Generic Explanations for Generics

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Abstract

It is widely accepted that generics express law-like generalisations, on the basis of evidence that their truth does not depend only on how things are in the actual world at one moment in time. In this paper, I propose a temporal truthmaker semantics for generics and argue that this theory can account for the intuition that generics express law-like generalisations. The law-likeness of generics therefore does not motivate the introduction of either the unarticulated constituent 'GEN' or a domain of abstract kinds. Instead, it can be explained by the nature of the states which make generics true, which may be either generic facts about a category, or particular facts about the instances of a category.

1 Introduction

While there are many points of disagreement regarding the meaning of generic sentences, one article of faith is that they express nomic, law-like or non-accidental generalisations. According to this orthodoxy, generics say not only how things are, but how things would be even if things were different in many respects, holding fixed some set of rules or laws.

(1) American Presidents are male.

If generics simply 'stated the facts', we should expect (1) to be true, since at the time of writing every actual American President has been male. Yet (1) is at best misleading and at worst false, since it suggests that there is some rule or requirement in force that states that in order to be an American President, a person must be male. The dominant attitude in the literature is that generics have a modal component to their semantics, usually contributed by the phonologically null operator, 'GEN' (e.g. Krifka et al., 1995; Nickel, 2016; Kirkpatrick, 2023). Simplifying a little, on this view, the logical form of (1) is:

(2) $\text{GEN}(x) : \text{American-President}(x)[\text{male}(x)]$

The semantic contribution of 'GEN' is something like a modal quantifier over objects in possible worlds or situations. Since these situations may be non-actual, the truth-conditions of generics do not depend only on what is the case in the actual world. The main alternative is the kind-reference theory (e.g. Carlson, 1977; Liebesman, 2011; Teichman, 2023); according to the simplest versions, the logical form of (1) is:

(3) male(american-president-kind)

On this view, generically interpreted bare plural noun phrases (henceforth generic BPs), are referential and refer to abstract objects: kinds. The intuition that generics are nomic is accounted for in what it is for a kind to have a property: kinds are more than just their actual members.

My objective in this paper is not to show that modal and kind-reference theories of generics are not viable. There are, however, reasons to be dissatisfied with the dominant modal theories which attribute a significant component of the meaning of generics to a constituent, 'GEN', which is not articulated in any known language. Instead, my aim is programmatic: to show that a viable alternative to both theories exists, which can explain why generics are nomic. To this end, I will give a truthmaker semantics for generics, which treats generic BPs as referential expressions whose reference extends across time, but not across possible worlds or situations.

2 Preliminaries

2.1 Nomicity

I begin with some brief remarks on what I take nomicity to be. I will use 'nomic' as a synonym for 'non-accidental' and 'law-like' (I choose the label for reasons of style alone). To begin with, we can distinguish between nomic *sentences* and nomic *regularities*. The first category is linguistic and includes sentences which are made true not only by how the world happens to be, but how things would be if things in the world were different, holding fixed some set of rules of laws.

Nomic regularities are not linguistic: they are regularities in the world. To label a regularity as nomic is not to say that it reflects a law of nature; laws of nature, if there are any, apply everywhere with no exceptions, yet many nomic regularities (especially those which are associated with generics) admit exceptions. I don't want to take on any metaphysical commitments about the nature of nomic regularities. My objective is to explain why generics are nomic in the linguistic sense. For now I will just note two characteristics of nomic regularities which will become relevant in the course of this paper:

Counterfactuals They support counterfactuals (Goodman, 1983). Suppose there is a law which underpins the regularity that all copper conducts electricity. Then, if I were to connect this particular strip of copper wire to a power source in the right way, it would conduct electricity. That is true, even if I never in fact do such a thing.

Unobserved Instances They support inferences about unobserved instances. Nomic regularities may be projected on to instances of a category which have not yet been observed, including those in the future (Jackson and Pargetter, 1980).

2.2 Generics and temporary generalisations

There is good evidence that generics are not about only the way things are at a particular moment in time. For instance, (4) would not be true even if every black raven died, leaving behind only white ravens (Nickel, 2016, p. 16).

(4) Ravens are white.

This is also nicely illustrated by Cohen's famous example:

(5) (a) *Situation:* By chance, every current Supreme Court judge has a prime Social Security number.
(b) Supreme Court judges have a prime Social Security number (Cohen, 1999, p. 35).

As Cohen argues, the sentence sounds false in this situation, since it is insufficient that every Supreme Court judge just happens to have a prime Social Security number for it to be true. More generally, if we construct contexts in which a generalisation holds of all instances of a category but only at a particular moment in time, a generic will sound false in that context.

This rules out a very simple referential theory according to which generic BPs refer to actual objects at the reference time of an utterance. But it does not rule out a temporal referential theory according to which generic BPs refer to actual objects at more than one time. This would explain, for example, why (4) is false: the BP refers not only to the ravens that there are now, but the ravens that there have been and will be, so the temporary fact that all *current* ravens are white does not suffice to make (4). Similarly, (5b) sounds false in Cohen's context because we assume that Supreme Court judges in the past and future have non-prime Social Security numbers. In what follows, I will expand on this initial sketch of a theory.

2.3 Branching time

I will assume a branching metaphysics of time (Thomason, 1970). On this picture, the past is fixed, but the future is open. Call a pair of times and an order on times, $\langle T, \prec \rangle$, a temporal frame. $\prec$, the precedence relation, has the following three properties:

Transitive $\forall t, t', t'' \in T(t \prec t' \wedge t' \prec t'' \rightarrow t \prec t'')$

Irreflexive $\forall t \in T(\neg t \prec t)$

Forward Branching $\forall t, t', t'' \in T(t' \prec t \wedge t'' \prec t \rightarrow (t' \neq t'' \rightarrow (t' \prec t'' \vee t'' \prec t')))$

The ordering is linear with respect to the past, but open with respect to the future, so for any time t it has at most one past but may have more than one future. A *history* is a maximal subset of T that is linearly ordered by $\prec$, i.e. it is a complete branch which cannot be extended (note that a history extends into the future).

This metaphysical picture raises the question: what is it for a sentence about the future to be true? If time branches into the future, there is no one history which contains *the* future, so we can't simply say that for a sentence about the future to be true at a time t is for there to be some time t' such that $t \prec t'$ at which the sentence is true, since there may be many other future times at which it is false. Following the terminology of Kaufmann et al. (2006), I will call a sentence *settled* at time t iff it is true in every history which includes t.

3 Truthmaker semantics for generics

I now turn to the semantics of generics. The proposal is that generics can be *made true* in different ways. In truthmaker semantics, propositions are identified with sets of states which make a sentence true (or *verify* it) (Fine, 2017). To a temporal frame, add a domain of states to be a set S which is ordered with respect to a partial ordering, $\sqsubseteq$, and a corresponding fusion operation, $\sqcup$, such that $a \sqsubseteq b \leftrightarrow a \sqcup b = b$: $\langle T, \prec, S, \sqsubseteq \rangle$. In a truthmaker semantic framework, whether a sentence is true depends on what states exist. The notion of verification ($\Vdash$) is primitive and holds between states and sentences. The idea that I will pursue here is that for a state s to verify a sentence ϕ is for there to be no need to look beyond the information contained in s to explain ϕ (Linnebo, 2022, p. 357).[1] This notion of verification naturally includes the relation of settling: if a state settles how things will be in the future, then it contains enough information to explain why things will be that way.

3.1 Generic and instance-based explanations

Fine informally states his semantics for the universal quantifier as follows: "A state verifies $\forall x \phi(x)$ if it is the fusion of verifiers of its instances $\phi(a_1), \phi(a_2), \ldots$" (Fine, 2017, p. 567). But when the domain of the universal quantifier is indeterminate, a truthmaker of this sort will not generally be available. This would be the case when the domain of the quantifier extends into the future, which I have assumed to be indeterminate. So how can a universal generalisation be true when it is not determinate which of its instances exist? Linnebo (2022) addresses this question by arguing that the truth of a universal generalisation can in principle be explained either by the nature of its instances or the nature of the categories that it describes (see also Fine, 2017, pp. 568–569). Linnebo distinguishes between two ways that a sentence might be made true:

[1] Note that here, unlike in Fine's truthmaker semantics, verification is monotonic, i.e. if $s \Vdash \phi$ and $s \sqsubseteq t$, $t \Vdash \phi$.

> An explanation is **generic** insofar as it does not proceed via individual instances but is based on general facts about the properties or operations involved in the claim that is generalized (Linnebo, 2022, p. 349).

An explanation is **instance-based** to the extent that it is not generic. Recall that we are considering *metaphysical* explanations here, so the question is: what currently existing state settles a sentence of the form ⌜All Fs are G⌝ when it is not determinate what things are Fs? No instance-based explanation will be possible in such a situation, but a generic explanation will be, provided that it contains enough information about what it is to be an F that it guarantees that any F is G.

Carrying over this distinction to the meaning of generics like (1), the problem is that it is not yet determinate who will be the President in the future. So no instance-based explanation will be possible. For there to be a generic explanation for (1), there would need to be a state which now settles for any given American President, their sex. If, for example, there were a rule in force which stated that the President must be male, then the existence of that rule would settle (1). That state would not itself need to settle who becomes the President in the future, provided that it settles whether they are male or female. But since there is no such state, (1) is not true.

3.2 Intrinsic truthmaker semantics

To make this intuition precise, I will augment Linnebo's truthmaker semantics for first-order sentences, which are reproduced in full below. Since I am introducing a temporal dimension to the semantics, I will index predicates to times; if P is a predicate, then $P_{\mathcal{T}}$ is a predicate true of everything which is P at some time in a set of times $\mathcal{T}$. $\mathbb{1}$ is the inconsistent state; $\bot$ is a sentential constant which is false on every interpretation; where P is an n-place predicate, $[\![P]\!]_s$ is the set of n-tuples which satisfy P in a state s; $D(s)$ is the domain of objects whose existence is verified by a state s.

$(\Vdash \mathbb{1})$	$\mathbb{1} \Vdash \phi$	if	$s \Vdash \bot$, then $s = \mathbb{1}$
$(\Vdash \wedge)$	$s \Vdash \phi \wedge \psi$	iff	$s \Vdash \phi$ and $s \Vdash \psi$
$(\Vdash \vee)$	$s \Vdash \phi \vee \psi$	iff	$s \Vdash \phi$ or $s \Vdash \psi$
$(\Vdash \rightarrow)$	$s \Vdash \phi \rightarrow \psi$	iff	for every s', if $s' \Vdash \phi$, then $s \sqcup s' \Vdash \psi$
$(\Vdash \neg)$	$s \Vdash \neg\phi$	iff	for every s', if $s' \Vdash \phi$ then $s \sqcup s' \Vdash \bot$
$(\Vdash At)$	$s \Vdash P(a_1, \ldots, a_n)$	iff	$\langle a_1, \ldots a_n \rangle \in [\![P]\!]_s$
$(\Vdash \exists)$	$s \Vdash \exists x \phi(x)$	iff	$s \Vdash \phi(a)$ for some $a \in D(s)$
$(\Vdash \forall)$	$s \Vdash \forall x \phi(x)$	iff	$s \sqcup s' \Vdash \phi(a)$ for each s' and each $a \in D(s')$

The intuition behind $(\Vdash \forall)$ is that a state can verify a universal generalisation without verifying the existence of each instance, provided that the state would verify the generalisation when fused with states which verify each instance. Extending this intuition to generics, I will use '$\sigma x {}^*P(x)$' to translate the bare plural 'Ps', where ${}^*P$ is the algebraic closure of P; $\leq$ is the mereological parthood relation; '$\sigma x P(x)$' denotes the least upper bound of P (Link, 1983). It is a term which denotes the things each of which satisfies P. Then we have the following clause:

$(\Vdash \sigma)$ $\quad s \Vdash Q(\sigma x {}^*P(x)) \quad$ iff $\quad$ $s \sqcup s' \Vdash Q(a)$ for every s' and every a such that for each $x \in D(s'), x \leq a$ and $s' \Vdash {}^*P(a)$.

The intuition behind $(\Vdash \sigma)$ is that for a state to verify $Q(\sigma x {}^*P(x))$, it is sufficient that, given any plurality of objects which are Ps, it verifies that those objects are Q. Since I claim that generic BPs refer to objects which satisfy a description at more than one time, their representation must be indexed to some set of times. Taking the temporal index of 'whale' to be the set of all times T, the translation of (6a) will be as follows:

(6) (a) Whales are mammals.
(b) ${}^*\text{mammal}(\sigma x {}^*\text{whale}_T(x))$

Since T includes times from more than one possible future, there is no fact of the matter which plurality of whales the σ-term refers to. Despite this indeterminacy, (6b) may still be verified by a state s, however, if any way of adding whales to s results in a state which verifies that those whales are mammals. This is what enables a generic to have a generic explanation: a state may verify a generic without proceeding via facts about individuals, but rather facts about a category in general. Let's now turn to a true generic which admits exceptions:

(7) (a) Ravens are black.
(b) $^*\text{black}(\sigma x^*\text{raven}_T(x))$

Since 'are black' is a distributive predicate, a purely instance-based explanation of this generic would be the fusion of all of the states which each verify sentences of the form $\ulcorner\text{black}(a)\urcorner$ where a is a raven. But, as I argued, that will need to include verifiers for sentences about not only the current ravens in the world, but the plurality of things which are ravens at any time in T. If those states don't yet exist, or it is not determinate which of those states will exist, an instance-based explanation of (7a) won't be available. So we should look for a verifier which is, to at least some extent, generic. The catch here, of course, is that not all ravens are black, so it looks like the clause in ($\Vdash \sigma$) will be too strong, since it requires that any state which verifies that somethings are ravens also verifies that those things are black.

I will follow Schwarzschild (1994) and Križ and Spector (2021), among many others, who propose that plural predications (a category which I claim includes BP generics) may be underspecified with respect to the proportion of the argument which must satisfy the predicate for the sentence to be true. Adding 'all' to the sentence eliminates the underspecification. On this view, there is no fact of the matter as to how many ravens must be black in order for (7a) to be true. But the context of utterance and the purposes of conversation can help to narrow down the intended meaning of a sentence, by filtering out unintended interpretations. On Križ and Spector's theory, this is because the meaning of the plural predicate itself is underspecified. So even for distributive predicates such as 'are black', it is not the case that if $a \in [\![\text{black}]\!]_s$, then for every $x \leq a$, $x \in [\![\text{black}]\!]_s$. That is, it can be true of a plurality a that they are black, even though it is not the case that for each thing among a, it is black.

Returning to the question of the nature of the verifiers of (7a), a general fact about the genotype of ravens and its relation to the phenotype might verify this sentence, without containing any information about particular ravens. And it may still be the case that a state satisfies ($\Vdash \sigma$) with respect to (7a), even though not every individual raven is black in every state which is fused with that state is black.

4 Explicit temporal restrictions

In the previous two examples, I assumed that the temporal index of the predicate was the set of all times, T. But that isn't always the case, since generics can be explicitly restricted by temporal adverbials:

(8) (a) Superpowers are referred to by abbreviations the first letter of which is 'U' (Dahl, 1975).
(b) In the 1970s, superpowers were referred to by abbreviations the first letter of which is 'U'.

As Dahl observed of (8a), the temporally unrestricted generic suggests that being referred to by an abbreviation the first letter of which is 'U' was a prerequisite for being a superpower (Dahl, 1975, p. 109). Yet the temporally restricted (8b) has a much more prominent 'accidental' interpretation, according to which it was simply true of the superpowers in the 1970s that they were referred to by such an abbreviation. Clearly, an instance-based explanation is possible for (8b), since there were just two things which were superpowers during the 1970s and the reference

of the BP is limited to that period of time (i.e. the temporal index $\mathcal{T} = \{t : t$ occurred during the 1970s$\}$). The instance-based explanation would be the state $s \sqcup t$, where:

(i) $s \Vdash$ the United States of America was referred to by an abbreviation the first letter of which is 'U';

(ii) $t \Vdash$ the Union of Soviet Socialist Republics was referred to by an abbreviation the first letter of which is 'U'.

On the other hand, it is consistent with there being a completely instance-based explanation for (8b) that there is *also* a generic explanation for it, so (8b) can be interpreted either as a nomic or a descriptive generalisation. In contrast, (8a) has no such temporal restriction and hence no instance-based explanation is possible. When a speaker utters (8a), in order to interpret the sentence as true, a hearer must then assume that there is a (partially) generic explanation for (8a). It is difficult to imagine what a generic explanation for (8a) could be – hence its oddness – but if there were a generic explanation for (8a), that would support counterfactuals – if China were a superpower, it would be referred to by an abbreviation the first letter of which is 'U' – and inferences about unobserved instances, since a generic explanation would be a state which contains information about what it is to be a superpower, irrespective of the identity of the particular object which is a superpower.

5 Implicit temporal restrictions

Finally, purely descriptive or statistical interpretations of unmodified generics must be accounted for. For instance, we can imagine both a nomic and a descriptive interpretation of (9):

(9) Firefighters wear protective clothing.

On its nomic interpretation, (9) says that in order to be a firefighter, a person must wear protective clothing (in appropriate situations). On its descriptive interpretation, it says that actual firefighters (typically) wear protective clothing. On the present theory, an instance-based explanation corresponds to the descriptive interpretation and a generic explanation – e.g. a rule requiring firefighters to wear protective clothing – corresponds to the nomic interpretation. More speculatively, it seems that only generics which are plausibly supported by generic explanations are felicitous as indefinite singulars (see Leslie et al., 2009; Lawler, 1973):

(10) (a) A firefighter wears protective clothing.

(b) ?A superpower is referred to by an abbreviation the first letter of which is 'U'

For an instance-based explanation of (9) to be available, the temporal index on 'firefighters' must not include times in the future, otherwise it will be indeterminate which objects are firefighters. When the temporal index includes only the present and the past, descriptive interpretations are possible, even when there is no explicit temporal restriction. That is, descriptive generics are statements about how things have been up until now.

Given that the value of the temporal index need not be made explicit, this represents a source of confusion in the meaning of generics, since a speaker may intend to communicate a descriptive generalisation about past/present instances, yet be interpreted as communicating a generalisation which holds of future instances too, supported by a nomic generalisation. The possibility of this kind of miscommunication means that hearers may "slip" from descriptive interpretations of generics to nomic ones (Langton et al., 2012). For instance, I might conclude that (9) is true on the basis observing a large number of firefighters wearing protective clothing, yet when I utter (9), a hearer may assume that I possess knowledge of a generic explanation for (9), which can then be extended to new firefighters who I have not observed.

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