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Is H₂O a Liquid, or Water a Gas?

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In *Beyond Rigidity* I argue that, like ‘red’, ‘water’ can be used both as a singular term, and (when combined with the copula) as a predicate – as illustrated by (1) and (2).

- 1a. Red is a color.
- b. Bill’s shirt is red.
- 2a. Unlike gold, which is an element, water is a compound.
- b. The liquid in the glass is water.

Just as ‘red’ designates a kind instances of which (at a world-state w) constitute the extension of the predicate ‘is red’ (at w), so ‘water’ designates a kind instances of which constitute the extension of the predicate ‘is water’. This observation is used in analyzing examples of the necessary aposteriori like those in (3), which have the force of quantified conditionals in which both the grammatical subjects and ‘is H₂O’ function as mass predicates, true of all instances of the associated kinds.

- 3a. Water is H₂O.
- b. Ice is H₂O.
- c. Water vapor is H₂O

Adam Sennet has no problem with this. Nor does he object to my claim that ‘water’ has a reading in which it designates a substance instances of which may be liquid, gaseous, or frozen. What does bother him is my postulation of a second reading, designed to accommodate the truth of (4a), in which ‘water’ designates a sub kind of that substance, all instances of which are quantities of liquid.

- 4a. Water is a liquid.

Viewing the postulation of such ambiguities as dangerous intellectual vice of past philosophers, from which the enlightened now properly recoil, Sennet argues that the truth of examples like (4a) can better be accounted for by other means.

One such means is by treating (4a) as equivalent to (4b), and taking the later to be generic -- presumably as equivalent to something along the lines of (4c).

4b. Water is liquid

c. Normally, instances of (the substance) water are liquid.

I am skeptical. First, although I can see that worthless diamonds, stripeless tigers, and three-legged horses fall outside the norm, and so do not falsify generic understandings of

5a. Diamonds are valuable.

b. Tigers have stripes.

c. Horses are four-legged.

I don't see that nonliquid forms of water – ice, snow, water vapor, etc. – are somehow abnormal, and so precluded from being counterexamples to (4c) -- when 'water' is given its unrestricted reading. On the contrary, taken in that way, (4c) seems false (or at least questionable), and hence not a proper analysis of uses of (4a,b) that express obvious truths. Second, if Sennet were right about (4a,b), then (6a,b) should have standard generic uses equivalent to those of (4a,b).

6a. H₂O is a liquid.

b. H₂O is liquid.

After all, if the substance water just is the substance H₂O, then any normal instance of the one should be a normal instance of the other. Thus, generic understandings of (4a,b) should be equivalent to those of (6a,b). But then, since the latter would typically be taken to be false, the generic understanding of (4a,b) cannot account for the familiar use on which they state obvious truths.

This does not mean that generics have nothing to do with Sennet's data. He may well be right that (7a,b) are naturally understood as generic.

- 7a. Water is a refreshing liquid.
- b. Water is refreshing.

However, in these cases, ‘water’ occurs with its restricted meaning, and the resulting statements tell us that normal instances of liquid water are refreshing. It is plausible to suppose that what rules out dirty or scalding water as counterexamples is not a further, even more restricted, meaning of the term, but considerations of what counts as normal in the relevant contexts of utterance. Such considerations may also be involved in examples in which ‘water’ is used with its unrestricted meaning. A good candidate is (3a), used to specify the chemical structure of water in all its forms. As noted in *Beyond Rigidity* (286), deuterium oxide, D_2O , is often counted as a kind of water (so-called “heavy water”), and even samples of ordinary “pure” water frequently contain very small amounts of deuterium and tritium. Samples of pure water, it seems, are often mixtures of H_2O , deuterium, and tritium, with H_2O being the overwhelmingly dominant part. If this is right, then interpretations of (3a) in which the quantification is universal may, strictly, be false, while interpretations in which the quantification is generic may properly be regarded as true. But if (3a) is generic, then the fact that the instances it talks about are not restricted to those in liquid form undercuts the rationale for attributing the restriction in (4a) and (4b) to generativity.¹

Sennet’s second suggestion for accommodating the truth of (4a,b) without appeal to ambiguity invokes contextual restrictions on the domain of quantification. It is well-known that the intentions of speaker-hearers in particular contexts can restrict the domains of quantifiers of all sorts. Noting this, Sennet suggests that the quantification in (4a,b) may be

¹ This observation does not undermine the argument based on the contrast between (4a,b) and (6a,b). Even if it is not strictly true that the substance water = the substance H_2O (undercutting the appeal to Leibniz’s Law), the use of a strictly accurate identity statement could be used to construct a parallel argument.

analyzed as universal, rather than generic -- with the truth of these examples being due to a domain that is contextually restricted to liquid quantities of water. But if this is so, why don't (8a-d) seem equally natural and true?

- 8a. Water is a gas.
- b. Water is gaseous.
- c. Water is frozen.
- d. Water is cold.

After all, if 'water' in these sentences applies equally to all quantities of the substance -- including those that are liquid, gaseous, or frozen -- and if contextual restrictions on the domain can narrow the range of quantification to any subset of this extension, then restrictions that make (8a-d) true should be as easy to come by as those that make (4a,b) true. Why then are (4a,b) unhesitatingly accepted as true by virtually all English speakers, while (8a,b) are naturally be regarded as bizarre, or false? The answer, I think, is that 'water' is lexically ambiguous -- with one meaning encompassing all quantities of the substance, in no matter what form, and one meaning applying only to liquid quantities -- but no meaning applying to only gaseous quantities of the substance, and no meaning applying only to those that are frozen.²

The ambiguity of 'water' is, by no means, unique. Rather, it is a kind of polysemy analogous to that of 'man' and 'cat'. In each case, the word has a restricted interpretation, in which it applies to a proper subset of the cases to which it applies on its general interpretation. 'Man' is ambiguous between a reading (still present, though fading in post-feminist times) on

² Could one -- if the intentions of speaker-hearers imposed the right domain restrictions -- *ever* use (8a-d) to express truths . Perhaps, but not without unusual stage-setting not required for (4a,b).

which it applies to all human beings, and a reading on which it applies only to adult males. ‘Cat’ is ambiguous between a reading on which it applies to all members of the cat family – tigers, lions, panthers, housecats, etc. – and a reading on which it applies only to housecats. Examples involving the unrestricted meanings include (9a,b) and (10a,b) -- which are naturally understood as expressing truths about humans in general, and members of the cat family in general.

- 9a. Man is mortal.
- b. Men are descended from apes.
- 10a. Cats are predators.
- b. The zoo has many types of cats.

Examples involving the restricted meanings of ‘man’ and ‘cat’ include (11a,b) and (12a,b).

- 11a. Sharon lives with a man. (vs. with a human)
- b. Boys grow up to become men. (vs. to become humans)
- 12a. Most cats are domesticated. (vs. Most members of the cat family are domesticated.)
- b. That dog chases every cat he sees. (vs. every member of the cat family he sees.)

It would be most implausible to suppose that one could explain away ambiguity-supporting data involving ‘man, and ‘cat’ by positing only their unrestricted readings, while appealing to generic quantification or context-sensitive domain restrictions to accommodate examples like (11) and (12). The same, I think, is true of ‘water’.

For this reason, I am not convinced that I was wrong to claim, in *Beyond Rigidity*, that ‘water’ is ambiguous. Contrary to Sennet, my claim is not analogous, to “once popular [but philosophically, as opposed to linguistically, motivated] claims that (i) ‘existence’ is ambiguous between its application to abstract object and material objects and (ii) ‘to see’ is ambiguous between seeing sense data and seeing real objects.” Rather, my claim is analogous

to – and supported by the same kinds of evidence as -- the widely-accepted, and linguistically well-supported, claim that ‘man’ and ‘cat’ are ambiguous. Nor was my claim about the ambiguity of ‘water’ philosophically motivated. As far as I can tell, none of the philosophical claims of *Beyond Rigidity* depend on the linguistic dispute between Sennet and me.