

COULD THINGS BE DIFFERENT IN ANOTHER WORLD?*

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In *Naming and Necessity*, Kripke suggests that statements like 'water is H₂O' and 'cats are animals' are necessarily true – that is to say, true in all possible worlds (Fig. 1) – and that the necessity is revealed by empirical investigation. The statements are said to be logically necessary *a posteriori*.

	Actual world	Other world
Logical necessity	<ul style="list-style-type: none">• <i>Water is H₂O</i>• <i>Cats are animals</i>	<ul style="list-style-type: none">• <i>Water is H₂O</i>• <i>Cats are animals</i>

Fig. 1. Kripke on logical necessity *a posteriori* in *Naming and Necessity*

However, Kripke's essentialist view of natural kinds does not rule out contingency altogether but goes along with an ample use of arguments from counterfactuals, often phrased in the terminology of other worlds. For example, although cats are necessarily animals, Richard Nixon did not necessarily become President of the the United States, and Franklin, the Postmaster General, did not necessarily invent bifocal glasses. In Kripke's view, in another possible world Nixon might not have gone into politics, or Franklin might not have invented bifocals (Fig. 2).

The idea of another world similar to, but not identical with, our actual one, also figures in Putnam's arguments for semantic externalism, but there in the make-believe game that water might *not* be H₂O (Fig. 3).

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	Actual world	Other world
Logical necessity	<ul style="list-style-type: none"> • <i>Water is H₂O</i> • <i>Cats are animals</i> 	<ul style="list-style-type: none"> • <i>Water is H₂O</i> • <i>Cats are animals</i>
Contingency	<ul style="list-style-type: none"> • <i>Nixon president</i> • <i>The Postmaster Gen. inventor of bifocals</i> 	<ul style="list-style-type: none"> • <i>Nixon not president</i> • <i>The Postmaster Gen. not inventor of bifocals</i>

Fig. 2. Necessity and contingency in *Naming and Necessity*.

Actual world	Other world ("Twin Earth")
• <i>Water is H₂O</i>	• <i>Water is XYZ</i>

Fig. 3. A Putnam argument for semantic externalism

In the present lecture I shall not discuss natural kinds, essentialism or semantic externalism. I am not going to take issue with the theory of causal referencing. Rather, I shall simply try and express an intuitive uneasiness over the rationality of arguments from other possible worlds, in general: *How can one be sure, or at least justify one's belief, that arguments from other worlds are consistent, in the sense of not necessarily contradicting anything that is true about the world?*

Counterfactual fantasies about our actual world are commonplace in everyday talk as well as in science, when we deliberately cut out a limited contextual scene from the totality of the world. We can do this in virtue of our ignorance as to how this scene should in all its details be conceptually and causally linked up with the totality. Indeed, scientific tests are useful precisely because there are epistemic uncertainties, called 'possibilities', that are *not* physically or, maybe, not even logically possible. In contrast, the invocation of a similar but not identical *world* would naturally seem to take on greater pretensions than merely to signal epistemic want. Yet, in *Naming and Necessity* Kripke is at pains to explain that his talk of other worlds is nothing but another way of talking about counterfactuals in our actual world. His undisputable right to his own stipulation notwithstanding, why talk about another world if not to emphasize that the relevant context is the totality, not a minor scene cut out at one's own discretion? If

there is a point in positing another world instead of merely talking counterfactually, it ought to be, I think, that this tactic relieves one of the “if” in counterfactual antecedents. One simply assumes that what is not known to be true, or even known to be false, about the actual world can be posited as true about the alternative world.

So, what can one really say about another world, without running a risk of being inconsistent?

Determinism has a prominent place in the history of thought. For a well known example, Spinoza’s holism obliterates the distinction between possibility and necessity. Given that both thought and extension are attributes of an undivided divine substance, he regards it as logically necessary that the world be structured as it is.

Similarly, in the East, Hsiang Hsiu and Kuo Hsiang almost eighteen hundred years ago commented upon the Taoist canonical text, *Chuang-tzu*, in the following manner (I quote Fung Yu-Lan’s English translation):

What we are not, we cannot be. What we are, we cannot but be. What we do not do, we cannot do. What we can do, we cannot but do. ... There are some people who are not satisfied with their own nature and always attempt what is beyond it. This is to attempt what is impossible, and is like a circle imitating a square, or a fish imitating a bird.

Spinoza’s conflating possibility with necessity hinges on his view of Nature as expressing divine thoughts. Modernity may not care much about divinities, but willingly puts Science in their place. Although Nature does not express propositions or statements, Science certainly does, aiming at a steadily more complete description of the world.

When we are asked to consider a world that is similar to, but not identical with, our actual one – be it a thought experiment or a realistic ontological assertion – one may wonder whether in fact we are asked anything at all. For, how does one know that the request is not implicitly analogous to asking us conceive of a world that is identical with the actual one, except for having plane triangles with angle sum greater than 180 degrees, or circles that look like squares – to borrow illustrations from both Spinoza and the scornful ancient taoists?

In general terms we can think of a complete description of the world as containing a set of laws and generalizations, ‘laws’ for short, and a set of true statements of facts. By ‘complete’ I here mean the extent to which the world is at all

describable. Although such a complete description is not likely to be attainable in practice, the idea is not vacuous as an abstract boundary concept, a goal toward which science is striving. How 'fact' should be analyzed is of little concern, as long as facts are taken to fulfill the function of arguments, binding the variables of open generalizations. Determination can then be understood in terms of laws and statements of facts. If the world is determined, then each statement of fact is implied by the laws and the other statements of fact.

If S is a true statement of fact, then a complete *description* of the world could not possibly entail *not-S* instead of S . It is not merely physically impossible for the world to be such that *not-S* obtains, but it is logically impossible for the true description of the world to contain *not-S*. For example, if it is true that water in our actual world consists of H_2O , then that is not a contingency. Rather, it is then impossible that an otherwise truthful description of the actual world could consistently contain the statement that water is not H_2O .

This conclusion does not rest on any presupposition that water, or anything else, belongs to an ontologically privileged class of objects such as natural kinds. On the premiss of holistic determinism, it holds for all objects that if S truthfully states a fact involving that object, then this fact is implied by the conjunction of the other true statements of facts and laws.

It may be said that I am here referring to nomological rather than logical necessity in the strictly general sense. If we make this distinction, it seems to me that we must at least accept being agnostic as to whether all the true statements about the actual world are consistent with more than one set of laws.

Now, let us consider the possibility of another world, identical to our actual one except for water's not being H_2O . Let S be the statement that water consists of H_2O ! As this is the only statement that is true in our actual world and false in the alternative world, the conjunction of all the other statements with the laws of our actual world implies that *not-S* is false. Therefore, either the alternative world is not determined, or its set of laws is different from that in our actual world.

If the set of laws in the other world differ from that in our actual world, the alternative world could hardly be said to be identical with our actual world, except for water not being composed of H_2O . Unless, perhaps, the only difference between the two sets of laws are laws whose realm is limited to water or its alternative variety. But it is inconceivable that laws determining the composition and macroscopic properties of

water, or its alternative, could be restricted to water or its alternative. To explain the formation and behaviour of something, the realms of laws must also cover external relations, to and between other objects that are integral parts of the world.

Moreover, for an alternative world to be governed by an alternative set of laws, this alternative set of laws must be consistently conjoinable with the subset of facts holding in both worlds. As the laws in our actual world are true, it seems highly unlikely that any other conjunction of laws in the alternative world could be consistently conjoinable with the statements of facts that hold in both worlds. At least, again, we cannot know or take it for granted that that is so.

Hence, for the idea of an alternative world containing water without H₂O to be consistent with a complete description of our actual world, save for the composition of water, non-determinism in at least one of the worlds must be presupposed.

The restricted predictability of non-linear complex systems is sometimes a bit carelessly described in terms of chance and randomness. It should be remembered, therefore, that the restricted predictability of so-called chaotic systems is an epistemic characterization that does not exclude determination.

However, as is well known, quantum physics involves a true breach with the determinism of macrophysics. This has encouraged a many-world ontology, in which the randomness of microscopic phenomena in one world, *e.g.* our actual one, is interpreted as the local manifestation of a deterministic wave function governing the behaviour of a huge universal collection of worlds. However, regardless of any deterministic nature of the wave function when quantified over all worlds, the individual quantum phenomena in our actual world will be random and appear as such to the earthly observer.

We must therefore ask whether the stochastic nature of quantum phenomena in each individual world is sufficient to guarantee the rationality of talk about other worlds that are nearly but not completely identical to our actual one.

As quantum effects are ascertained by the use of macroscopic machinery, random micro phenomena can no doubt exert noticeable effects at the macro level of material organization. For statistical reasons, microscopic random effects do not in general combine to perturb the qualities of objects in a way that would violate the macroscopic laws. Macroscopic regularity, as it is presently perceived in both everyday life and in scientific research, is clearly a requisite for semantic stability in our descriptions of the macro world. Therefore, in the first analysis, quantum theory does

not seem to allow much more than microscopic differences between the descriptions of two nearly identical worlds. This is not to question the rationality of speculative cosmologies which envisage a plethora of radically different universes. Here I am only considering worlds that are stipulated to be identical with our actual one, except for limited macroscopic differences, for instance that Nixon did not become President. And such talk about such worlds that takes its own consistency and meaningfulness for granted.

Of course, a major uncertainty arises from the fact that our world contains living organisms, notably with nervous systems. Nerves markedly influence the world's macroscopic structure – not by exerting any physical force of their own but by their catalytic influence on the flow of other matter. It is not known whether such catalytic cerebral events may be truly random and thus escape the rule of determining laws. It is not known whether a specific fact – such as Nixon's decision to run for President – reflects a random microscopic event in Nixon's brain, or anybody else's brain, or should be more correctly described as implied by rigid laws in conjunction with true statements of other facts. As long as this remains an open question, the idea of a world in which Nixon never went into politics may be as consistent an idea as that of a world in which plane triangles have an angle sum greater than 180 degrees. This hazard has nothing to do with whatever theory of naming and referencing is the correct one.

Although phenomenological randomness is part of received quantum physics, there are also heterodox attempts to preserve a certain amount of lawfulness at the subatomic level. In his book from 1957, *Causality and Chance in Modern Physics*, the physicist David Bohm envisaged the world as multilayered in such a way that causality or chance at one ontological level can give rise to its opposite at a higher level. He also speculated that the world is epistemically and ontologically infinite and that there may be no bottom-most ontological level where either causality or chance reigns supreme. This theory leaves us without guidance as to what might consistently be said about another, similar, world. However, if one restricts one's observations to the top levels of Bohm's world, a comparison with another world would in principle seem possible. But then the quantum level phenomena are more determined in Bohm's theory than in orthodox quantum theory. So, that heterodox theory seems even further remote from guaranteeing that another world can without implicit self-contradiction be assumed to be macroscopically nearly identical with the actual one.

In conclusion, therefore, I suggest that one should look at arguments from other worlds in the following way. They are either merely meant to be about epistemic uncertainty and thus to signal ignorance, or they run the risk of being implicitly inconsistent (Fig. 4).

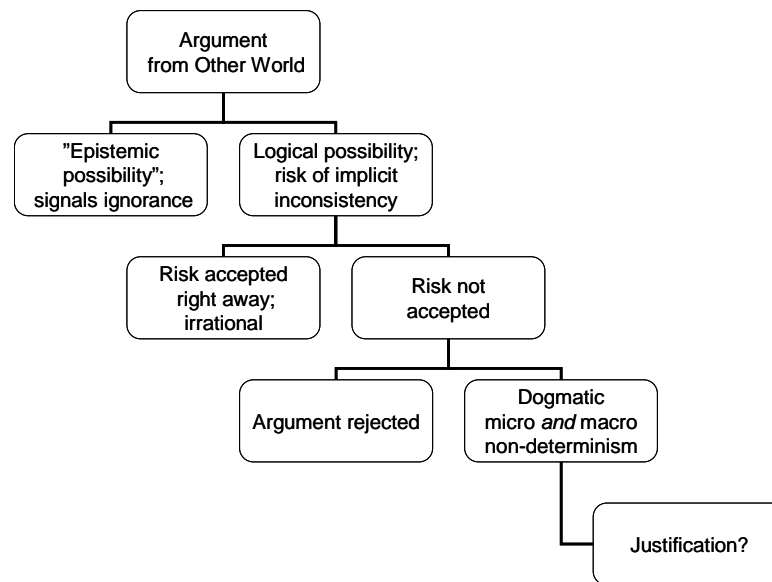


Fig. 4. Schematic analysis of the rationality of arguments from other worlds that are similar to, but macroscopically slightly different from, our actual one.

To accept such a risk right away would seem outright irrational. As a radical alternative one could simply reject the argument. If, for some reason, one does not want to do that, then it seems necessary to assume as a premiss that non-determinism is a valid ontology at both the microscopic and macroscopic levels. But then, of course, one is left with the problem of accepting *that* premiss, and either to do it dogmatically, which seems irrational, or to take on the burden of justifying it, a challenge which seems quite demanding.