

Sharks and Mosquitos, Habits and Capacities

Bernhard Nickel · Harvard University

June 10, 2010

Among the sentences we use to convey general information are so-called *generics*. One kind is illustrated by (1) and (2).

- (1) Ravens are black.
- (2) Tigers have four legs.

These convey neither straightforwardly universal nor straightforwardly existential propositions. Not universal, because what falsifies the universal need not falsify the generic (e.g., albino ravens). Not existential, because what verifies an existential need not verify the corresponding generic. Even though there are albino ravens, ‘ravens are white’ is false.

1 The Problem with Generics

If we wanted to say what is required for a generic *As are B* to be true, we might try to do so by placing conditions on how the property of being *B* has to be distributed among *As*.¹ Being at least informative on this issue raises one of the core puzzles—perhaps *the* core puzzle—of generics. On the one hand, some generics are false even though the majority of *As* are *B*, such as (3) and (4).

¹Generics are independent of their corresponding existentials and universals in the opposite direction, as well. Consider a situation in which all tigers have lost a leg due to predation, rivalry, accident, or illness. In that case, ‘all tigers have three legs’ is true, ‘some tiger has four legs’ is false, but (2) is still true and ‘tigers have three legs’ false. That can presumably be handled via some kind of modal expansion of the domain—once we take a sufficiently broad view of things, these kinds of situations will appear as aberrations. I’ll ignore this complication here.

(3) Books are paperbacks.

(4) Prime numbers are odd.

Their falsity seems to require that the generic *As are B* is true only if the vast majority of *As*, or perhaps all normal *As*, or perhaps even all *As simpliciter*, are *B*. On the other hand, some generics are true even though the majority, and sometimes the vast majority, of *As* fail to be *B*.

(5) Lions have manes.

(6) Chickens lay eggs.

(7) Mosquitos carry plasmodia. (The organisms that cause malaria)

(8) Sharks attack bathers.

Thence the puzzle: how can we possibly account for the apparent strength of (3) and (4), and thus their falsity, while simultaneously accounting for the apparent weakness, and thus truth, of (5)-(8)?

The most common strategy for dealing with (5) and (6) makes use of a variable domain: generics always require that very many—assume all normal for purposes of illustration—members of the kind in a suitable domain have the property in question, which is why (3) and (4) are false, but the suitable domain changes from generic to generic. (5) is interpreted in terms of a suitable domain that only contains male lions or lions with sexually selected ornamentation, (6) in terms of a suitable domain that consists only of fertile, female chickens. It may even be possible to say something general about how the relevant domain is determined.²

This paper is concerned with examples like (7) and (8) because the strategy of appealing to a suitably restricted domain seems to fail for them.³ Only a small minority of mosquitos actually carry plasmodia at any given time, and there is nothing that objectively distinguishes those that do from those that don't, aside from the fact of plasmodia-carrying itself. Thus, there is no way of restricting the domain nontrivially so as to allow the analysis of (7) as 'all

²Perhaps the mechanism is largely formal, as in the case of Ariel Cohen's theory (see Cohen, 1999a,b), or perhaps it makes reference to a notion of normality (see Asher and Morreau, 1995; Krifka, 1995) [[REFERENCE SUPPRESSED FOR BLIND REVIEW]].

³The classic statement of this objection is given by Carlson (1977, 2002). Recently, it's been pressed by Leslie (2007, 2008).

normal mosquitos (in the relevant domain) carry plasmodia' to make the right prediction about the truth of (7). Similar remarks apply to (8).⁴

Of course, (7) and (8) are troublesome only if they predicate a property that only a minority of members of the kind at issue have. Importantly, they also have a weaker reading on which (7) and (8) are completely unproblematic. Put intuitively, the difference in readings is a difference between an ascription of a habit and of a capacity. If the latter was at issue, a normality-analysis would predict (7) to roughly mean 'all normal mosquitos (in the relevant domain) have the capacity to carry plasmodia,' and this is indeed true. This paper provides a test to tell the two readings apart, and it argues that by the lights of this test, the predicates have the capacity interpretation in the most natural readings of (7) and (8). These examples thus do not threaten normality- or majority-based analyses of generics.

2 Habits and Capacities—and How to Tell the Difference

The idea of thinking about the semantic value of an expression in quantificational terms has proved very popular for certain kinds of predicates, including ascriptions of dispositions: to say that the vase is fragile is to say that it breaks in a certain range of cases.⁵ But the application of this technique is not limited to ascriptions of dispositions. Consider the examples in (9).

- (9) a. The Eurostar goes 120 mph.
b. My Peugeot goes 120 mph.

(9a) is most naturally understood as about the cruising speed of the high speed train, (9b) as about my Peugeot's top speed. If we analyze these examples in terms of quantification over situations in which they move, neither (9a) nor (9b) would quantify over all possible situations. (9a) isn't threatened if the Eurostar goes more slowly when the tracks are repaired, and (9b) isn't true if my Peugeot only reaches 120 mph by being shot out of a cannon. Rather, we can interpret both with respect to a suitable range of actual and

⁴See in particular the discussion in Leslie (2008).

⁵What that range of cases is, is an extremely dicey matter. For some recent contributions to this discussion, see Fara (2005); Manley and Wasserman (2008).

merely possible situations (intuitively, the normal ones), and we can capture the difference between (9a) and (9b) in terms of different quantifiers: (9a) says that the Eurostar goes 120 mph in all normal situations in which it travels, while (9b) says that my Peugeot goes 120 mph in some normal situations in which it travels. I want to emphasize that a witnessing situation for (9b) need not be actual. It could still be true, even if my Peugeot never actually runs at its top speed.⁶

Predicates like the one in (9) are therefore ambiguous between what I'll call a habit and a capacity.⁷ This ambiguity is directly relevant to the interpretation of (7) and (8). Consider the predicate 'carry plasmodia.' On the habitual reading, the predicate is true of a mosquito iff that mosquito carries plasmodia in all relevant situations—presumably just about all of the time. On this reading, the predicate is satisfied by hardly any mosquitos. On the capacity reading, the predicate is true of a mosquito iff that mosquito carries plasmodia in some relevant situation, perhaps a merely possible one. In other words, the capacity reading is true of all mosquitos that have the right constitution to be plasmodia-carriers, quite independently of whether they ever actually carry them. This is why (7) is problematic for a normality-based analysis only if the predicate receives the habitual reading.

Looking at the distribution of 'any' can help us determine which reading is at issue in the most natural interpretation of (7). Following Vendler (1967), we take 'any' to indicate a complete freedom of choice, paradigmatically illustrated in (10a).

- (10) a. John may take any of these cards.
- b. * John must take any of these cards.

As the unacceptability of (10b) shows, 'any' is only licensed in some environments, and the contrast between (10a) and (10b) exhibits a very well-confirmed generalization about that licensing: 'any' is acceptable in the scope of a possibility modal but not in that of a necessity modal.⁸

⁶For more discussion, see Chierchia and McConnell-Ginet (2000); Lawler (1973); Schubert and Pelletier (1989).

⁷The habitual reading goes with universal quantification over the relevant situations, the capacity reading with existential quantification.

⁸For some theoretical treatments that seek to account for the data, see e.g., Aloni (2003); Dayal (1998); Giannakidou (2001); Menendez-Benito (2005).

We can use this fact to diagnose whether the predicates in (7) and (8) have a habitual or a capacity reading. Consider the examples in (11).

- (11) a. The Eurostar goes any speed up to 120 mph.
b. My Peugeot goes any speed up to 120 mph.

While (11b) is roughly equivalent in meaning to the corresponding (9b), (11a) has a clearly different meaning from (9a). This is exactly what we would expect, given the analysis of the original contrast between (9a) and (9b). If (9b) contains a possibility modal (existential quantification over possibilities), we expect 'any' to be licensed without further difficulties. Likewise, the only reading available for (11a) is a capacity reading, since that is the only way for 'any' to be licensed. And since the most natural reading of the original (9a) involved a necessity modal, we expect there to be a significant change in meaning.

More generally, the pattern in (9a)-(9b) and (11a)-(11b) suggests the following test for whether a predicate ascribes a habit or a capacity. Replace the predicate to be tested with another one that contains 'any' and is otherwise as close in meaning to the original as possible. If the original predicate ascribed a capacity, the result of replacement should be very close in meaning, since both are interpreted as possibility modals. If, however, the original predicate ascribed a habit, the replacement forces a shift from a necessity to a possibility modal with an attendant change in meaning. Moreover, such a replacement should be quite generally available for capacity-ascriptions, since a given capacity is usually one among many, as for example the capacity to go 120 mph is usually accompanied by the capacity to go at any lower speed.

By applying this criterion, we find that the target generics predicate a capacity, not a habit, since the relevant replacement does not force a change in meaning.

(7') Mosquitos carry any of a number of disease agents, including plasmodia.

(8') Sharks attack any of a number of large animals, including bathers.

Thus, neither (7) nor (8) threaten normality- or majority-based analyses of generics.

References

- Aloni, M. "Free Choice in Modal Contexts". In M. Weisgerber, ed., *Proceedings of Sinn und Bedeutung 7*, 25–37 (Konstanz: FB Sprachwissenschaft, Konstanz, 2003).
URL: <http://ling.uni-konstanz.de/pages/conferences/sub7/>
- Asher, N. and M. Morreau. "What Some Generic Sentences Mean". In G. N. Carlson and F. J. Pelletier, eds., *The Generic Book*, 300–339 (Chicago: University of Chicago Press, 1995).
- Carlson, G. N. *Reference to Kinds in English*. Ph.D. thesis, University of Massachusetts, Amherst (1977).
- . "A Unified Analysis of the English Bare Plural". In P. Portner and B. H. Partee, eds., *Formal Semantics: The Essential Readings*, 35–74 (Malden, MA: Blackwell Publishing, 2002).
- Chierchia, G. and S. McConnell-Ginet. *Meaning and Grammar, Second Edition* (Cambridge, MA: MIT Press, 2000).
- Cohen, A. "Generics, Frequency Adverbs, and Probability". *Linguistics and Philosophy*, 22, (1999a), 221–253.
- . *Think Generic!* (Stanford, CA: CSLI Publications, 1999b).
- Dayal, V. "ANY as inherently modal". *Linguistics and Philosophy*, 21, (1998), 433–476.
- Fara, M. "Dispositions and Habituals". *Noûs*, 39(1), (2005), 43–82.
- Giannakidou, A. "The Meaning of Free Choice". *Linguistics and Philosophy*, 24, (2001), 659–735.
- Krifka, M. "Focus and the Interpretation of Generic Sentences". In G. N. Carlson and F. J. Pelletier, eds., *The Generic Book*, 238–264 (Chicago: University of Chicago Press, 1995).
- Lawler, J. *Studies in English Generics* (Ann Arbor: University of Michigan Press, 1973).
- Leslie, S.-J. "Generics and the Structure of the Mind". In J. Hawthorne, ed., *Philosophical Perspectives 21, Philosophy of Mind*, 375–403 (Malden, MA: Blackwell, 2007).
- . "Generics: Cognition and Acquisition". *Philosophical Review*, 117(1), (2008), 1–47.
- Manley, D. and R. Wasserman. "On Linking Dispositions and Conditionals". *Mind*, 117(465), (2008), 59–84.

Menendez-Benito, P. *The Grammar of Choice*. Ph.D. thesis, University of Massachusetts, Amherst (2005).

Schubert, L. K. and F. J. Pelletier. "Generically Speaking, or, Using Discourse Representation Theory to Interpret Generics". In G. Chierchia, B. H. Partee, and R. Turner, eds., *Properties, Types, and Meaning, Vol. II*, 193–268 (Dordrecht: Kluwer Academic Publishers, 1989).

Vendler, Z. *Linguistics in Philosophy* (Ithaca, NY: Cornell UP, 1967).