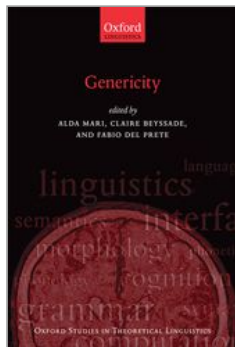


# More Truths about Generic Truth \*

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## Genericity

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## More Truths about Generic Truth \*

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### Abstract and Keywords

In Pelletier and Asher (1997) we presented a modal conditional analysis of the semantic interpretation of characterizing generics (in the terminology of Krifka et al. 1995). Since that time there have been a number of advances to our understanding of this area: Cohen (1999a,b, 2005), Leslie (2007, 2008), Nickel (2010), Sterken (2009). However, some of these advances have been seen as overthrowing the modal conditional analysis, and we think this is not correct. The present paper is a defense of the modal conditional analysis when it is augmented with information about prosody.

*Keywords:* modality, conditionals, semantic interpretation of characterizing generics

## More Truths about Generic Truth \*

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### 12.1 Introduction: the view of Pelletier and Asher (1997)

One prominent interpretation of sentences containing bare plurals in English has a characterizing property be ascribed to a set of individuals. Thus,

(1) Dogs bark.

is seen as attributing the property of barking to the set of dogs—in a characterizing manner, as described in Krifka et al. (1995). Asher and Morreau (1995) argued that such interpretations could be captured by a modal quantifier which they defined in a first-order modal language using a weak conditional (symbolized  $\rightarrow$ ) and the ordinary universal quantifier ( $\forall$ ). So the sentence (1) was offered the following logical form:

(2)  $\forall x(\text{Dog}(x) \rightarrow \text{Bark}(x))$

In words, this logical form predicts (1) to be true whenever anything that is a *normal* dog barks. They also proposed that the consequent of the  $\rightarrow$  conditional could also have a similar quantification over events—for example, (1) could look like

(3)  $\forall x(\text{Dog}(x) \rightarrow \forall e(C(e) \rightarrow \text{Bark}(x, e)))$ ,

where  $C(e)$  stands for something like ‘ $e$  is a circumstance appropriate for barking’. We elaborated and defended this approach in Pelletier and Asher (1997). We argued that the defeasible inferences that generic statements license strongly supported the modal quantifier approach using  $\rightarrow$ ; Asher and Morreau (1991) developed a non-monotonic logic based on  $\rightarrow$ ; Pelletier and Asher (1997) expanded the formal development, while subsequent empirical work (by Elio and Pelletier (1996), Pelletier and Elio (2005)), showed that reasoning patterns with generics patterned with those predicted by the non-monotonic consequence relation defined using  $\rightarrow$ .

There have been critics of the general approach taken in Pelletier and Asher (1997), and we wish to defend and expand that theory against some of these (p.313) criticisms, and to incorporate some new developments in order to provide responses to others.

## 12.2 Challenges

Since those days, the literature has seen much further work on generics. In particular (Ariel Cohen 1999a, b, 2005) has developed a competing probabilistic account, motivated by several difficulties that have surfaced for our earlier analysis, some of which we had already mentioned in Pelletier and Asher (1997). One such problem has to do with the fact that many characterizing sentences seem to only hold of certain specifiable members of the kind picked out by the bare plural. Here are some examples that many writers have found to be troublesome. (The first is in Krifka et al. 1995, Pelletier and Asher 1997; and the second is due to Leslie 2008; various other writers have found this to be a difficult issue with which to grapple.)

(4)

- a. Ducks lay eggs.
- b. Cardinals are bright red.

The analysis offered for (1) in (2) or (3) appears to make the wrong predictions for such examples, in that it predicts that normal male ducks will lay eggs in the appropriate circumstances, or that female cardinals will be bright red in the appropriate circumstances.

We do think that such examples are a problem for our account, even though we never thought we were giving a complete analysis of the bare plural construction. Other putative difficulties, such as the presence of weak existential readings, have also been raised for our account, for which we are less convinced, however. Consider the following example also due to Leslie (2007, 2008):

(5) Mosquitoes carry the West Nile Virus.

The problem is that (5) may be true even if a vanishingly small percentage of normal mosquitoes carry WNV, which is contrary to what the semantics provided in (2) or (3) predicts.

We think, however, that our account can handle such examples, and we will discuss this below. We also believe that our view has been subject to misinterpretation as well, and so we will address these issues too. But we will in addition extend

## More Truths about Generic Truth \*

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the view: we believe that generics have a unified analysis, provided we make use of certain complex types discussed in Asher (2010).

### 12.3 Defending generics as modal quantifiers

Our semantics for generic characterizing sentences of the form  $\phi$ 's  $\psi$  quantifies overall elements of a constant domain. However, the consequent  $\psi$  of the universally (p.314) quantified conditional  $\forall x(\phi \rightarrow \psi)$  is evaluated relative to each individual  $a$  **only** in those worlds where  $a$  is assumed to be a normal  $\phi$ . This makes a difference to how generics are evaluated:

- (6)
- a. Ravens are normally black.
  - b. This machine crushes oranges.

Even in worlds where all the ravens happen to be red, (6a) can be true, if those worlds are embedded in the right modal structure—that is, if for any object  $b$  and every world  $w$  that is a normal 'b-raven' world,  $b$  is black in  $w$ . A normal 'b-raven' world is one where  $b$  is a normal raven, and has the properties of a normal raven.

The modal semantics above thus relies on what are the most normal  $\phi(a)$  worlds for each  $a$  in the domain, where  $\phi$  is the antecedent of the  $\rightarrow$  conditional. (This is as opposed, say, to an account where *all* the  $\phi$ 's are normal.) To see what is happening more generally, and to forestall certain objections, let's consider what is happening when we evaluate a sentence like

- (7) Penguins don't fly.

and look at Opus the penguin. Here we are *not* considering what is a normal-Opus world; we are evaluating instead whether in the normal *Opus-penguin* worlds, Opus flies or not. And we do this for each object in the domain. Of course, in such worlds Opus is also a bird, due to taxonomic facts. But the normal Opus-penguin worlds are not normal Opus-bird worlds, at least not if the generic

- (8) Birds fly.

## More Truths about Generic Truth \*

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is taken to be true. There are normal Opus-bird worlds too, but in those Opus is definitely not a normal penguin.

The notion of what is a normal  $\phi(a)$  world has some 'give' to it. Consider

(9) Turtles live to be 100.

Suppose we want to evaluate (9). So consider Tim and any normal Tim-turtle world. There are several ways in which we could think of such worlds. One is from the Aristotelian perspective of what is the natural 'telos' of a turtle: if everything goes right or normally for a given turtle, then he lives to be 100. This perspective would make (9) true. On the other hand, if we consider the way life proceeds for a turtle based on statistics for turtles in our world, another way of construing normality, then matters are rather more grim for Tim. Most turtles actually die within a few hours of being hatched. This way of construing normality would make (9) false at the actual world. A variety of contextual factors, including preceding discourse, typically fixes or at least precisifies the sense of normality at issue.

We think that this 'give' in the notion of normality is a virtue of our account. Research in recent years, as we'll see below, has uncovered many cases that show that (p.315) the truth conditions for generics have a related kind of 'slop' to them. We think that this slop is correctly located in the notion of what is a  $\phi(a)$ -normal world.

This understanding of the generic quantifier also enables us to steer clear of a problem with comparatives. Consider (from Nickel 2010a)

(10) Girls do better in school than boys.

One paraphrase for this sentence is:

(11)  $\forall x \forall y ( \text{girl}(x) \wedge \text{boy}(y) \rightarrow x \text{ does better than } y )$

But in fact there are a number of paraphrases for this sentence, which are all subtly different from one another:

## More Truths about Generic Truth \*

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(12)

- a.  $\forall x \forall y ((\text{girl}(x) \ \& \ \text{boy}(y)) \rightarrow x \text{ does better than } y)$
- b.  $\forall x (\text{girl}(x) \rightarrow \forall y (\text{boy}(y) \rightarrow x \text{ does better than } y))$
- c.  $\forall x \forall y (\text{boy}(y) \rightarrow (\text{girl}(x) \rightarrow x \text{ does better than } y))$

(11) provides the truth conditions of the following sort.

Consider any two people  $a$  and  $b$  and any world  $w$  where  $a$  is a normal girl relative to the world of evaluation. Then in any world  $w'$  where  $b$  is a normal boy relative to  $w$ ,  $a$  does better than  $b$  in  $w'$ . These conditions are relatively weak: they say that (10) will be true just in case for each  $a$  and  $b$ , in all the  $b$ -normal boy worlds determined by the  $a$ -normal girl worlds,  $a$  does better than  $b$ . Because of the way we understand our quantifier and our  $\rightarrow$  operator, this certainly doesn't entail that all the normal girls in some world do better than all the normal boys. Instead, and with some simplifying assumptions, it entails that in the Bob-normal-boy worlds, Alice (who we can assume is a normal girl there) will do better than Bob. But in the normal-Alice-girl worlds, Alice may in fact do worse than many boys, even normal ones (with respect to the world of evaluation). In fact, Alice will do better than all the normal boys (as well as the really bad boys) in only the normal boy worlds relative to any given normal-Alice-girl world.

(12)a gives us slightly different truth conditions. It looks at pairs of objects  $\langle a, b \rangle$  and worlds where  $a$  is a normal girl and  $b$  is a normal boy. It implies that in such worlds  $a$  does better than  $b$ . Once again this is compatible with the fact that Alice does worse in a normal-Alice-girl world than lots of boys. But in those worlds she will do better than all the normal boys. That is, in worlds where Alice does worse than a single boy, she's not a normal girl. These conditions may be too strong for many normal understandings of (11). (12b) is slightly different: for all  $a$ -normal-girl worlds  $w$ , any object  $b$  in a normal- $b$ -boy world  $w'$  with respect to  $w$  does less well than  $a$  in  $w'$ . The truth conditions of this paraphrase are close to those of (11). *Mutatis mutandis* for the other logical forms.

One might instead think that (10) actually is an 'extensional' claim about averages: in school, the average girl does better than the average boy. (Or, what might be a different, yet still 'extensional' claim, the average schoolgirl does better in school than (p.316) the average schoolboy.) Here it may be understood not as a generic, because what might be asserted

## More Truths about Generic Truth \*

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by (11) is merely that there is some ‘accidental fact’ concerning girls, boys, and their academic successes. As our account stands, it is difficult to tie our truth conditions together with this type of ‘extensional’ conception of averages. But if one does have a feeling as one of us does (see Carlson and Pelletier 2002) that sentences like (10) talk about averages, then this might tell us something about how such normal girl and boy worlds are related. As a generic sentence about averages, as opposed to the ‘accidental and extensional’ reading just discussed, (11) *does* say something about the underlying natures of schoolboys and schoolgirls. It says that in every normal schoolgirl-and-schoolboy world, girls do better in school than boys, although it still does not follow that there is a world in which every schoolgirl does better in school than any schoolboy.<sup>1</sup> But of course, this is not in accord with our account, since our account relied on finding an *individual*, and then looking at normal worlds where that individual has a certain property. The truth of a generic statement, which has a universal quantifier, was predicated on being able to investigate whether every instance of the subject term will have that property. It does not seem straightforward to accommodate averages within that framework.

### 12.4 A modality or a probability?

Ariel Cohen (1999a, 1999b, 2005) has argued that it is probability rather than modality that should form the basis of the semantics of generics, at least, for ‘absolute generic sentences’. In these cases, Cohen proposes (roughly) that *A’s B* is true just in case the probability of an arbitrary *A*’s being a *B* is greater than 0.5, where *an A’s being a B* is understood in terms of conditional probability. (Cohen’s ‘relative generic sentences’ are treated differently, making use of a set of alternatives, which we will discuss shortly). We, following the overwhelming opinion in the history of the literature, have already presented examples that preclude a probabilistic semantics for generic sentences, if probabilities here are defined in terms of limiting frequencies of the ratio of *A*’s and *B*’s to *A*’s *in the world of evaluation*. Examples of this kind are:

(13)

- a. This machine crushes oranges.

## More Truths about Generic Truth \*

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b. Kim handles the mail from Antarctica.

If probabilities are understood as measures over *worlds* in the sense of Lewis, then in fact this is another modal approach. To make matters a little more precise, we might suppose that conditional probabilities are defined as follows: (p.317)

- For an arbitrary formulas  $A, B$  with one free variable and arbitrary object  $a$ :

$$\Pr(B(a)/A(a)) = \frac{\mu(\|A(a) \wedge B(a)\|)}{\mu(\|A(a)\|)}$$

where  $\mu$  is a measure over sets of worlds that validates the ordinary probability axioms.

This modal probability approach can be understood as a very weak conditional, which we'll call a Cohen conditional. Conditionals normally quantify universally over some set of possibilities singled out by the restrictor, perhaps in conjunction with contextual factors. The 'probability conditional' in effect holds if just over half of the possibilities picked out by the antecedent verify the consequent. There are many difficulties with this view. The first is that it seems just too weak. Let's suppose that for instance the normal cases or relevant possibilities as far as cats are concerned are such that in 50.05 percent of them cats have tails. We can make the number arbitrarily close to 50 percent; our intuitions say that in this case, the generic *cats have tails* isn't true. As another example consider a slightly biased coin that comes up heads 50.00000001 percent of the time. The probabilistic account predicts that *this coin normally comes up heads* is a true generic. This can't be right according to our intuitions. Generic truths are a lot closer to modally necessary conditionals than this. The weakness of the probabilistic conditional also makes it fare very poorly in validating the defeasible inference patterns that are a prominent feature of our use of generic statements (Pelletier and Asher 1997). The probabilistic account translates the premises of the following intuitive argument *Birds fly, Tweety is a bird. So Tweety flies (normally)* as *Tweety is a bird* and *The conditional probability of an  $x$ 's flying given that  $x$  is a bird* 0.5, which we might 'Cohen translate' as *It's more likely that a bird flies than not*. It's empirically attested that people don't draw the same inferences with the probabilistic axioms; in particular they don't draw the inference that Tweety flies, whereas they do with the generic form. Given a standard conception of modal



## More Truths about Generic Truth \*

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validity, the Cohen translation is clearly invalid, and it's not at all clear how to adapt the semantics to capture uncertain inference.<sup>2</sup> As well known from the work on conditionals by Adams and Pearl (Adams 1975; Pearl 1990), the only way to have a sporting chance of modeling these common-sense reasoning patterns using probabilities is to use non-standard probabilities in which probabilities can have infinitesimal values. This makes the probability account for generics very close to an account for *if-then* conditionals, which we don't think is right either. And even then, one has to do some work on orderings, to get the reasoning to work out properly (Pearl 1990; Adams 1975); and in any case this makes the probabilistic semantics for generics too strong (it validates Modus Ponens, whereas generics only validate Defeasible Modus Ponens). In comparison, the modal approach to generics is built to handle common-sense inference.

(p.318) There is also the well-known problem that the assignment of probabilities to formulas cannot be done in a compositional fashion due to the dependence of one formula on another. That is, the probability assignment to  $Pr(a \wedge b)$  cannot be defined in terms of  $Pr(a)$  and  $Pr(b)$ , but rather also needs a statement of the amount of independence between  $a$  and  $b$ . We already think these arguments are damaging enough to any attempt to carry through a probabilistic semantics for generics.

A final difficulty has to do with embedded generics. Like conditionals, generics embed easily within other generics:

(14)

- a. People who go to bed late don't get up early.
- b. Dogs chase cats that chase mice.

We take these to be examples of embedded generics. In the first case, we have a generic embedded within the 'antecedent' of another while in the second, we arguably have a generic embedded within the 'consequent' of another generic. It's unclear how a probability approach can interpret these embedded cases properly. To evaluate embedded generics, we have to understand the conditional probability of a certain conditional probability statement dependent upon other information.

## More Truths about Generic Truth \*

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A seductive way to interpret some embedded generics is to use conditionalization, which is the following rule.

$$\bullet Pr(A \supset B|C) = Pr(B|A \wedge C)$$

Conditionalization gives a plausible probability assignment to generics that contain other generics embedded in their consequents—i.e. generics of the form  $C \supset (A \supset B)$ . Using conditionalization, however, Milne (2003) gives a very simple proof of the result known as Lewis's triviality result for conditionals, showing that conditionalization implies that the conditional probability function is two-valued (its value is either 0 or 1), whenever  $0 < Pr(A) < 1$ . Using conditionalization, Cohen truth for generics has the following disastrous consequence:<sup>3</sup>

**Fact 1** Assuming conditionalization, no generic  $A \supset B$  is Cohen-true unless the strict conditional  $\Box(A \rightarrow B)$  is also true, if  $0 < Pr(A) < 1$

Cohen does not adopt conditionalization; he simply takes embedded generics to contribute their truth conditions to the top or the bottom of the conditional probability. So we have higher-order probability statements such as  $Pr(x \text{ gets up late} \mid C(x) \wedge x \text{ normally goes to bed late}) = 0.5$ . While technical systems of higher-order probability exist (Gaifman, 1986), they have a clear epistemic interpretation, according to which (p.319) higher-order probabilities reflect our confidence on lower-order probabilities in a partial state of knowledge. We think that higher-order probability is a potentially interesting and useful concept, but it seems far away from the semantics of generics. If we take the modal account of probability sketched above (which we take the most plausible account of probability for the semantics of generics), second-order epistemic notions seem to have little place. The probability measures involved are 'objective'; and all probability statements are evaluated with the best available means and thus given highest (or lowest) probability. Thus, all higher-order probability statements are trivial in that they take values of 0 or 1.<sup>4</sup> That is,  $Pr(Pr(a \supset \alpha) \supset \alpha) = 1$  or 0, for all  $a$  and all  $\alpha$ . What does this tell us about embedded generics? Given that probability distributions are established facts, then conditionalizing on any information whatsoever won't change them. So for any  $a, b, c$ ,  $Pr(Pr(b|a) \supset 0.5|c) = \frac{Pr(Pr(b|a) \supset 0.5 \wedge c)}{Pr(c)} = 1$  or 0, depending on whether  $Pr(b|a) \supset 0.5$  or not. And conditionalizing on

## More Truths about Generic Truth \*

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probability distributions, since they are established with certainty, is also equivalent to simply conditionalizing on  $\top$  if they are true and is undefined if they are false. This leads to another damaging trivialization result for probabilistic treatments of the semantics of embedded generics:

**Fact 2** Assuming higher-order probabilities and perfect information: (i) every embedded generic of the form  $C \text{ } (A \text{ } B)$  is Cohen-true if  $A \text{ } B$  is Cohen-true, for every  $C$ ; (ii) every embedded generic of the form  $(A \text{ } B) \text{ } C$  is defined only if  $A \text{ } B$  is Cohen-true. So, assuming that the embedded generic is defined,  $(A \text{ } B) \text{ } C$  is true if  $C$  is true.

In order to make a plausible higher-order probability logic for generics, we would have to assume that somehow the probability measure is sensitive to a world of evaluation which could take into account the information upon which we are conditionalizing. Thus, a conditional probability  $\Pr(a|b)$  would be given relative to the probability function for worlds in which  $b$  was true. So,  $\Pr(a|b) > 0.5$  would hold if in all worlds  $w$  in which  $b$  is true,  $\frac{\mu_w(\|a \wedge b\|)}{\mu_w(\|b\|)} > 0.5$ . This would in principle give us the variability needed in the measure function to give a non-trivial account of embedded generics, if  $a$  and  $b$  are allowed to range over not only first-order statements but also over probability statements as well. But we are somewhat at a loss to explain how the measure functions vary and how conditionalizing on an ordinary event can affect a probability statement, unless we take a subjective view as Gaifman counsels. But a subjective view of higher-order probability just isn't very plausible for embedded generics: we are not shifting our confidence in a probability statement given knowledge of certain facts when evaluating an embedded generic; we are saying that the generic is true given certain facts. Indeed, we don't think that a subjectivist view of probabilities makes (p.320) much sense of *un* embedded generic statements either. And the empirical evidence shows that ordinary speakers treat probability statements and generic statements very differently.

To sum up, we see little to attract us to a probabilistic interpretation. It has no advantages over a modal approach; in fact its only plausible interpretation is just a very weak modal conditional and the resulting truth conditions for generics are too weak to be plausible. In addition it fails to support the sort of reasoning attested concerning generics. Finally, embedded

## More Truths about Generic Truth \*

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generics seem to pose insuperable problems regardless of whether one adopts conditionalization or a higher-order probability approach.

### 12.5 Building logical forms for generic sentences

Generics give rise to a wide range of different readings, according to the intuitions of many researchers on the subject. This could be grounds for despair on the part of logically minded compositional semanticists. But it is also grounds for suspecting that there is a fair amount of 'looseness' with which the bare plural in English combines with its predicate in a generic statement.

As has been evident from the beginning of formal semantic research on generics (Carlson 1977a and probably before, as in the work of Lawler 1972, 1973a, b), bare count plural nouns support both kind-level predications and individual-level predications:

(15)

- a. Dinosaurs are extinct.
- b. Ducks are widespread throughout Europe.
- c. Ducks lay eggs.

The felicitousness of 'copredications' like (16) involving kind and individual predications show that these readings must be simultaneously available for a bare plural noun.<sup>5</sup>

(16) Ducks lay eggs and are widespread throughout Europe.

Predicates like *are widespread* or *are extinct* require kinds as their arguments, while plausibly *lay eggs* or *smoke after dinner* are predications over members of the kind.<sup>6</sup> Asher (2010) provides a formal analysis of terms that happily accounts for such copredications, by developing a theory around a new sort of type constructor,  $\bullet$ . The type  $a \bullet b$  means that a term so typed has (at least) two aspects, one of type  $a$  and one of type  $b$ . Such a term can thus combine with predicates that demand either type of their arguments.<sup>7</sup>

Asher (2010) assumes as a hypothesis that all nouns are  $\lambda$  terms whose  $\lambda$  bound objectual variable has the KIND  $\bullet$  INDIVIDUAL type. Which type gets selected for the noun will

## More Truths about Generic Truth \*

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depend on the predicate to which it forms an argument. We also posit a null quantificational element, which could either be a null determiner or a silent generic quantificational adverb that may combine with a bare plural, when the latter provides material for the restrictor of the quantifier. As we will see below, there is some delicacy as to when a bare plural provides the restrictor of our quantificational element; discourse and prosody are important elements in shaping the restrictor of our quantifier. The null determiner or quantificational element is itself underspecified or of polymorphic type (appealing again to the framework of Asher 2010), taking one of two forms depending on whether its input from the NP is typed KIND (K) or INDIVIDUAL (I). To say that the determiner has a polymorphic type means that its exact value will depend on the type of the variable that it binds. This type is given to the variable by the NP. In the case where the input is of type K, the determiner will look like that given by a proper name: it is of the form  $\lambda PP(c)$ , where  $c$  is of type K. When combined with a noun like DOG whose type has been assigned K, we get  $\lambda P P(d)$  for the DP.

On the other hand, in keeping with our earlier work (Pelletier and Asher 1997), we will assume that when the determiner or quantificational element has a property expression over elements of type I, it has at least roughly the form of a universally quantified defeasible conditional, of the form  $\lambda P \lambda Q \forall x (P(x) \rightarrow Q(x))$ . When combining with a property of individuals, this yields the usual sort of quantifier from Pelletier and Asher (1997). In the type-theoretic formalism, this is not a coercion but a *specification* of the meaning of the null determiner in the bare plural DP. Coercions of the sort studied in the literature usually involve a type clash; a predicate demands one type of its argument, while the argument supplies an incompatible type. For instance, *enjoy* requires of its internal argument that it be of type EVENTUALITY, but in *enjoy the book* the type of *book* is not an eventuality—in this case, we appeal to mechanisms of coercion to ‘adjust’ the types to get conversion to take place. We see no reason to posit any type incompatibility between the type demanded by a null determiner and the type of its argument. Underspecification and polymorphism seem the natural way to go.

## More Truths about Generic Truth \*

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We are not done yet, however, in specifying the logical form for a generic. There are well known and mostly accepted existential readings for generics as in (17b) or in at least one reading of sentences like (17a) (the one that is more prominent when prosodic stress is placed on *typhoons*).<sup>8</sup>

(p.322)

(17)

- a. Typhoons arise in this part of the Pacific.
- b. There are firemen available.

Though we agree that such readings exist, we doubt that this forms a distinct translation of the null determiner. Our reason for thinking this has to do with the large array of weak generic readings that have been observed in the literature. We think that in fact all of these involve some particular rearrangement of what content goes into the restriction on the modal quantifier we use to analyze characterizing sentences.

Let us look at this question of the division of content in a bit more detail. It has long been noticed that prosody affects the division of content into nuclear scope and restrictor with regard to generics, and this is something that Cohen has rightly made a prominent part of his work. Research on prosody and generics suggests that what is in focus should go in the nuclear scope of focus-sensitive constructions, while what is backgrounded should go in the restrictor. We'll call this *the Standard Prosodic Hypothesis*. Cohen's proposal, which strikes us as reasonable, is that generics are like other focus-sensitive constructions, and so the restrictor should involve reference to the alternatives of the prosodically prominent element. We follow this line of thought in the analyses of the sentences below.<sup>9</sup> We informally employ 'Alt(x, c)' to indicate the set of alternatives to 'c'. The set, as usual, includes 'c'. As we say, we leave matters somewhat informal: for instance, we do not worry about the type of the members since the intent will always be obvious. (See the use of this in (20b).)

(18)

- a. Typhoons arise in this part of the PACIFIC.

## More Truths about Generic Truth \*

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b.  $\forall x, y((\text{typhoon}(x) \wedge x \text{ arise in } y) \supset \text{this part of the Pacific}(y))$

In words, if  $x$  is a typhoon then it normally arises in this part of the Pacific.

(19)

a. TYPHOONS arise in this part of the Pacific.

b.  $\forall P(P(\text{this part of the Pacific}) \wedge \text{Alt}(P, \text{typhoons arise in})) \supset \lambda x \exists y(\text{typhoon}(y) \wedge y \text{ arise in } x) = P$

In words, in this part of the Pacific, normally there are typhoons.

(20)

a. John drinks BEER.<sup>10</sup>

b.  $\forall y(j \text{ drinks } y \wedge \text{Alt}(y, \text{beer})) \supset \text{beer}(y)$

In words, if John drinks something, it's normally beer.

c. John DRINKS beer.

(p.323)

d.  $\forall y, R((\text{beer}(y) \wedge Rjy \wedge \text{Alt}(R, \text{drinks})) \supset R = \text{drinks})$

In words, if John is doing something with beer, normally he's drinking it.

e. John DRINKS BEER.

f.  $\forall x, P((P(j) \wedge \text{Alt}(P, \text{drinks beer})) \supset P = \lambda x.$

$\exists y(\text{beer}(y) \wedge x \text{ drinks } y))$

In words, if John has some property that is a relevant alternative to drinking beer, it's normally drinking beer.

Importantly, these examples show that bare plurals like these that do not move out into a position that furnishes the restrictor of our quantificational element do not have a generic quantificational force. The question then is, what do such bare plurals contribute to logical form when they are in the nuclear scope of a generic quantifier? Perhaps the simplest option is to assume that they simply contribute a property. But as there is a type incompatibility between the property introduced by the bare plural and the type requirements imposed by the verb, the bare plural licenses a coercion in the form of an existential closure, allowing the property

## More Truths about Generic Truth \*

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introduced by the bare plural to combine with the rest of the material in the nuclear scope.

Postulating such existential closure yields an interesting consequence: the logical form (19) defeasibly entails an existential claim, namely that there are typhoons that arise there, once we assume, as is standard, that the alternative set of any property is non-empty and contains a property that actually applies to the object in question, in this case the object denoted by *this part of the Pacific*.

Purely existential generics may result in cases where the nuclear scope takes all the extant material in the sentence (what is known as an *all-focus sentence*), as seems to be the case with *Firemen are available* in those contexts where it has the existential reading. So what goes into the restrictor? We suppose that it's just the tautologous property  $\lambda u u = u$ , and that  $*(w, x = x) = \{w\}$ , for all  $x$ . In other words, logical truths do not determine any special set of normal worlds; they do not move us from the world of evaluation.

With these assumptions, a *non-defeasible* existential entailment follows for statements like (17b). We get the following logical form for (17b).<sup>11</sup>

$$(21) \forall y(y = y) \exists x(\text{firemen}(x) \wedge \text{available}(x))$$

Given our assumption that  $*(w, T) = \{w\}$ , (21) is equivalent to:

$$(22) \exists x(\text{firemen}(x) \wedge \text{available}(x))$$

Given the way we have treated generic quantification, we predict that there may be interesting interactions with quantificational adverbs. The quantificational adverbs may keep bare plural material in the nuclear scope as in (23) in which case, we could (p.324) get existential readings like those in (22). But there are also cases like (24) where the adverb and associated focus has a discourse role that allows the generic clause to have its usual modal quantificational reading (as noted by Sterken 2009).<sup>12</sup>

(23) Philosophers rarely smoke NOWADAYS.

(24) Lots of animals make good pets. For instance, DOGS make good pets.



## More Truths about Generic Truth \*

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The upshot of our proposals is that we do not need to assume that generics form a heterogeneous semantic class. Our modal logical form provides the basis for all the readings of generic sentences. The variation comes in how the restrictor of the generic quantifier is determined.

As is also well known, prosody also interacts with discourse structure, and this can affect the information partition for focus-sensitive expressions. For one thing, prosody and discourse can tell us what the alternatives are. In particular, in cases of parallelism and contrast, which also require prosodic prominence on the new or contrasting parts, the same new or contrasting parts typically constitute the elements of the alternative set used by the generic. For example, if one is building a contrast (p.325) between Australian snakes and South American snakes then prosodic focus will naturally fall on these DPs, which will constitute the alternative set that a focus-sensitive expression may use, whereas in another context, focus may well fall on the VP. More concretely, consider (the prosodically most prominent part is in capitals):

(25)

- a. Let's talk about Australian snakes. Australian snakes are POISONOUS.
- b. Let's talk about poisonous snakes. AUSTRALIAN snakes are poisonous but SOUTH AMERICAN snakes are not.

The truth conditions for (25a) would be those of (26a), whereas (25b) would have the truth conditions in (26b). (We now represent the alternative set explicitly via a disjunction, as does Cohen, for the sake of readability.)

(26)

- a.  $\forall x((\text{Australian snake}(x) \wedge (\text{poisonous} \vee \text{not-poisonous})(x)) \supset \text{poisonous}(x))$   
(More simply:  $\forall x(\text{Australian snake}(x) \supset \text{poisonous}(x))$ )
- b.  $\forall x(\text{snake}(x) \wedge \text{poisonous}(x) \wedge (\text{Australian} \vee \text{South American})(x) \supset \text{Australian}(x)) \wedge \forall x(\text{snake}(x) \wedge \neg \text{poisonous}(x) \wedge (\text{Australian} \vee \text{South American})(x) \supset \text{South American}(x))$

## More Truths about Generic Truth \*

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But there are stronger effects of discourse structure on information partition. In general the mapping from prosody to logical form is not a simple one. Consider the effects of discourse structure on focus-sensitive adverbs. Normally the prosodically most prominent part of a sentence serves as the nuclear scope for a focus-sensitive expression. However, discourse context can complicate the picture. In the examples below, we again mark the prosodically most prominent part of the utterance in small capitals.

(27)

- a. A: The graduate students made copies only for the PROFESSORS.
- b. B: No, it was the SECRETARIES who made copies only for the professors.

In (27b) above, the prosodically most prominent part of the utterance is actually serving a discourse function of ‘correcting’ what the speaker B takes to be false about A’s utterance. However, because of the semantics of the discourse relation correction, the nuclear scope of *only* in (27b) remains the professors. There have been many studies to show that there is secondary focus on *the professors* in (27b). This means that we should slightly modify our hypothesis about prosody and information partition.

**Definition 1. Modified Prosodic Hypothesis:** The nuclear scope of a generic must have some prosodic prominence and an exploitation of the alternative set suggested should be part of the restrictor.

We should expect then that discourse structure may affect logical form and hence truth conditions of generics. There is evidence that this is true. Consider: (p.326)

(28) AUSTRALIAN snakes are POISONous, ASIAN snakes are too.

We seemingly have a bad consequence here, if we were to attend only to the prosodic prominence on *Australian* and *Asian*, and assume that these must go into the nuclear scope. For this would predict that poisonous snakes are Australian and poisonous snakes are Asian, which entails that poisonous

## More Truths about Generic Truth \*

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snakes are both Asian and Australian, which is not what we want.

However, one must be careful how one gauges the semantic effects of prosodic prominence. The prosodic prominence on *Australian* and *Asian* in (28) is arguably there to make clear the two elements linked by the parallelism introduced by the adverbial *too*.<sup>13</sup> For this example, we hear in fact a double prosodic prominence in the subject of the first sentence: one prosodic prominence serves to mark the parallelism, and the other is used to determine the nuclear scope of the first generic; and the discourse parallelism carries over the structure of the first generic to the second. This gives us a logical form for the first sentence that is akin to (26a), and for (28) as a whole we get: normally, anything that is an Australian snake is poisonous and anything that is an Asian snake is poisonous too. Formally, the logical form looks like this:

$$(29) \forall x((\text{Australian-snake}(x) \vee \text{poisonous}(x)) \wedge \\ (\text{Asian-snake}(x) \vee \text{poisonous}(x)))$$

Here's another example of discourse affecting truth conditions. (30a) has straightforward truth conditions using the prosodic constraint

$$(30) \\ \text{a. FRENCHMEN eat horsemeat.} \\ \text{b. } \forall x((\text{eats-horsemeat}(x) \wedge (\text{Frenchman} \vee \\ \text{Canadian} \vee \text{American} \vee \dots)(x)) \vee \text{Frenchman}(x))$$

That is, a horsemeat eater is normally a French person and not of some other nationality. However, there can also be prosodic focus on the consequent as in

$$(31) \text{Let's talk about FRENCHMEN. Frenchmen eat} \\ \text{HORSEMEAT, though Belgians do too.}$$

If the main pitch accent is on HORSEMEAT in (i), a straightforward implementation of the prosodic constraint predicts that an arbitrary Frenchman who eats any kind of meat normally eats (or is more likely than not to eat if we adopt Cohen truth conditions) horsemeat, which is incorrect. In fact, a closer analysis of the prosody here is that there seems to be a double prosodic prominence, one prominence on FRENCH and one on HORSEMEAT. So this example is close to

## More Truths about Generic Truth \*

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(28). The correct truth conditions for (i) are that the French, as opposed to some other nationals, which crucially doesn't include the Belgians, eat horsemeat. That is, we have pretty much the (p.327) same truth conditions for (31) as for (30a) but with a different prosody and a different alternative set. This happens because we read (31) with a discourse context in mind, one in which we are trying to distinguish the French from other nationalities. The prosodic prominence on *horsemeat* singles out the novel property that characterizes Frenchmen. That is the role of this prosodic prominence. The secondary focus on *Frenchmen* then gives us the nuclear scope of the generic. It is the discourse context that tells us how to make use of the prosodic information.

### 12.6 Accommodation

We've now sketched how to build a logical form for a generic sentence that we interpret in our modal semantics from Pelletier and Asher (1997). Our earlier account didn't say much about how to construct logical forms, and we hope to have at least shown how a more precise account might go. In so doing, we've appealed to some pretty complicated lexical semantics, and to prosody and discourse context. While we agree with Cohen that prosody plays an important part in the construction of such sentences, we think that it's only a defeasible indication of what goes into the restrictor and what goes into the nuclear scope of a generic quantifier. We've also shown that at least discourse structure also has to be taken into account. Given all of this, what can we say about the examples that have been argued to be problematic for our account?

In Pelletier and Asher (1997), we worried about (32a), because our simple approach predicted incorrect truth conditions. Leslie provides other examples such as (32b), and once they are pointed out the general style is obvious.

(32)

- a. Ducks lay eggs.
- b. Cardinals are bright red.

We proposed that in such cases, an accommodation might add additional material in the restrictor so as to result in a true generic, e.g.:

## More Truths about Generic Truth \*

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(33)

- a. Female ducks lay eggs.
- b. Male cardinals are bright red.

Pelletier and Asher (1997) didn't, unfortunately, propose an account of how such an accommodation could work.

### 12.6.1 Revisiting Leslie's worry

If it were the predicate that engenders the accommodation, then (32a)—by way of (33a)—would seem to entail that

(34) Ducks lay eggs and are female.

is a true generic, which is clearly wrong. Further, on the modal analysis it would threaten to lead to the plainly false *Ducks are female*, since  $\forall x(A \wedge (B \wedge C)) \rightarrow \forall x(A \wedge B)$  is valid on our semantics.

**(p.328)** However, if we adopt something like the modified prosodic constraint, the accommodation is more constrained: we need to include a disjunction over the alternatives to *egg laying*. Then (32a) has the truth conditions:

(35)  $\forall x((\text{duck}(x) \wedge (x \text{ bears live young } \vee x \text{ lays eggs } \vee x \text{ reproduces by osmosis})) \rightarrow x \text{ lays eggs})$

In words, (32a) is true if ducks that reproduce by either bearing live young or by osmosis or by laying eggs, lay eggs. To see whether or not (34) still would follow from (35), we have to investigate what actually is the logical form of (34). Whatever the alternative set is for *lay eggs and are female*, it seems clear that it will not yield the same disjunction as that in the antecedent of (35). Even if it yields a disjunction that contains the disjunction in (35), we cannot deduce (34) from (32a), any more than one can deduce  $(A \vee B \vee D) \rightarrow C$  from  $(A \vee B) \rightarrow C$ . Leslie's worry is solved, or at least ameliorated.

Once again, we see that there is some 'slop' in how the restrictor of the logical form of a generic is constructed. We've cheated, like many others, by specifying a particular and appropriate alternative set. Once again, this comes back to the problem of precisifying the particular conception of normality at issue with respect to the predication. Discourse can

## More Truths about Generic Truth \*

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certainly help us provide the right material in the restrictor.  
Consider the following mini-discourse.

(36)

- a. These farm animals have different means of reproduction.
- b. Cows bear live young.
- c. Ducks lay eggs.

If we assume a discourse semantics like that provided by Segmented Discourse Representation Theory (SDRT—see Asher and Lascarides 2003 for an introduction), we can make some headway as to how to specify the alternative set more precisely. SDRT predicts the presence of an Elaboration discourse relation holding between (36a) and (36b, c), and this helps us to specify the alternatives. The explicit material furnishes the contrasts between the subcases of the Elaboration, while the accommodated material makes it explicit that these are all aspects of a single theme. Elaborations of this kind (discussed in Asher 2002) provide a partition of a collection of objects introduced in the topic (36a); the elaborating clauses provide contrasting properties of the different elements of the partition, and the properties assigned to these different elements provide the alternative set for understanding the generic quantifications.

Out of context, it is difficult to specify precisely the restrictor/nuclear scope partition for a generic quantifier. In ‘out of the blue’ contexts, uttering (32a) can lead to confusion about what to put in the restrictor and so may give rise to corrections of the following sort.

(37) FEMALE ducks lay eggs.

(p.329) In the case of cardinals, a discourse correction might proceed like this:

(38)

- A: Cardinals are bright red.  
B: Well, MALE(L+H\* H H%) cardinals are bright red;

## More Truths about Generic Truth \*

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FEMALE (L+H\* H H%) cardinals are MOSTLY  
DULLISH BROWN (H\*).<sup>14</sup>

We would predict this happens when the alternative set isn't clearly specified by the discourse context.

### 12.7 Back to copredications

As we saw before, the type of a noun like *duck* seems to be flexible—it can denote a set of individuals or it can denote a kind, as required by the different conjuncts of the VPs in:

(39)

- a. Ducks lay eggs and are widespread throughout Europe.
- b. Mosquitoes are widespread and carry WNV.

But we can also make copredications that predicate properties of disjoint subsets of the set of individuals that are generically quantified over.

(40)

- a. Cardinals are bright red and lay smallish, speckled eggs.
- b. Lions have large manes and rear their young in groups.
- c. Jade is green and black.
- d. Jade is green but also sometimes black.
- e. Jade is green. Jade is also black.

Even though we find the sentences in (40) to be perfectly acceptable, we are aware that some speakers find some of them harder to accept than (32a) or (32b). They are also much more difficult to deal with, because, for example, in (40a), we are copredicating of cardinals a property that only *male* cardinals have and another property that only *female* cardinals have. The same cardinal *can't* even defeasibly have both properties. We suspect that specifying the relevant alternatives and hence the restrictor for such copredications is a tricky business. In general, we think that specifying the logical form of a generic is a matter of accommodation and while the modified prosodic constraint is a useful clue and a defeasible indicator of the restrictor/nuclear scope partition, other factors come into play as well. We've seen that discourse

## More Truths about Generic Truth \*

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context can affect that partition. With other forms of accommodation, we know that consistency, informativeness, and non-vacuous quantification constraints play a role as well. Factoring these constraints into the general process may very well lead us to a much (p.330) more complex procedure for determining the restrictor and nuclear scope of a generic. Constraints of consistency and informativeness may force us to reinterpret material in the nuclear scope. For instance, many have argued that natural language conjunction does not always translate into the Boolean connective  $\wedge$ , but rather into a sum-forming operator (Krifka 1996, *inter alia*), which is logically weaker than Boolean conjunction. This would also require a reinterpretation of the predication relation, because on this proposal we need to relate an individual variable (that bound by the generic quantifier) to a sum of properties, in our case a sum of two properties. Though one way of understanding this relation is that the individual that is the value of the bound variable has all the properties in the set, another weaker predication relation is to say that it has all of the properties in the set that are relevant to that individual. If this is a possible interpretation strategy for *and* in copredications, it may be used to good effect here: this would mean that a cardinal must have at least one and perhaps both of the properties denoted by the copredication, exactly the right prediction.

Our thoughts here are quite speculative. We emphasize that this is a challenge for *all* theories of generics (and for *all* theories of predication more generally). Maybe it is even the most serious testing grounds for semantic theories generally, or at least, for semantic theories of generics.

### 12.8 Mosquitoes, deer ticks, and other problems

Leaving the problems of complex copredications aside, we've seen that our original proposal holds up so far relatively well, once we complicate the mapping from syntax to logical form and make use of the modified prosody constraint. However, there are still other problematic examples in the literature. Consider the following example we've already mentioned from Leslie (2007, 2008) with an introductory background sentence to make the prosody clear.



## More Truths about Generic Truth \*

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- (41) You be careful about mosquitoes and deer ticks.  
Mosquitoes carry the WNV and deer ticks do too.

Our strategy seems overly strong when applied to (41): we predict that its logical form says that normal mosquitoes carry the WNV. As Leslie argues, this generic can be true even if a vanishingly small proportion of mosquitoes actually carry the WNV in any normal world. It is tempting at this point to conclude with Leslie that this is a pure existential generic. But Leslie actually goes further and claims that weak existential-like truth conditions are the basic truth conditions for all generics. We could not disagree more.

Before we give our reasons why we disagree, we note that Cohen has problems with such examples as well. He would, we suppose, treat (41) as a pair of relative generics; that is, a random choice of a mosquito is more likely to carry the WNV than a random choice of any insect, and *mutatis mutandis* for the second generic. We prefer (p.331) not to countenance an ambiguity in the logical form of generics between absolute and relative generics. But even if we did, the notion of a relative generic strikes us as giving bizarre truth conditions to generics. To make things concrete, let's suppose that there are ten billion mosquitoes, 10 percent of which carry WNV. As it does to Leslie, this strikes us as a worrisome scenario in which (41) is warranted and even true. On the other hand now suppose that only one out of our ten billion mosquitoes carries WNV but that no other insects carry WNV. The relative generic account still postulates that (41) is true—whereas we view the one case of WNV-carrying mosquito as a statistical freak. The relative account of generics, like what we have called the Cohen probability account, is too weak. All sorts of generics turn out to be true on the relative generic proposal that intuitively aren't:

- (42)
- a. Asteroids collide with Earth.
  - b. US governors are bodybuilders. (There are only fifty governors and Schwarzenegger is a bodybuilder; this is a much larger percentage of bodybuilders than the percentage of bodybuilders planet-wide).

## More Truths about Generic Truth \*

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c. Philosophers are athletes (supposing that there are 1000 philosophers and one or two manage to leave their armchairs to go do sport, whereas the vast majority of the six billion inhabitants of the planet are just couch potatoes or too poor to be able to afford to do sports.)

We think that some other explanation must be found for sentences like (41). We think that for at least some of these sentences, there is room in our account to get the right truth conditions simply from our existing methods. This is due to the phenomenon of double genericity. Generic predication occurs over individuals and sometimes over eventualities and sometimes over both. Consider

(43)

- a. Nicholas smokes after dinner.
- b. Mosquitoes carry the West Nile Virus.
- c. Sharks attack an injured bather.

These sentences have a generic quantification over events and some of them (namely (43b) and (43c)) have a generic quantification over individuals as well. Here is our proposal for their logical forms:

(44)

- a.  $\forall e(\text{after dinner}(e) \rightarrow \text{Nicholas smokes}(e))$
- b.  $\forall x(\text{Mosquito}(x) \rightarrow \forall e(C(e) \rightarrow \text{carry the WNV}(x, e)))$
- c.  $\forall x(\text{Shark}(x) \rightarrow \forall e(C(e) \rightarrow \exists x(\text{bather})x \wedge \text{attack}(x, e)))$

Going back to Leslie's examples, double genericity actually captures something like the force of *Mosquitoes can carry the WNV*. That is, *in the appropriate circumstances*, Mosquitoes *do* normally carry the WNV. Quantification over circumstances is at least an approximation of modality and quantification over worlds. What we get using the (p.332) approach of generic quantification over circumstances is something like *Mosquitoes can carry WNV and so can deer ticks*.

The appropriate circumstances we appeal to here in the restrictor of the generic obey certain important constraints (as does the modality we appealed to). In practice, it appears relatively clear what counts as an appropriate circumstance to

## More Truths about Generic Truth \*

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judge whether mosquitoes carry WNV: it takes a normal mosquito and the appropriate circumstances for acquiring the virus. These predications involve a natural disposition of mosquitoes to have a certain property, and the triggering circumstances for the realization of the disposition are relatively clear. More formally, we suppose that the circumstances don't change with regard to whether we look, for instance, at the first instance of (44b) or at its internal negation, *Mosquitoes don't carry WNV*. In addition, the circumstances described in (44b, c) must be ones that can plausibly occur to any shark or mosquito and are causally sufficient (in normal cases) to ensure the truth of the restrictor of the generic. Generally, the characterization of the circumstances should offer a lawlike explanation of the observed frequency of occurrences of the instances of the consequent of the generic. Typically, the lawlike explanation involves a causal explanation (using assumed background scientific knowledge as in the WNV case), though sometimes it depends on legislation or established convention, as in *Kim handles the mail from Antarctica*. Sometimes it depends on the facts in the discourse context.<sup>15</sup>

Consider, as an example, a situation in which billionaires, the Koch brothers for instance of Tea Party fame, offer everyone in the state of Kansas a million dollars if they stand on one leg for at least thirty minutes a day. The news gets around Kansas, and pretty soon, visitors as well as the natives observe that citizens of Kansas normally stand on one leg for at least thirty minutes a day. In this case, this generic strikes at least one of us as true. But it isn't true in the actual world, as there is no legislation that would guarantee this nor any significantly instantiated causally efficient mechanism that would bring about the result that people in Kansas stand on one leg for thirty minutes a day.

The truth conditions given in (44) provide a modal analysis of (43). What we get using the approach of generic quantification over circumstances is something like *Mosquitoes can carry WNV and so can deer ticks*. Double genericity gives us another means of complicating the restrictor of generic quantifiers, thus weakening their truth conditions further.

## More Truths about Generic Truth \*

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The same strategy could be applied to the *Australian snakes are poisonous* cases of (25a) and (25b) as well, giving us the following not implausible reading for (25a):

(45) Australian snakes can be poisonous.

(p.333) Sterken notes a problem for this proposal: whereas it is relatively clear that the events quantified over in sentences like those in (43) may have contextual restrictions placed on them, it is much less clear what sort of restrictions would be applied to the states or circumstances that our proposal would quantify over in similar fashion in the logical forms for sentences like (45). In fact, we are unsure as to how or whether our proposal carries over to statives generally. We suspect that generics allow for such quantification even when it is relatively unspecific. This quantification can take various forms: over the right sort of circumstances, perhaps spatial or temporally restricted states (like Australia). This is once again a matter of the ‘slop’ of the relevant notion of normality that is applied to the explicitly given material that makes up the restrictor of generics.

### 12.9 Conclusions

We’ve argued in this chapter that the counter-examples to the account developed in Pelletier and Asher (1997) are not as telling as they have seemed to some at first glance. Our account has the resources to deal with these examples. We remain convinced that a modal treatment of generics is the right way to go, and we’ve given some indications of what factors would be involved in a precise reconstruction of the logical form of generics in general.

Notes:

(\*) Our thanks to the anonymous reviewer of this chapter for very many important questions. We have tried to deal with them all, but unfortunately we will not have satisfied all of his or her concerns.

<sup>(1)</sup> Our world might be such a normal schoolgirl-and-schoolboy world: the very best students are boys, as are the worst. The remaining students are mixed alternations of groups of girls and boys, concerning their academic successes, but on average, the girls outperform the boys. And it may be that this

## More Truths about Generic Truth \*

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relative performance is not an ‘accidental’ artifact of recent generations of schoolchildren, but rather some inherent feature of their natures.

(<sup>2</sup>) We could use a notion of probabilistic validity where a set of premises  $\Gamma$  yields a probabilistically valid conclusion  $\phi$ , just in case whenever the premises in  $\Gamma$  have a probability above a designated value, so does  $\phi$ . We might take this value to be 0.5, and then the conclusion  $\phi$  would have it as well. This would validate the Modus Ponens inference above, but with very unintuitive consequences that don’t match linguistic practice.

(<sup>3</sup>) Consider the embedded generic  $(A \rightarrow B) \text{ } (A \text{ } B)$ , where  $\rightarrow$  is the material conditional.  $(A \rightarrow B) \text{ } (A \text{ } B)$  is Cohen-true if  $P\left(\frac{A \text{ } B}{A \rightarrow B}\right) \geq 0.5$ . By conditionalization we have  $P\left(\frac{A \text{ } B}{A \rightarrow B}\right) = P\left(\frac{B}{A \wedge (A \rightarrow B)}\right) = 1$ .

Then asking about the probability of  $A \text{ } B$  (and it must have a probability assigned to it), we have

$$P(A \text{ } B) = P((A \text{ } B) \wedge (A \rightarrow B)) + P((A \text{ } B) \wedge (A \rightarrow \neg B)) \geq P((A \text{ } B) \wedge (A \rightarrow B)) = P\left(\frac{A \text{ } B}{A \rightarrow B}\right).$$

$P(A \rightarrow B) = P(A \rightarrow B)$ . Fact 1 now follows.

(<sup>4</sup>) Gaifman concurs with us, and says: ‘If “full information” means knowing all the facts then, of course, the true (unknown to us) probability has only two values 0 and 1; this will make the HOP [Higher-Order Probabilities] trivial in a certain sense.’

(<sup>5</sup>) Examples such *Snow is white and falling throughout Alberta*, which are also copredications involving kind- and individual-level predications were discussed in Schubert and Pelletier (1987).

(<sup>6</sup>) There are also cases involving stage-level predications involving generics, again discussed in Schubert and Pelletier (1987): consider the difference between *Passengers on the #3 bus are happy* vs *Passengers on the #3 bus normally stand*. We won’t discuss these here, however.

(<sup>7</sup>) While one might be tempted to analyze such copredications using mechanisms of coercion, Asher (2010) shows in detail that this approach does not get the facts right. We briefly mention one such consideration below.

(<sup>8</sup>) Examples are from Milsark (1974).

## More Truths about Generic Truth \*

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(<sup>9</sup>) The observations about prosody and the informational partition relevant to generics follows regardless of the particular analysis of generics, as long as they are treated as expressions having a restrictor and nuclear scope. The GEN operator of Krifka et al. (1995) stands for any of a variety of specifications for a semantics for generics, and would do just as well for the point we want to make here. Ours is a specification of GEN's semantics.

(<sup>10</sup>) This example formed a part of the analysis in Lawler (1973a), where he distinguished 'universal generics' from 'existential generics'.

(<sup>11</sup>) We predict that sentences given a 'headline' intonation, i.e., all focus prosody, should also get existential readings. Thus, if we read in the newspaper the headline *Dogs rescue child*, we predict an existential reading for the bare plural.

(<sup>12</sup>) We comment here on the whole debate on adverbs and weak existential readings. Cohen (2004a) derives weak existential-like truth conditions only for sentences like (1), in which focus-sensitive adverbs like *even* and *for instance* are present (as in the following from Sterken 2009).

((1))

- (a.) Even MAMMALS lay eggs.
- (b.) Even DOGS eat garbage.
- (c.) For instance BODY BUILDERS become important politicians. (The existence of Schwarzenegger is enough to make this true, according to Sterken.)

According to Cohen, the alternative set is 'used up' by the focus-associating adverb, which then produces the one element of this set of alternatives that is to be in focus. So, this one element is all that is available to use in the restrictor of the generic. For (1a), we then get the (quasi-tautologous) logical form (using our notation)

((2))  $\forall x((\text{mammal}(x) \wedge \text{lay eggs}(x)) \rightarrow \text{lay eggs}(x))$ .

To get the weak existential readings, Cohen stipulates in addition that the restrictor of the generic must have a non-empty denotation, which in the case of (1a) entails the reading that there are mammals that lay eggs. This gets Cohen the

## More Truths about Generic Truth \*

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weak existential truth conditions that people have claimed hold of these examples. But as pointed out by Sterken (2009), such weak truth conditions are arguably not the right ones, even for the examples in (1).

We have quite different feelings about the different examples in (1). For (1a), there seems to be an existential quantification over kinds that is verified by the presence of at least one mammalian species that gives birth to young via egg-laying. On the other hand, some of our spouses don't like it and would have rather *Even some MAMMALS lay eggs*. (1c) on the other hand strikes us as pretty bad, although it is much improved with a modal such as *can* inserted, or in a past tense.

((3))

(a.) For instance body builders CAN become important politicians.

(b.) For instance body builders HAVE become important politicians.

We think that (1b) is false, except when discourse provides a restricted alternative set, and even then we're not sure it has an existential reading rather than the 'generic normality' reading we have ascribed to bare plurals with individual-level (as opposed to kind-level) predicates.

We suspect (as does Sterken 2009) that such existential readings are a kind of illusion. Even if there are such weak truth conditions, they are not widespread—especially in those cases where generics are embedded under focus-sensitive adverbs.

<sup>(13)</sup> For more details, see again Asher (2002).

<sup>(14)</sup> We are appealing here to the TOBE notation for prosody. L+H\*HH% refers to a particular prosodic contour which is also known as a 'B' accent and is used to mark a contrastive topic, while a simple H\* marks the main prosodic pitch prominence, usually associated with focus.

<sup>(15)</sup> We thank our reviewer for the following example, which we have embellished.

## More Truths about Generic Truth \*

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