ought*. It is true that Cookie Monster ought to share his cookies, though we all know that he's not actually going to (or at least do so very reluctantly). It would not sound appropriate to say that he *might* share his cookies; likewise, it would not sound appropriate to say that he *must* share his cookies. It is in this sense that sentences with overt weak necessity modals share something in common with generics: the defeasible consequences we derive sound appropriate when we add an overt weak necessity modal. Additionally, if we were to take the generic version of the premise of (47), that is, 'Residents of Sesame Street share their cookies', the appropriate way of embedding the defeasible conclusion would be the same.

So, generics and sentences with overt weak necessity modals share an important link to each other in nonmonotonic reasoning environments. What we should take away from the parallel behavior is that generics must have something like a covert weak necessity modal, for this would be an explanation of the parallels. And this also means that if we want to understand the relationship between generics and defeasible reasoning, we should also look to study patterns of defeasible reasoning involving *ought* and *should*.

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3.2 A remark on the reasoning data

Before moving forward, it is worth nothing that there are generics from which it does not appear that we can draw any reasonable consequences. This makes for a general worry for those who investigate the links between generics and defeasible reasoning, as it undermines the strength of such links. A challenge of this form is put forth by Leslie (2007). The challenge is based on inferences such as the following:

(48) Mosquitoes carry West Nile Virus

Buzzy is a mosquito

Buzzy carries the West Nile Virus

Leslie holds that this is not a very attractive inference and that the existence of such cases means that schemas like (41) and (42) do not hold for all generics. However, I think this challenge is too quick and that it is worth taking another look at her case.

Let us begin by finding an *in view of* phrase that helps us make sense of the generic premise in (48). Perhaps the following are some bad attempts:

(49) a. Mosquitoes, *in view of scientific testimony*, carry West Nile Virus.

b. Mosquitoes, *in view of their dispositions*, carry West Nile Virus.

c. Mosquitoes, *in view of their DNA*, carry West Nile Virus.

I am inclined to hold that under these *in view of* phrases, we get false interpretations of 'Mosquitoes carry West Nile Virus'. Suitable non-doxastic readings do not appear easily available. Perhaps the following *in view of* phrases with an apparent 'epistemic' flavor help provide some 'reasonable' readings:

(50) a. Mosquitoes, *in view of what I've been told*, carry West Nile Virus.

  b. Mosquitoes, *in view of what I've seen*, carry West Nile Virus.

These doxastic *in view of* phrases help us draw out some suitable contexts for the major premise of (48).[19] A consequence is that the conclusion that 'Buzzy carries West Nile Virus' seems reasonable–given a sort of doxastic *in view of* phrase in the generic premise–when read in the following ways:

(51) a. Buzzy, *in view of what I've been told*, carries West Nile Virus.

  b. Buzzy, *in view of what I've seen*, carries West Nile Virus.

In particular, we should read the sentences in (51) as restricted according to some evidential information. So, the idea is that these conclusions are warranted on the basis of the source of evidence given in the major premise, thereby making these conclusions defeasibly acceptable.

The main upshot of looking at Leslie's example in a different way is that perhaps there is a way to salvage such cases where it does not appear as though reasonable conclusions can be drawn from

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[19]However, stay tuned for some remarks in the following section on the status of generics evaluated with doxastic *in view of* phrases. I will argue that such *in view of* phrases do not affect the covert generic modal. This makes for another distributional parallel with sentences containing overt weak necessity modals–there is good reason to believe that such sentences do not admit of genuine epistemic readings. Anyway, there is an intuition that 'Mosquitoes carry West Nile Virus' is a true generic, so it must have some suitable non-doxastic interpretation or other.

generics. The suspicion is that, at least in some cases, those who judge (48) as bad do so because they may be interpreting the premises and the conclusion with respect to different sorts of conversational backgrounds.[20]

To recap, the main point of interest is the parallel behavior of generics and sentences with overt weak necessity modals. We observe this through the relationship between generics and the defeasible conclusions we draw from them. While it appears as though many generics do not warrant reasonable conclusions, the same holds for sentences with overt weak necessity modals. In this way, it does not matter whether the difficult inferences involving generics are or are not salvageable. Given this, I claim that there is indeed interest in investigating the nonmonotonicity of inferences from generics. In the next section, we move on to discussing another parallel between generics and sentences with overt weak necessity modals, namely that both sorts of sentences do not receive genuine doxastic interpretations.

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[20]Yet there is, in some sense, the overriding intuition that inferences such as (48) are bad. Indeed, generally, there is some kind of difference between the reasonableness of inferences like (42) and (48), whether or not there is a way to salvage (48). It is worth noting that, strictly speaking, these defeasible inferences involving generics such as (42) and (48) are bad. There is a sense in which such inferences appear fine because they are reasonable unless we have defeating information. However, there is a sort of oddity. Consider the case of 'Birds fly'. It is plausible to think that this generic is somehow about ideal or normal birds. But Tweety is an actual bird. The oddity is that when we conclude that Tweety flies we do so on the proviso that the normal or ideal birds of interest are relevantly similar to the actual birds. Without such an auxiliary assumption even the inference involving 'Birds fly' is going to be unreasonable. The reason why there is a kind of inferential badness in the case of the mosquito inference is because we are unable to make a similar auxiliary assumption. On the reading that makes 'Mosquitoes carry West Nile Virus' true we would have it that this sentence talks about mosquitoes in a certain ideal or normal way. But Buzzy is an actual mosquito. We know that most actual mosquitoes don't carry West Nile Virus. So we do not operate under the assumption that the actual mosquitoes are relevantly similar to the ideal or normal ones that we are talking about. Thank you to Matthew McKeever for discussion on the points in this section.

4 Doxastic backgrounds and genericity

In Section 2, it was noted, in the case of non-modal, non-generic sentences, that doxastic *in view of* phrases affect the interpretation of a tacit epistemic modal. In particular, such conversational backgrounds concern the evidential state of a speaker. It was also noted that non-doxastic *in view of* phrases do not combine well with non-modal, non-generic sentences.

The present section begins by observing that there are generics that do not receive any reasonable non-doxastic interpretations. What we learn from this observation is that only non-doxastic conversational backgrounds affect the interpretation of a generic. Then, I will argue for the claim that generics do not receive genuine epistemic interpretations and that this is a feature that is shared with sentences that have overt weak necessity modals. This gives further reason to believe that the generic covert modality is a weak necessity modal.

4.1 On the lack of epistemic interpretations for generics

There are many generics that only appear to have true readings given doxastic *in view of* phrases. For instance, consider the following prejudicial generics:

(52)   a. Blondes are dumb.

b. Black people are violent.

c. Muslims are terrorists.

There is no non-doxastic reading that could make any of the sentences in (52) true. For instance, consider:

(53) a. *In view of their DNA*, blondes are dumb.

      b. *In view of scientific testimony*, blondes are dumb.

      c. *In view of their dispositions*, blondes are dumb.

(54) a. *In view of their DNA*, black people are violent.

      b. *In view of scientific testimony*, black people are violent.

      c. *In view of their dispositions*, black people are violent.

(55) a. *In view of their DNA*, Muslims are terrorists.

      b. *In view of scientific testimony*, Muslims are terrorists.

      c. *In view of their dispositions*, Muslims are terrorists.

These readings of the various sentences in (52) are plainly false. The following doxastic readings of (52) can only come out as true just in case an agent has the appropriate states of mind:

(56) a. *In view of what I've seen*, blondes are dumb.

      b. *In view of what I've heard*, Black people are violent.

      c. *In view of what Smith tells me*, Muslims are terrorists.

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However, this does not mean that any of the sentences in (52) are true generics.[21] The doxastic *in view of* phrases present in (56) do not affect the covert generic modal at all; instead, they provide information to a tacit epistemic modal. This is because doxastic *in view of* phrases, when combined with generics, contribute not-at-issue content, which does not end up affecting the *genericity* of the prejacent.

There are a number of generics that only have 'reasonable' readings under such doxastic *in view of* phrases. I will not claim that this is a general feature of prejudicial or 'troublesome' generics. The claim of interest at present concerns the variance between doxastic and non-doxastic conversational backgrounds and their interactions with generics.

My aim in this section is to argue that both generics and sentences with overt weak necessity modals share the feature that doxastic conversational backgrounds do not affect their interpretation; that is, there are no genuine epistemic interpretations of such sentences (at least in a certain technical sense of 'epistemic'). So, in order to do so, I continue to build the point that generics do not receive genuine doxastic interpretations.

First, if generics can have genuine epistemic readings, we should expect there to at least be a case where the only available reading of a generic is an epistemic one. That is, we need a case where the only available interpretation of a generic is under a doxastic *in view of* phrase. Let us consider a generic with such a doxastic conversational background:

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[21]Think of the sentences in (52) as being very much as bad as the following:

(57) Philosophers have wings.

(57) is plainly false and can only receive true readings under doxastic *in view of* phrases. And the likely reason (57) is judged to be false is because, uncontroversially, there is no non-doxastic *in view of* phrase that can make it true. The asymmetry between the sentences in (52) and (57) is that there are people out there who judge sentences in (52) as having reasonable interpretations.

(58) In view of what I believe, mosquitoes carry West Nile Virus.

This claim is true so long as an agent has the appropriate belief states. However, that the doxastic generic claim is true is entirely uninteresting. When we separate generics into true generics and false generics, we do not hold that this division at all depends upon belief states. If we did care about doxastic readings, then what it means to be a true generic is entirely trivial.

Another reason doxastic conversational backgrounds are irrelevant when theorizing about genericity is that such statements are akin to belief sentences:

(59) I believe that mosquitoes carry West Nile Virus.

The irrelevance is that belief sentences are not generic sentences: genericity does not survive through embedding under doxastic operators. We would not hold that the embedded proposition (whatever its underlying nature may be) is true just because the belief sentence is true. So, even having a case where the only available reading seems epistemic does not matter if we want to investigate whether generics can have genuine epistemic readings.[22]

Second, for further evidence, let us see if there can be genuine cases of faultless disagreement involving doxastic readings of generics. But as we have already observed, if a generic is true, it's true provided a suitable non-doxastic *in view of* phrase. So, whatever is going on with disagreement involving generics under doxastic *in view of* phrases is irrelevant and uninteresting. We can imagine two parties disagreeing over whether philosophers have red wings or blue wings, but we do not

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[22]Thank you to Quentin Pharr for discussion on this point.

take it that the disagreement has anything to do with the covert modality of generics; presumably it instead has something do with the false and irreconcilable beliefs of the two disputants. Additionally, let us consider a case of disagreement involving a true non-doxastic generic claim and a contrary doxastic generic claim. Suppose someone disagrees with 'Birds fly' and holds 'In view of what I believe, birds do not fly'. We take it that the former party is correct and the latter party is wrong. So, there is no interesting case of disagreement here that will tell us anything about whether generics can involve genuine epistemic modality.

Third, we should expect epistemic-*might* claims to be entailed by the apparent epistemic readings of generics. Consider the following sentence:

 (60) Dobermans have floppy ears.

On a doxastic construal of this sentence, we get an epistemic-*might* claim entailed in a non-generic environment. A non-doxastic construal of this sentence entails a *might* claim, but not an epistemic-*might* claim. For instance, we would get:

 (61) In view of evolutionary facts, it might be the case that Dobermans have floppy ears.

But this *might* is not an epistemic-*might*. So, epistemic-*might* claims do not follow from true generics.

4.2 On the lack of epistemic interpretations for weak necessity modals

Given the evidence that generics do not receive genuine doxastic interpretations, we want a view of the covert generic modality that allows us to block such interpretations. The weak necessity view is promising because there are independent arguments for the view that sentences with overt weak necessity modals do not receive genuine epistemic interpretations.

Yalcin (2016) has observed that *should* and *ought* do not admit of genuine epistemic readings, and makes a strong case for this.[23] Let us consider his example:

> Consider a case which many would, at least initially, take as drawing out the putative epistemic reading of the English modals *ought* and *should*. Suppose Jones is in a crowded office building when a severe earthquake hits. The building topples. By sheer accident, nothing falls upon Jones; the building just happens to crumble in such a way so as not to touch the place where he is standing. He emerges from the rubble as the only survivor. (Yalcin 2016, 231)

After the incident, suppose Jones says either:

(62) I should be dead right now.

(63) I ought to be dead right now.

In such situations, we do not have standard circumstantial readings of (62) and (63). These utterances

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[23]This observation is anticipated by Copley (2004, 2006).

do not involve considering, say, certain deontic or bouletic preferences. Given the unavailability of other readings, it looks plausible that what we have here are paradigmatic cases of epistemic readings of (62) and (63). If there's an epistemic reading here, it would be reasonable to expect that epistemic readings of the weaker modals *might* and *may* are entailed–but this is not the case:

(64) # I might be dead right now.

(65) # I may be dead right now.

These sentences appear defective in the context as described. As Yalcin notes, a sentence which entails a defective sentence is presumably itself defective. However, Jones's utterances do not appear defective, so we should not think that (62) and (63) entail (64) and (65). This brings some support to the claim that there is no genuine epistemic reading of either (62) or (63).

Additionally, a modal which would be uncontroversially epistemic could not be used here either. Consider:

(66) # I am probably be dead right now.

These data points work as evidence for the idea that *should* and *ought* do not have true epistemic readings. On their own, we don't, however, get a full defence of the claim that these modals can *never* get genuine epistemic readings. For that discussion, I refer the reader to Yalcin (2016); here my interest is only to present the motivating evidence.

Generics and sentences with overt weak necessity modals share the feature that they do not take

genuine epistemic readings. There are independent, yet related, reasons for why both types of sentences do not take such readings. This parallel gives support to the view that the covert generic modal is a weak necessity modal.[24] Now, we move on to use these observations and parallels to motivate a theory.

5 Weak necessity semantics for generics

The evidence presented in this paper challenges the standard modal analysis of GEN and points to the view that generics involve covert weak necessity modals. In this section, I give a sketch of a theory of generics based on a covert weak necessity modal operator. This is motivated in light of the various parallels that we have observed throughout the paper between generics and sentences containing overt weak necessity modals. After this, I go on to discuss various cases of interest.

The main contrast between the approach offered here and the standard approach will lie in an account of the difference between weak and strong necessity modals. I will follow von Fintel & Iatridou (2008) on their account of weak necessity modals. This will inform our theory of the covert generic modality. The main idea behind the proposal of von Fintel & Iatridou (2008) is that weak necessity modals arise from the promotion of a secondary ordering source of a strong necessity modal. In particular, the idea is that strong necessity modals tell us that the prejacent proposition is true in all of the preferred worlds; weak necessity modals tell us that the prejacent proposition is true in all of the best of the preferred worlds. In this way, weak necessity modals carve out a finer portion of the modal base due to a secondary ordering source.

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[24]Additionally, note that it is widely acknowledged that *must*, as it occurs covertly in conditionals, can take epistemic readings, but generics can't–so there is also general pressure against the idea that we should see generics as conditional sentences in the usual sense.

Following this account of weak necessity modals, the guiding idea, here, will be that the generic covert modal is sensitive to two ordering sources: a primary ordering source and a secondary ordering source. The former ordering source will be given by the proposition picked out by an *in view of* phrase; the latter ordering source is determined by an additional measure.

Thus far, we have observed the various ways in which generics get their domains restricted by *in view of* phrases. These free relative clauses that we supply come with a proposition that helps us specify a modal base and allows us to impose an ordering on the set of worlds in question. For instance, we are able to specify different conversational backgrounds for a given generic:

(67)   a. *In view of their DNA*, birds fly.

      b. *In view of scientific testimony*, birds fly.

      c. *In view of their dispositions*, birds fly.

The information, however, given in the free relative clauses in (67) will not be enough for our purposes. These clauses give us what is required to restrict the domain of a strong necessity modal. The intuitive way of determining the truth conditions based on what is given in (67) will be to take the contextually determined best worlds and see whether in all of those words the prejacent is true. A further restriction will give us weak necessity, which will give us what we need to capture genericity.

The subsidiary ordering source, from a cross-linguistic perspective, according to von Fintel & Iatridou (2008), can be brought about by counterfactual marking. They claim that in a wide variety of languages, counterfactual morphology, in combination with a strong necessity modal, returns a construction that is semantically equivalent to the English *ought*. Generics do not manifest themselves

with overt modal lexical items, so the strategy here will be to introduce some counterfactual marking to help us capture the secondary restriction.

Another precedent for introducing counterfactual marking as a way to interpret sentences containing weak necessity modals comes from Yalcin (2016). At least in the cases where a weak necessity modal takes a non-genuine epistemic reading, the suggestion is that it receives a reading that has something to do with the way things *normally* unfold.[25] Recall either utterance of Jones after the earthquake:

(68) I should be dead right now.

(69) I ought to be dead right now.

Roughly, the idea is that the interpretation of these sentences is somehow restricted according to normality, in some sense or other. Furthermore, an initial gloss of the relationship between weak necessity modals and normality is given as follows:

(70) α should/ought to F $\approx$ It is normal for α to F

However, the problem with this gloss is that it would be odd for Jones to say:

(71) # It is normal for me to be dead right now.

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[25] Although Yalcin's suggestion was, in particular, about non-genuine 'epistemic' readings of *should* and *ought*, I think that the point here generalizes.

But (71) does sound better when adding some standard counterfactual morphology:

(72) It would be normal for me to be dead right now.

Then, following Yalcin (2016), a better gloss of the relationship between *ought*/*should* and normality is as follows:

(73) α should/ought to F ≈ It would be normal for α to F

We can then use (73) to make manifest an overt construal of the affect of a secondary ordering source:

(74)   a. In view of their DNA, *it would be normal* for birds to fly.

      b. In view of scientific testimony, *it would be normal* for birds to fly.

      c. In view of their dispositions, *it would be normal* for birds to fly.

The counterfactual morphology present in (74) represents a further restriction which then allows the modal to quantify over the very best of the worlds picked out by the various *in view of* phrases. We, then, check whether in this more restricted set of worlds whether the prejacent holds. Additionally, and crucially, the subsidiary restriction may rule out the actual world, thus allowing for the coherence of the idea that it would be normal for birds to fly but that a given actual bird does not fly; this helps make sense of the fact that generics grant exceptions.

It is also important to note that, strictly speaking, the subsidiary restriction need not be a normality restriction. What we need is a sort of way of putting the restriction which serves the function of providing a counterfactual displacement which may remove the actual world from the information states relevant to assessing the truth-conditions. To illustrate the point, let us have a look at the following generics:

(75) a. Oysters make round pearls.

b. Scots wear kilts.

c. Stealing is wrong.

d. If you make a promise, you should keep it.

Now, we consider the generics in (75) supplemented by the counterfactual morphology which makes the subsidiary ordering source overt:

(76) a. *It would be ideal* for Oysters make round pearls.

b. *It would be ideal* for Scots wear kilts.

c. *It would be ideal* not to steal.

d. If you make a promise, *it would be ideal* for you to keep it.

These ways of putting the restrictions on the modal base in (76) are preferred over normality restrictions. Consider (75)a. It appears as though many oysters produce pearls that are not perfectly round. At least in some sense, a normal pearl is one that is not perfectly round. A way to pick out the pearls of interest is to pick out certain *ideal* ones like we have in (76)a. The idea, then, is that we are

likely talking about *ideal* pearls when we use (75)a. Similar remarks apply for (75)b. It isn't quite *normal* for Scots to wear kilts, though restricted in various ways to certain cultural ideals we get the worlds where the prejacent holds. Now consider the moral principles in (75). Taking for granted the idea that moral principles are like generics, the more suitable way of capturing their genericity is by selecting the ideal world where the right conditions hold, that is, worlds where the circumstances are such that there are no cases of stealing which are morally permissible.[26] It is true that, normally, stealing is wrong, but we can more aptly capture the moral content of the generic with (76)c. Similar remarks apply for the conditional construction in (76)d. This way of putting things does a much better job at capturing the moral content than an overt appeal to normality. We would have 'If you make a promise, then it would be normal for you to keep it', but, when phrased this way, doesn't quite do the job we want.

One can think of using 'it would be ideal' to capture the additional restriction as having something to do with normality in some broader sense. That is, we can think of this way of capturing the restriction as isolating a particular sense of normality. It is convenient, though, in my mind, perhaps not entirely essential to think of the further required restriction in this way.

Here is another way to think about the additional measure provided by weak necessity modals. A suggestion from von Fintel & Iatridou (2008) is to construe things in a metalinguistic fashion. Consider:

(77) If we were in a context in which the secondary ordering source were promoted, then it would be a strong necessity that...

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[26] For further evidence and discussion of the claim that moral principles are generics, see Thakral (2019).

It is useful to compare this to a move by Nickel (2016) who suggests adding a counterfactual element into the semantics of generics, along with a reference to normality. One way of doing this, Nickel suggests, is to take a generic like 'Lions have four legs' and interpret it as follows:

(78) If there was a lion that was normal with respect to the number of legs for lions, then all lions that are normal with respect to the number of legs for lions would have four legs.

The idea we are after in capturing *weak* necessity is that the weak necessity results from embedding a strong necessity claim in a counterfactual environment.[27] The counterfactual embedding is what can move the world of evaluation away from the actual world. The *in view of* phrase places the restriction over the strong necessity claim. And the counterfactual restriction places a further restriction on top of this.

Generics work in the very same way. Their initial restrictions come from *in view of* phrases. We have seen that such phrases play the role of determining different readings for a given generic. This is because, at least with non-doxastic conversational backgrounds, we are able to specify contexts that affect the interpretation of a given generic. And, as we have seen, genericity, just like with sentences containing overt weak necessity modals, comes with an additional proviso: we not only select the best worlds given the conversational background, we select the best of these best worlds. This is the main idea behind the proposal. The best of the best worlds are the worlds determined by some sort of additional measure based on normality or ideality.

I close this section by discussing how the theory sketched here might approach various more problematic cases of generics. In particular, we will consider cases of generics which appear true yet

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[27]See also Silk (forthcoming) for comparison and further discussion.

the prejacent holds only for a minority; we will also consider cases of generics which appear false yet the prejacent holds for a majority of instances.

First, the majority cases. A paradigm example of the kind of generic I have in mind is 'Books are paperbacks'. The standard suggestion is that such generics are false; the weak necessity view can help us see why this is so even though the majority of books are paperbacks. If we attempt to make the ordering sources overt, then we could have something like:

(79) In view of bookbinding practices, it would be normal for books to be paperbacks.

The basic idea is that we consider the set of worlds where a certain kind of bookbinding practice is held fixed (presumably one where many of the books are produced in paperback form). And then we consider a set of these worlds based on whatever ideals or norms we are apt to associate with books. But in this set of worlds it is not the case that it is considered normal for a book to be paperback. So, according to the weak necessity view, when we feed in information pertaining to norms and ideals, we would predict that 'Books are paperbacks' is false. The weak necessity restriction allows this sentence to be false no matter how prevalent the relevant bookbinding practices are.

Second, the minority cases. Examples of cases I have in mind are sentences such as 'Mosquitoes carry West Nile Virus'. One feature of this generic is that it does not easily appear to take a genuine non-doxastic reading. This is partly why this sentence is associated with a weak inferential profile. But there is the more obvious weakness that very few mosquitoes actually have the virus. What the weak necessity view has to offer is that it could capture such weakness. In particular, it captures the idea that it's false that many actual mosquitoes carry West Nile Virus, yet, at the same time, it's true that, in some sense, they ought to be carriers of the disease. Perhaps a plausible reading for

the generic claim could be that it's somehow reasonable to expect that mosquitoes are carriers of the virus. Indeed, the idea is that they are the very species that is a carrier of the virus. The weak necessity view is positioned to capture this kind of intuition because of the nature of displacement associated with weak necessity modals. We pick out a suitable *in view of* reading and then consider a weak necessity restriction which asks us to consider norms and ideals. Weak necessity modal claims do not depend on actual circumstances; they instead very much depend on the ideals and norms we are apt to associate with these sentences–and this could give some leverage in the case of weak generics.

6 Conclusion

I have defended the claim that the generic covert modality is a weak necessity modal. The distributional parallels between generics and sentences containing overt weak necessity modals point us to this view. In light of these parallels, I have presented a new way of thinking about the generic covert modal as a weak necessity modal and discussed how this would approach various cases of generics. The hope is that we have made some progress in both our understanding of generics and of weak necessity modals. There is much more to be said on understanding genericity in terms of weak necessity, and there is much more to understand about weak necessity. I leave this for future work and other researchers.[28]

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