Genericity

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Summary

Generics are sentences such as *Birds fly*, which express generalizations. They are prevalent in speech, and as far as is known, no human language lacks generics. Yet, it is very far from clear what they mean. After all, not all birds fly—penguins don't!

There are two general views about the meaning of generics in the literature, and each view encompasses many specific theories. According to the *inductivist* view, a generic states that a sufficient number of individuals satisfy a certain property—in the example above, it says that sufficiently many birds fly. This view faces the complicated problem of spelling out exactly how many is "sufficiently many" in a way that correctly captures the intuitive truth conditions of generics.

An alternative, the *rules and regulations* view, despairs from this project and proposes instead that generics directly express rules in the world. Rules are taken to be abstract objects, which are not related to the properties of specific individuals. This view faces the difficult problem of explaining how people come to know of such rules when judging the truth of falsity of generics, and accounting for the strong intuition that a sentence such as *Birds fly* talks about birds, not abstract objects.

What seems to be beyond dispute is that generics, even if they do not express rules, are *lawlike*: they state non-accidental generalizations. Many scholars have taken this fact to indicate that generics are parametric on possible worlds: they refer to worlds other than the actual world. This, again, raises the problem of how people come to know about what happens in these other worlds. However, a rigorous application of standard tests for intensionality shows that generics are not, in fact, parametric on possible worlds, but only on time. This unusual property may explain much of the mystery surrounding generics.

Another mysterious property of generics is that although there is no language without them, there is no linguistic construction that is devoted to the expression of genericity. Rather, generics can be expressed in a variety of ways, each of which can also express nongenerics. Yet, each manifestation of generics differs subtly (or sometimes not so subtly) in its meaning from the others.

Even when these and other puzzles of genericity are solved, one mystery would remain: Why are generics, which are so easy to produce and understand in conversation, so difficult to analyze?

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Subjects: Linguistic Theories, Pragmatics, Semantics

1. Introduction

We often express our knowledge about the world in sentences such as the following:

(1)

a. Ravens are black.

b. Zebras have stripes.

c. Mary smokes after dinner.

We refer to such sentences as *generics*. They appear to express some sort of generalization: about ravens, about zebras, and about Mary, respectively. Yet it is far from clear exactly what they mean. What does it mean to say that some generalization holds?

It turns out that there are a great many theories trying to answer this question. This, in itself, is a fact that is in need of explanation. Why are generics so puzzling? What is it about them that forces researchers to come up with one theory after another, with no clear agreement on what the correct theory is? And, if they are so strange, why are generics so prevalent?

This article considers some of the puzzles concerning generics, why they are so difficult, and the various solutions proposed. Let me say at the outset that readers who expect to find definitive answers to these puzzles will unfortunately be disappointed. But if not the answers, I hope this article will at least convey the depth and significance of the problems.

2. Two Views on Genericity

2.1 The Interpretation of Genericity

When we consider generics, probably the first idea that comes to mind is that they express quantification—that (1a) is really just a different way to say something like

(2)

Every raven is black.

Things are not that simple, however. First, note that generics do not express universal quantification: while (1a) is true, (2) is false, because there are some ravens that aren't black. Still, even if the quantifier is not the universal one, perhaps generics use some other quantifier. If this is the case, our role is to figure out what this quantifier is.

This, however, is far from an easy task. Consider the following examples of generics:

(3)

a. Dogs are mammals.

b. Birds fly.

c. Mammals bear live young.

d. The Frenchman eats horsemeat.

e. Bulgarians are good weightlifters.

f. The giant panda is an endangered species.

g. Primary school teachers are female.

h. People are over three years old.

i. Members of this club help each other in emergencies.

j. Supreme Court judges have a prime Social Security number.

k. **A:** Nobody in India eats beef.

B: That's not true! Indians do eat beef.

Sentences (3a)–(3f) are all presumably true, but what is it that makes them true? Sentence (3a) seems to hold for all dogs, (3b) for most birds, (3c) for most female mammals (presumably less than half the total number of mammals), (3d) for rather few Frenchmen, (3e) for very few Bulgarians, and (3f) for no individual giant panda. On the other hand, the majority of primary school teachers are female, and the majority of people are over three years old, and yet (3g) and (3h) are not true. Even if no emergencies ever occurred, (3i) may be true, and even if all Supreme Court judges happened to have a prime Social Security number, (3j) may be false. The truth of B's answer in (3k) requires only that *some* Indians eat beef.

The diversity of interpretations of generics, as exemplified by the sentences in (3), poses severe problems for any quantification theory of generics. Given this difficulty, there are two approaches one may take.

One, which Carlson (1995) calls the *rules and regulations* approach, is to deny that generics express quantification of any sort. According to this view, generics are evaluated with respect to rules and regulations, which are basic, irreducible entities in the world. Each generic sentence denotes a rule; if the rule is *in effect*, in some sense (different theories construe differently what it means for a rule to be in effect), the sentence is true, otherwise it is false. The rule denoted by a generic may be physical, biological, social, moral, etc.

An alternative approach, which Carlson (1995) calls the *inductivist* view, is to posit some quantifier, which counts individual instances and, on this basis, determines the truth of the generic. Theories that take this view attempt to define this relation in such a way that its nature (possibly in conjunction with facts about context, intonation, and world knowledge) may account for the diversity of readings of generics, exemplified in (3).

The rules and regulation view and the inductivist view are each a cover term for a number of specific proposals. Let us briefly consider some of them.

2.2 Rules and Regulations Theories

Carlson (1977) proposes that a generic expresses simple predication of a property of a kind.[1] Thus, (1a) has a very similar logical form to that of

> (4)
>
> Nevermore is black.

Both sentences express simple predication rather than quantification. The difference is only that whereas (4) predicates a property (being black) of an object (the individual raven Nevermore), (1a) predicates this property directly of the kind *raven*. Thus, Carlson's approach can, in principle, account for all the examples in (3). This, however, is done at a price: no explanation is given for why, say, eating horsemeat is a property of the kind *Frenchman*, or why being female is not a property of the kind *primary school teacher*. Moreover, Carlson's theory cannot account for scope ambiguities of generics, exemplified by the following sentences (from Schubert & Pelletier, 1987):

(5)

a. Canadian academics are supported by a single granting agency.

b. Storks have a favorite nesting area.

c. Sheep are black or white.

d. Whales are mammals or fish.

Krifka (1987) proposes that generics express a *default rule*. This is a type of inference rule that allows for exceptions. For example, we may assume that any raven, by default, is black, but we are ready to retract this conclusion if we learn more information about the raven—that it is an albino raven, that it fell into a bucket of whitewash, etc. According to Krifka, then, (1a) is true just in case every raven is black, unless its being black is not consistent with the facts assumed so far. One challenge that Krifka's approach has to face is to determine which rules are in effect and which are not. For example, a default rule that states that a primary school teacher is female is presumably a useful one, since, if we know that someone is a primary school teacher, we can reasonably assume that she is a woman, unless we learn something to the contrary. Yet this rule is not in effect, since (3g) is false. On the other hand, a default rule stating that a given Bulgarian is a good weightlifter is probably not very useful—if we know that someone is Bulgarian, we will be reluctant to conclude, solely on the basis of this information, that the person is a good weightlifter. Yet this rule *is* in effect, since (3e) is true.

An alternative theory is that generics express not rules in the world, but a cultural convention, a stereotype (Declerk, 1986; Geurts, 1985). Thus (1a) is true because it corresponds to stereotypical beliefs about ravens in our culture—the stereotypical raven is black. Not all sentences are as amenable to the treatment proposed by this theory; for example, it may very well be that the stereotypical primary school teacher is female, and yet (3g) is not true. Another problem with this theory is that it takes a generic to be not a statement of fact about the world but, rather, a statement about the stereotypical beliefs prevailing in one's culture. But it appears that this is not the way we interpret generics. For example, whereas (6a) (after Krifka et al., 1995) is a coherent sentence, (6b) is not:

(6)

a. Snakes are stereotypically believed to be slimy, but in fact they are not.

b. *Snakes are slimy, but in fact they are not.

Working within the framework of Situation Semantics (Barwise & Perry, 1983), several researchers (Cavedon & Glasbey, 1994; ter Meulen, 1986) have proposed that generic sentences express *constraints* on situations. Roughly speaking, (1a) expresses the constraint that every situation involving a raven involves a black raven.

Cavedon and Glasbey (1994) treat constraints as part of the natural order of the world; in particular, they are not reducible to properties of individual instances. This property of constraints enables them to tolerate exceptions so that (1a) is true even if some ravens are not black.

Just like other theories that follow the rules and regulations approach, both the strength and the weakness of Cavedon and Glasbey's (1994) account lies in this separation between the meaning of a generic and the properties of individual instances. The theory implies that the truth of a generic cannot be observed directly; as such, all the sentences in (3), as well as many others, can be accounted for: the true ones correspond to a constraint that is in effect, the false ones do not. However, this is also a weakness because although the theory cannot be refuted, it is not clear what it would take to corroborate it—there is no clear prediction about the way things ought to be in the world for a generic sentence to be true or false.

Some researchers have considered this to be an undesirable situation for a truth-conditional semantics, which defines the meaning of a sentence as the states of affairs that would make it true. Instead, they proposed versions of the inductivist view, in the hope of providing some relation between the facts obtaining in the world and the truth of a generic sentence. We now turn to some of these theories.

2.3 Inductivist Theories

The idea underlying the inductivist approach is rather simple. A generic sentence is true just in case sufficiently many relevant individuals in the domain of the generic satisfy the predicated property. This idea is, of course, vague on at least two issues: Which instances count as "relevant," and how many is "sufficiently many"? Various inductivist approaches offer different answers to these questions. Let us briefly discuss some of them.

Farkas and Sugioka (1983) suggest that the quantifier is *significantly many*. For example, (1a) is true because significantly many ravens are black. *Significantly many* is, of course, a vague quantifier, so for many generic sentences it could be argued that this quantifier is applied correctly. It is not clear, however, that all generics can be accounted for in this way. For example, significantly many people are over three years old, and yet (3h) is not true.

Another possibility is that the appropriate quantifier is *most*. For example, (1a) is true because most ravens are black. The problem with this proposal is that in order for a generic to be true, it does not need to be the case that the majority of individuals satisfy the predicated property: sentences (3c) through (3e) are good counterexamples.

A more sophisticated version of this theory has been proposed by Schubert and Pelletier (1989). According to them, generics do not quantify over actual individuals, but possible ones. Thus, for example, if most, or even all actual Supreme Court judges had a prime Social Security number, (3j) would not be true: if we consider all possible judges, it is not true that most of them have a prime Social Security number. Schubert and Pelletier suggest that *most* is defined relative to a measure function on possible worlds, which favors worlds that are close to the real one in terms of the essential or inherent nature of things.

What is meant by terms such as “inherent” or “essential” is candidly left open by Schubert and Pelletier (1989). Apparently, it is a modal notion, but it is clearly not the same as logical necessity: there is no logical necessity for birds to fly or for mammals to bear live young. The problematic nature of these notions becomes even more apparent when we consider sentences such as the following:

(7)

a. A cheetah outruns any other animal.

b. Spices are affordable.

c. Gold cubes are smaller than 10 cubic meters (after Koningsveld, 1973).

d. Dogs annoy Sam.

Perhaps running fast is an inherent property of cheetahs, but certainly not the property of running faster than any other animal, since some other animal could have been faster. Affordability is not a necessary property of spices; in fact, throughout much of history, spices

were extremely expensive, yet (7b) is true nonetheless. Similarly, we would be hard-pressed to claim that gold cubes are inherently smaller than 10 cubic meters, or that annoying Sam is an essential property of dogs.

If *most* is problematic, perhaps the universal quantifier will work better. Of course, we know that taking generics to express unrestricted universal quantification over actual individuals would not work: if a counterexample is required, our well-worn example, (1a), will suffice. This sentence is true, despite the fact that not all ravens are black.

Alternatively, we can take the quantifier to be a restricted universal (Chierchia, 1995; Declerk, 1991). Context, according to this view, provides a restriction for the domain of the quantifier. For example, (3c) says that all relevant mammals bear live young. Which are the relevant mammals? Both Declerk and Chierchia do not provide a principled account of how this restriction is obtained. Presumably, male mammals are irrelevant, as are females that are too young or too old to bear live young, etc. Strange mammals, such as the platypus, which lays eggs, are also somehow left outside the domain of the quantifier. The remaining mammals do lay eggs, hence the truth of (3c).

For Declerk, the universal quantifier ranges over actual individuals; for Chierchia, it ranges over possible individuals. Hence, Chierchia, unlike Declerk, can explain why (3j) is not true, but his account suffers from similar problems to those of Schubert and Pelletier (1989).

Schubert and Pelletier (1987) offer a more detailed discussion of how the restriction to relevant individuals is provided. It could be induced by the presupposition of the VP, by focus, by the linguistic context, or by an explicit *when* clause. Later works (Cohen, 1999b; Krifka, 1995; Partee, 1991) combine this approach with theories of focus, claiming that generics are *associated* with focus, in the sense of Rooth (1985): focus provides a set of alternatives that restricts the domain of the generic quantifier.

This type of approach is quite powerful, in providing empirically testable predictions about the interpretations of many generics. It can even be explained why, in cases such as (3k), generics get quasi-existential readings—B's response only requires that some Indians eat beef. In such cases, it has been proposed (Cohen, 1999b), the role of the contrastive focus is to restrict the domain to only those Indians who eat beef; if this domain is not empty, the sentence is true.

Yet it is not clear that such approaches can account for the full range of readings of generics. For example, it is difficult to see what sort of restriction of the domain of Frenchmen would yield the truth of (3d), when the sentence is not uttered in a contrastive context.

Yet another view of generics as expressions of universal quantification is that the quantifier quantifies over *normal* individuals (Asher & Morreau, 1995; Delgrande, 1987; Greenberg, 2003; Krifka, 1995; Morreau, 1992; Nickel, 2016; Pelletier & Asher, 1997 among others). Sentence (1a) is true, according to this view, because all normal ravens are black—albino ravens are abnormal ravens. Normality is taken to be a modal notion. Following Kratzer

(1981), a partial ordering relation is assumed to be defined on possible worlds. This relation orders worlds according to their normality. Then, a generic sentence such as (1a) is true just in case in all worlds that are most normal, all ravens are black.

Thus, we can account for sentences such as (3g) and (3h): although male teachers are in the minority, they are still normal teachers; and although most people are over three years old, babies are still normal people. On the other hand, we can account for the truth of (3i) even when no emergencies occurred in the actual world, provided that in those most normal worlds where emergencies do occur, all members of the club help each other.

One problem with these approaches is that the ordering source of normality is not given an independent definition. Why is a black raven normal, and a white raven abnormal? Note that the interpretation of normality seems to change from sentence to sentence, as the following sentences (from Krifka et al., 1995) indicate:

(8)

a. Two and two equals four (normal = the rules of mathematics hold).

b. A spinster is an old, never-married woman (normal = the rules of English hold).

c. This machine crushes oranges (normal = machines perform as intended).

d. Mary smokes cigarettes (normal = Mary shows her typical behavior).

e. Bob jumps 8.90 meters (normal = Bob performs as well as he can).

f. A lion has a mane (normal = stereotypical properties hold).

g. Six apples cost one dollar (normal = the actual world).

h. A turtle is long-lived (normal = ?).

i. A pheasant lays speckled eggs (normal = ?).

There is some debate over what the standard of normality would be for (8h) and (8i), since worlds in which all turtles reach an old age (no predators?) or where all pheasants lay eggs (no males?) do not, on the face it, appear to be normal. But perhaps this problem could be solved by adding a restriction to the domain of the generic quantifier (Krifka, 1995; Pelletier & Asher, 1997), thus, in a sense, combining the normality approach with a domain-restriction theory such as that of Schubert and Pelletier (1987).

Other than these skeptical doubts, quantification over normal individuals runs into some empirical problems as well. It is not clear how it would account for (3d) and (3e): it is hardly the case that all normal Frenchmen eat horsemeat or that all normal Bulgarians are good weightlifters.[2]

Given the difficulty of deciding what the meaning of the generic quantifier is, some people have proposed that it is, in fact, ambiguous.

Strzalkowski (1988) takes a generic such as (9a) to be ambiguous between the senses paraphrased by (9b) and (9c).

(9)

a. Birds fly.

b. All except for a negligible number of birds fly.

c. A non-negligible number of flying animals are birds.

In this way he is able to account for sentences such as (3d) and (3e), assuming that a non-negligible number of horsemeat eaters are French, and that a non-negligible number of good weightlifters are Bulgarian. However, his theory predicts, wrongly, that (10) is true, since a non-negligible number of birds are grey.

(10)

Grey animals are birds.

Note that under both readings of the generic quantifier, Strzalkowski takes it to quantify over actual individuals. Hence, his theory is subject to the problems with sentences such as (3j) and (3i).

In contrast, Dahl (1975) interprets the generic quantifier as quantifying over possible worlds. According to him, the quantifier is ambiguous between (restricted) universal and existential quantification over worlds—that is, between the modal notions of necessity and possibility. Thus, (3a) states that all dogs are necessarily mammals. Dahl can account for (3d): it means that if we pick an arbitrary Frenchman, it is possible that he would eat horsemeat. This approach, however, would predict no difference between (3d) and (11), since it is also possible that an arbitrary American would eat horsemeat.

(11)

The American eats horsemeat

Dahl's approach can handle with ease the cases that are difficult for Strzalkowski's theory, such as (3j) and (3i). However, just like Schubert and Pelletier's (1989) theory, it runs into difficulties with cases of contingent generics, such as those in (7).

Leslie (2007) seems to take the bull by the horns and proposes quite a complex definition, partitioned into several cases, which is meant to account for the variety of interpretations of generics. For example, she claims that (12) is true although very few mosquitoes actually carry the West Nile virus, because the property of carrying the West Nile Virus is particularly *striking* (it constitutes a significant health hazard) and, moreover, because the vast majority of mosquitoes that do not carry the disease are nonetheless disposed to do so in the right circumstances.

(12)

Mosquitoes carry the West Nile Virus.

Without getting into the details of Leslie's proposal, and whether it succeeds in accounting on every case of generics, it must be asked how such a complex definition can be reconciled with the ubiquity of generics, and the intuitive feel that they are clear and simple statements. Leslie is aware of this difficulty and, in order to resolve it, proposes a distinction between semantic truth conditions and what she calls *worldly truth-makers*, but it is not easy to make sense of this distinction.

If the generic operator is complex and overspecified in Leslie's (2007) proposal, Sterken (2015) goes in the opposite direction and proposes that it is *under*specified. According to her, the generic quantifier is an indexical, like a demonstrative, in that it is dependent on context, which fixes its interpretation in every given case. In this way, Sterken is able to account for any example of generics, by assigning an appropriate semantic value to the generic quantifier.[3] This, of course, comes at a price. How does one know what value is assigned in any given case?

Cohen (1999a, 2001b) has a different account of the ambiguity of generics. Generics, according to this proposal, express probability judgments. Thus, (3b) is about the probability that an arbitrarily chosen bird flies, and (3d) is about the probability that an arbitrarily chosen Frenchman eats horsemeat. However, generics are ambiguous with respect to the requirement that this probability needs to satisfy in order for the sentence to be true: the most plausible interpretation of (3b) is that the probability is higher than some constant

(specifically, 0.5); the most plausible interpretation of (3d) is that the probability is greater than the probability that some arbitrary person eats horsemeat. Thus, (3d) is true just in case, if we pick an arbitrary Frenchman, however unlikely this person is to eat horsemeat, he would still be likelier to do so than a person of an arbitrary nationality.[4]

2.4 Combining the Two Types of Theory

It appears that there are some generics that are better explained by rules and regulations theories, and others that are better explained by inductivist theories. One may wish to consider, then, whether the two types of theory can somehow be combined.

This possibility is rejected by Carlson (1995). He describes the two approaches as a dichotomy: one has to choose one or the other, but not both. How can we decide which? One way is to consider a case in which the behavior of observed instances conflicts with an explicit rule. For example, Carlson describes a supermarket where bananas sell for $.49/lb so that (13a) is true. One day, the manager decides to raise the price to $1.00/lb. Immediately after the price has changed, claims Carlson, sentence (13a) becomes false and sentence (13b) becomes true, although all sold bananas were sold for $.49/lb:

(13)

a. Bananas sell for $.49/lb.

b. Bananas sell for $1.00/lb.

Consequently, Carlson reaches the conclusion that the rules and regulations approach is the superior one.

This conclusion has been challenged by Greenberg (1998) and Cohen (2001a). Suppose the price has, indeed, changed, but the supermarket employs incompetent cashiers who consistently use the old price by mistake so that customers are still charged $.49/lb. In this case, there seems to be a reading of (13a) which is true, and a reading of (13b) which is false.[5]

Consequently, Greenberg (1998) claims that generics are ambiguous: on one reading they express a descriptive generalization, stating the way things are. Under the other reading, they carry a normative force and require that things be a certain way. Cohen (2001a) proposes that when they are used in the former sense, they should be analyzed by some sort of inductivist account; when they are used in the latter sense, they ought to be analyzed as referring to a rule or a regulation. The respective logical forms of the two readings are different; whereas the former reading involves, in some form or another, quantification, the latter has a simple predicate-argument structure: the argument is the rule or regulation, and the predicate holds of it just in case the rule is “in effect.”

3. Lawlikeness and Intensionality

3.1 Generics Are Lawlike

Perhaps one of the reasons why it is so difficult to determine whether generics are quantificational, and, if so, what the quantifier is, is that generics are *lawlike*. The distinction between lawlike and nonlawlike statements is well known in philosophy. One way to characterize the difference between lawlike and nonlawlike statements is that only the former, not the latter, support counterfactuals.

Generics, in general, support counterfactuals; the truth of (14a) entails (14b):

(14)

a. Birds fly.

b. If Dumbo were a bird, he would probably fly.

It is tempting to think that rules and regulations theories are particularly well suited to handle the lawlikeness of generics, but, in fact, such approaches have difficulties accounting for the fact that generics support counterfactuals. If there is no relation between the truth of (14a) and the flying abilities of actual birds, why should there be such a relation between its truth and the flying abilities of hypothetical birds?

Inductivist theories face difficulties too. If generics involve a quantifier, it has rather special properties: this quantifier must be sensitive not only to the number of individuals satisfying a certain property but also to whether the statement is lawlike or not. It is for this reason that, as discussed in section 2.3, many researchers proposed modal treatments of generics; the hope is that the notion of lawlikeness is similar enough to the notion of necessity to be formalizable within a possible worlds framework. If, indeed, generics can be captured by a theory that is based on possible worlds, it follows that they must be intensional. Let us now turn to the issue of intensionality.

3.2 Are Generics Intensional?

Suppose ψ_1 and ψ_2 are two extensionally equivalent properties—that is, at this moment in time and in the actual world, the respective sets of individuals that satisfy ψ_1 and ψ_2 are equal. If generics behave extensionally, we would expect the following sentences to have the same truth conditions for every property ϕ:

(15)

a. ψ_1s are ϕ.

b. ψ_2s are ϕ.

This does not hold in general. Consider (16), from Carlson (1989):

(16)

A computer computes the daily weather forecast.

Suppose today's weather forecast predicts a blizzard; this may well be the main news item. Yet, (16) does not entail

(17)

A computer computes the main news item.

Although a computer may have computed today something that turned out to be the main news item, this does not hold in general; on most days, the main news item will not be computed by a computer, hence (17) is false.

Intensionality, it is important to note, does not come in one form only. In particular, a construction may exhibit intensionality with respect to the time index, but not with respect to possible worlds, or vice versa (Landman, 1989).

Generics and frequency statements, it turns out, behave intensionally with respect to the time index, but not with respect to possible worlds. Suppose that the weather report is Mary's favorite newspaper column. Then (18) would have the same truth conditions as (16), although there are any number of worlds where Mary has no interest in the daily weather forecast:

(18)

A computer computes Mary's favorite newspaper column.

To give other examples, it is true in the actual world that the whale is the largest animal on earth, and the quetzal is Guatemala's national bird, but there are any number of possible worlds where this is not the case. Yet (19a) and (20a) have the same respective truth conditions as (19b) and (20b):

(19)

a. The whale suckles its young.

b. The largest animal on earth suckles its young.

(20)

a. The quetzal has a magnificent, golden-green tail.

b. Guatemala's national bird has a magnificent, golden-green tail.

Generics, then, are parametric on time, but not on possible worlds; if two properties have the same extension throughout time, they can be freely interchanged in a generic sentence salva veritate. In other words, the truth conditions of the generic

(21)

ψs are ϕ

do not depend on the extensions of ψ and ϕ in any other world but the actual one, although the truth conditions do depend on the extensions of these properties at different times.

How can a theory of generics account for this behavior? Clearly, a fully extensional theory, such as those of Declerk (1991) or Strzalkowski (1988), will not do justice to this phenomenon; according to such theories, generics ought not to be parametric on either time or possible worlds, which is not the case. On the other hand, a fully intensional theory would not do either, since it would predict that generics are parametric on possible worlds, which they are not.

Theories that make use of possible worlds but restrict them to worlds that are normal, or that are close to the actual world in terms of its essential properties, fare better. They do, however, have to face the problem of defining normality or essence in such a way that a world where Mary is not interested in the weather, or where the quetzal is not Guatemala's national bird, is somehow abnormal or violates essential principles holding in the actual world.

An alternative way to explain the behavior of generics with respect to intensionality has been proposed by Cohen (1999a, 1999b, 2012), who uses a *branching* model of time. That is, for any given time, there is more than one possible future: there is a future where it is going to rain tomorrow and one where it is not. The generic (21) is evaluated with respect to all those futures where the frequency of ϕ among ψs is more or less the same as during an interval of time containing the reference time of the sentence. For example, (16) is true just in case in the extended present the daily weather forecast is computed by a computer, but (17) is false because in the extended present, the weather is rarely the main news item. On the other hand, (18) is true just in case (16) is true, given that in the extended present Mary's preference for the weather forecast remains unchanged.

3.3 Frequency Adverbs

It is often pointed out that generics are similar to sentences involving an overt adverb of quantification. Consider the sentences in (1), when modified by an overt adverb of quantification:

(22)

a. Ravens are usually black.

b. Tigers always have stripes.

c. Mary sometimes jogs in the park.

Some researchers (Chierchia, 1992; de Swart, 1991) have proposed that frequency statements simply express quantification. However, a problem with this approach is that frequency statements, just like generics, are lawlike. For example, the truth of (23), just like the generic (3j), requires more than simply that the current Supreme Court judges have a prime Social Security number:

(23)

Supreme Court judges always have a prime Social Security number.

An alternative is to treat frequency statements as just another kind of generic. As Carlson (1995) notes, this is problematic for the rules and regulations approach. Although we may expect that there is a (genetic) rule making ravens black, it is difficult to accept a rule that states that *most* of them are; although there may be a rule of Mary's behavior that makes her jog in the park, it is difficult to imagine a rule that says, in effect, "Mary, jog in the park sometimes!"

Not all versions of the inductivist view fare better. As we have seen, some of them, being extensional, fail to account for the lawlike nature of generics, and hence cannot account for the lawlikeness of frequency adverbs either.

The normality approach, if applied to generics, faces a different problem. If frequency adverbs, just like generics, quantify over normal individuals only, (24) would be (wrongly) predicted false since, by hypothesis, all normal ravens are black:

(24)

Ravens are sometimes white.

Other inductivist approaches, which take generics to express some quantification over possible individuals, appear to have better prospects for a uniform account of generics and frequency adverbs. The generic quantifier can be taken to be just another frequency adverb, with the semantics of *generally*, *usually*, or something of the sort.

The situation is more complicated, however. There is a difference between generics and frequency adverbs that needs to be commented upon. Sentences (3g) and (3h), although bad as generics, become perfectly fine (and true) if the frequency adverb *generally* (or *usually* and the like) is inserted:

(25)

a. Primary school teachers are generally female.

b. People are generally over three years old.

Therefore, the interpretation of generics, though similar to that of some adverbs of quantification, cannot be identical to it.

Cohen (1999a, 2004) proposes that generics presuppose their domain to be homogeneous, in the following sense. The generic (21) requires that the property ϕ hold not only for ψs but also over every psychologically salient subset of ψ. For example, assuming that it is salient to partition the domain of teachers according to sex, (3g) requires that both male and female teachers be female—a requirement that is clearly violated. Similarly, assuming that a partition of people according to age is salient, (3h) requires that people of all ages be over three years old, hence it is not true.

In contrast, frequency adverbs do not require homogeneity. Sentence (25a) only requires that the property of being female hold of the domain of teachers as a whole, which it does, since the vast majority of primary school teachers *are* female. Similarly, (25b) requires merely that the property of being over three years old hold, in general, of people as a whole, which it does.

4. Manifestations of Generics

No known language contains a specific construction that is exclusively devoted to the expression of genericity (Dahl, 1995). Yet there is no language that does not express genericity in some form or another. It follows that expressions used for generics have a double nature: they have generic as well as nongeneric uses. In English, generic noun phrases may be bare plurals, definite singulars, or indefinite singulars (and in some marked cases, definite plurals). It turns out that there are differences in the generic interpretations of these constructions; let us look at each one of them in turn.

4.1 Bare Plurals

The most common way to express a generic sentence in English is with a bare plural—that is, a plural noun preceded by no determiner.[6]

What is the denotation of a generically interpreted bare plural? There are cases in which the answer appears to be simple. Consider this typical example:

> (26)
>
> Dinosaurs are extinct.

There is no individual dinosaur that is extinct; individual dinosaurs are just not the sort of thing that can be extinct—only the kind *dinosaur* can have this property. A natural account for (26) is that it predicates the property of being extinct directly of the kind *dinosaur*. It follows, then, that the bare plural *dinosaurs* denotes this kind in (26).

Krifka et al. (1995) refer to such sentences, which predicate a property directly of a kind, as cases of *direct kind predication*. They distinguish between them and sentences such as (1a), which predicate a property of instances of a kind, and not of the kind as a whole; these are named *characterizing generics*.

One test for cases of direct kind predication is to verify that it is impossible to modify the sentence by an overt adverb of quantification. For example, (27) is bad, confirming that (26) is a case of direct kind predication:

(27)

*Dinosaurs are { always / usually / sometimes / never } extinct.

On the other hand, (28) is fine, indicating that (1a) is, indeed, a characterizing generic:

(28)

Ravens are { always / usually / sometimes / never } black.

What is the denotation of a bare plural in a characterizing generic? Some researchers (e.g., Diesing, 1992; Kratzer, 1995; Krifka, 2004; Wilkinson, 1991) claim that bare plurals are ambiguous: they may denote kinds, in which case we get direct kind predication, or they may be interpreted as indefinites—that is, as variables ready to be bound by the generic quantifier, resulting in characterizing generics.

There are, however, reasons to believe that generic bare plurals uniformly refer to kinds, in characterizing generics as well as in cases of direct kind predication (Carlson, 1977, 1982; Chierchia, 1998; Cohen, 2020). Consider the case of a bare plural that serves as the subject of two clauses: one a characterizing generic and one expressing direct kind predication:

(29)

a. Dodos lived in Mauritius and (they) became extinct in the 18th century (after Heyer, 1990).

b. Elephants are killed for their tusks and are therefore an endangered species.

c. Dinosaurs, which are now extinct, were very large.

The most straightforward explanation for the phenomena exemplified by the sentences in (29) is that a generic bare plural unambiguously refers to kinds.[7]

If bare plurals in characterizing generics denote kinds, a natural question arises: How is a characterizing generic obtained from a kind-denoting bare plural? In order to answer this question, Carlson (1977) proposes a *realization* relation between an instance and a kind. Thus, for example, $R(x, \mathbf{dog})$ indicates that *x* is an instance of the kind *dog*—that is, *x* is a dog.

As discussed in section 2.2, Carlson (1977) does not believe that generics involve quantification, and therefore does not provide any mechanism for the introduction of such a quantifier.

Nickel (2016) considers the distributivity operator, which is a phonologically null universal quantifier, independently needed for the interpretation of sentences such as (30) to mean that each one of the kids sneezed (Link, 1983*inter alia*):

(30)

The kids sneezed.

He proposes that the generic quantifier is generated in the same as the distributivity operator. The only difference is that quantifies over normal individuals, rather than actual ones. See section 2.3, for a discussion of this approach, its advantages and disadvantages.

Ter Meulen (1995) proposes a type-shifting operator, which transforms a kind into the property of being an instance of the kind. The application of this type-shifting operator is claimed to be optional. When it is applied, the result is a characterizing generic; when it is not —direct kind predication. Thus, every generic sentence is ambiguous between characterizing and kind interpretations, but one of these readings is ruled out as semantically anomalous. For example, (1a) has a reading where the property of being black is predicated directly of the kind *ravens*. But this reading is ruled out because a kind is not the sort of thing that can have a color. Similarly, (26) has a reading where individual dinosaurs are extinct. This time, the characterizing interpretation will be ruled out since individual dinosaurs cannot be extinct.

There are, however, two problems with ter Meulen's (1995) account. One is that type shifting is usually not considered an optional operator: since it is triggered by type mismatch, when it does not apply, the result would be ill-formed. Another problem is that operators introduced by type shifting are usually restricted to narrow scope only (Cohen, 2020), but as the sentences in (5) demonstrate, generics do give rise to scope ambiguities.

Consequently, Cohen (2020) argues that the operator is actually predicate transfer (Nunberg, 1995) rather than type shifting. Predicate transfer is an operator that allows a predicate to change its denotation when its interpretation does not make pragmatic sense. For example, when (31) is said in a restaurant, by a server to the cook, the property *is a ham sandwich* is transferred into the property *has ordered a ham sandwich* in the following sentence, since only people, but not sandwiches, can get restless:

(31)

The ham sandwich is getting restless.

Since predicate transfer is optional and can apply at any level of the derivation (Nunberg, 1995), it is a better candidate for the operator that generates the characterizing generic reading. Cohen proposes that, in contrast, habituals *are* derived by type shifting and

consequently are restricted to narrow scope only. Consequently, (32) can only get the nonsensical reading where Mary smokes the same cigarette again and again, not that she smokes cigarettes habitually (cf. (8d)):

(32)

Mary smokes a cigarette.

4.2 Definite Singulars

Just like bare plurals, definite singular generics may occur in cases of direct kind predication as well as characterizing generics, as exemplified by the following:

(33)

a. The giant panda eats bamboo shoots.

b. The giant panda is an endangered species.

Sentence (33a) is about individual pandas, whereas (33b) is about the kind *giant panda* as a whole.

On the basis of examples such as (34), Krifka et al. (1995), following Carlson (1977), claim that definite singulars may only refer to well-established kinds:

(34)

a. The Coke bottle has a narrow neck.

b. The green bottle has a narrow neck.

Although the distribution of definite generics is, indeed, restricted, it is not clear that the facts about this distribution can be explained in terms of well-established kinds. The acceptability of the definite generic seems to depend on a variety of factors (see Bolinger, 1980; Carlson,

1977; Dayal, 1992; Vendler, 1971, *inter alia*). For example, the definite generic is often more acceptable when the descriptive content of the common noun is richer. Contrast the oddness of (35a) (under the generic reading) with the acceptability of (35b):

(35)

a. ?The politician never misses a photo opportunity.

b. The successful politician never misses a photo opportunity.

Yet one would be hard-pressed to argue that *successful politician* is a well-established kind, whereas *politician* is not.

There are additional, poorly understood factors affecting the productivity of the definite generic, which appear idiosyncratic and language dependent. Contrast (36a), which is fine, with (36b), which is odd (under the generic reading):

(36)

a. The tiger lives in the jungle.

b. ?The dog barks.

Yet there is no reason to suppose that the kind *tiger* is better established than the kind *dog*. The distinction seems to be an idiosyncratic property of English; indeed, there are languages in which the equivalent of (36b) is perfectly acceptable—for example, German:

(37)

Der Hund bellt (Heyer, 1990).

4.3 Indefinite Singulars

Unlike bare plurals and definite singulars, indefinite singulars may not refer to kinds, as the unacceptability[8] of the following examples indicate:

(38)

a. *A giant panda is an endangered species.

b. *A dinosaur is extinct.

If indefinite singulars may not refer to kinds, we can predict that collective readings are impossible. This is, indeed, borne out:

(39)

*A lion gathers near acacia trees when it is tired.

The distribution of the indefinite singular is restricted compared with that of the bare plural, but in ways that are different from those of the definite singular. Consider the following pair (Lawler, 1973):

(40)

a. A madrigal is polyphonic.

b. *A madrigal is popular.

While (40a) receives a generic interpretation, (40b) cannot. In contrast, both (41a) and (41b) are fine:

(41)

a. Madrigals are polyphonic.

b. Madrigals are popular.

Burton-Roberts (1977) provides a number of additional examples, among which are the following:

(42)

a. Kings are generous.

b. *A king is generous.

(43)

a. Rooms are square.

b. *A room is square.

(44)

a. Uncles are garrulous.

b. *An uncle is garrulous.

Lawler (1973) claims that this difference between bare plural and indefinite singular generics is due to the fact that the latter are restricted to properties that are, in some sense, “necessary,” “essential,” “inherent,” or “analytic.” Thus, whereas polyphonicity is an essential property of madrigals, popularity is not, hence the unacceptability of (40b).

The problem with this approach is that it falls short of a complete explanation: Why is it indefinite singulars, rather than bare plurals or definite singulars, that have this property? Moreover, it fails to account for sentences such as the following:

(45)

A madrigal is a popular song.

Although (45) seems to be saying exactly the same as (40b), it is perfectly acceptable.

Krifka et al. (1995) propose an account of this phenomenon, based on the fact that indefinite singulars may not refer to kinds. They suggest that all cases in which the indefinite singular generic is disallowed are cases of direct kind predication. That is, just like (26) expresses a property directly of the kind *dinosaur*, and not of individual dinosaurs, (41b) expresses a property directly of the kind *madrigal*. Specifically, unlike (41a), the logical form of (41b) does not involve the generic quantifier. Since indefinite singulars cannot occur in cases of direct kind predication, (40b) is ruled out.

This approach amounts to disposing with the quantificational account of genericity except for a small number of cases such as (41a). It follows that characterizing generics are, in fact, the exception rather than the rule.

However, it is not clear that the claim that (41b) is a case of direct kind predication can be maintained. If we apply the relevant tests, it appears that these are cases of characterizing generics rather than direct kind predication: the sentences in (46) are grammatical, and (47) exhibits a scope ambiguity:

(46)

a. Madrigals are always popular.

b. Kings are usually generous.

c. Rooms are sometimes square.

d. Uncles are never garrulous.

(47)

Madrigals are popular with exactly one music fan.

Burton-Roberts (1977) proposes that indefinite singulars carry a normative force. He considers the following minimal pair:

(48)

a. A gentleman opens doors for ladies.

b. Gentlemen open doors for ladies.

Burton-Roberts notes that (48a) expresses what he calls “moral necessity,” whereas (48b) “merely makes a generalisation about gentlemen” (p. 188).

Thus, unlike bare plurals, indefinite singulars are not ambiguous: they only express rules.

Specifically, the rule may be a linguistic rule—that is, a definition (Cohen, 2001a; Krifka, 2012). Since polyphonicity forms a part of the definition of a madrigal, (40a) is fine. The acceptability of (45) stems from the fact that it has the classical *form* of a definition, even though it is not, in fact, the approved definition of a madrigal.

5. Conclusion

Constrained by space limitations, this article was sketchy and left out a lot of important and interesting issues concerning generics. But I hope the little that was presented managed to convey a sense of the mystery of generics. We have seen at least three puzzling, not to say paradoxical, properties of generics:

1. On the one hand, generics are very common, are attested in all languages, and appear to be easily understandable by speakers. On the other hand, it is very difficult to capture exactly what they mean, and a staggering number of theories have been proposed, with no clear consensus reached.
2. On the one hand, generics are lawlike, hence not extensional. On the other hand, they are not fully intensional either, as they do not appear to be modal.
3. On the one hand, generic noun phrases (bare plurals and definite singulars) denote kinds. On the other hand, the most common generics—characterizing generics—express quantification.

Any adequate theory of genericity would have to face up to these paradoxes.

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Notes

1. See Lowe (1991) and Liebesman (2011) for more recent proposals along similar lines.

2. A related idea is to regard generics as expressions of universal quantification over a set of *typical individuals*, rather than normal ones (Heyer, 1985, 1990; see also Link, 1995), but it suffers from similar problems.

3. Tessler and Goodman (2019) make a similar proposal, using a probabilistic framework. Nguyen (2020) takes this idea in an even more extreme direction, arguing that generics do not even express a proposition, unless further specified by the context.

4. For a rather different probability-based approach, see van Rooij and Schulz (2020).

5. These readings are more salient if the sentence is modified by expressions such as *actually* or *in fact*.

6. It is well known that bare plurals may receive not only a generic reading but also an existential one; we do not deal with existential readings here.

7. See Carlson (1977) for additional arguments.

8. Unless they are read taxonomically.

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