

Possibility in Single World

Mark Ressler

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Abstract

In response to suspicions concerning the use of possible worlds in philosophy, this brief paper proposes an analysis of possibility that requires only a single world, using a combination of temporal logic and a potentiality operator.

It is not only ontological scruples that might lead one to be concerned with the use of possible worlds in philosophy. For my part, I am suspicious of possible worlds primarily due to their lack of explanatory value. Rather than explaining the notion of possibility, possible worlds themselves seem urgently to require explanation. To claim that possible worlds are merely a device used to articulate the logic of possibility is merely to ignore the demand for explanation. The use of possible worlds has not made the notion of possibility clearer, but seems rather to have clouded the issue, particularly given the profusion of modal systems based upon possible worlds semantics. I intend here to sketch the beginnings of an alternative analysis of possibility that does not rely on possible worlds, one that I hope will have greater explanatory value with regard to the notion of possibility itself.

The initial approach to this analysis is that a possibility is the promise of an actuality, and that whatever makes this promise must be something in the actual world. Consequently, the possibility of some sentence being true would appear to be grounded in the potentiality of something to make it true. Since this something is within the actual world, there is no need to invoke possible worlds to explain possibility. A single world will do.

By invoking the notion of potentiality, I do not intend to rely on what some may consider to be objectionable Aristotelian essentialism. The notion of potentiality I have in mind is fairly broad. I mean only that entities have certain abilities, and these abilities are grounded in the actual nature of an entity at a given time. At a different time, the entity may have quite different abilities. The truth of certain sentences clearly appears to depend upon the abilities of some entity, for example the sentence "Friedrich is moving his hands". Such a sentence depends significantly upon the state of Friedrich's muscularity and nervous system for its truth or falsity, and this dependence represents potentiality as I understand it here. This kind of potentiality is not merely the potential of one thing to develop into something else, but more generally the potential of some

thing for the truth of some statement. I propose that possibility claims always involve statements whose truth depends upon the potentiality of some entity.

Consequently, let POT be a potentiality operator on a sentence that takes an additional parameter x , as follows:

$$\text{POT}_x(\alpha) \tag{1}$$

where x is some entity, and α is some statement. $\text{POT}_x(\alpha)$ can be read: x has the potential to make α true. A possibility claim would therefore be based upon the identification of some entity x with the potentiality for the truth of what is claimed:

$$(\exists x)\text{POT}_x(\alpha) \tag{2}$$

However, some possibilities may be grounded in entities that no longer exist, as in the possibility that Friedrich might have been a pastor, though Friedrich is sadly no longer alive. Therefore, it would appear that this analysis of possibility would need to rely on temporality. Let P be the tense logic operator indicating the past. If I can assume for convenience that whatever entity grounds a possibility claim has existed at some point in the past, if only a microsecond ago, a possibility claim based upon an instance of past or present potentiality could be expressed as follows:

$$\text{P}(\exists x)\text{POT}_x(\alpha) \tag{3}$$

Yet this formulation still does not adequately analyze the notion of possibility, since some possibilities would seem to be grounded in potentialities that are themselves grounded in other potentialities, as with the possibility that Friedrich's son might have become a Buddhist, though Friedrich never actually had a son and never will. Consequently, it would seem that some possibilities involve nested potentialities. I think this situation could be expressed recursively as follows, where \diamond is the modal possibility operator:

$$\diamond\alpha \leftrightarrow (\text{P}(\exists x)\text{POT}_x(\alpha) \vee \diamond(\exists x)\text{POT}_x(\alpha)) \tag{4}$$

Thus according to this analysis, the possibility of α is grounded either in the potentiality of some past entity to make α true, or in the possibility of some entity to make α true.

This recursive use of the possibility operator enables the nesting of potentialities that some possibility claims require, ultimately grounded in the potentiality of some past actual entity. For example, the above recursive analysis would yield the following after a single substitution, eliminating false or irrelevant disjuncts:

$$\diamond\alpha \leftrightarrow \text{P}(\exists y)\text{POT}_y(\text{P}(\exists x)\text{POT}_x(\alpha)) \tag{5}$$

In this case, the possibility of some sentence α is grounded in the potentiality of some past entity y to bring about the potentiality of some entity x to make α true, as in the potentiality of Friedrich to have a son with the potentiality

to become a Buddhist. Other possibility claims may require further levels of nesting of the potentiality operators.

It seems to me that one merit of this analysis of possibility is that it provides an approach toward evaluating possibility claims, particularly some of the wilder possibility claims that have been made. If a philosopher should make an apparently outrageous claim that something crazy is possible, I think I have the right to demand on what grounds I should accept that possibility. If the philosopher cannot identify something with the potential to make that particular item of craziness true, or if the potential is grounded in a god or some other magical creature to make it true, I would not feel obliged to accept the possibility claim.

Another merit of this analysis is that it allows for the recovery of possible worlds. Systems of modal logic that use possible world semantics are powerful devices, and I think it would be a demerit against any analysis of possibility that required the abandonment of such systems. Possible worlds can be reclaimed by projecting the state of the actual world subject to the actualization of the potentialities of certain past entities. If Friedrich had become a pastor, what would the rest of the world be like? The state of the world subject to the actualization of Friedrich's potential to become a pastor would constitute a possible world. The state of the world subject to the actualization of some other potentiality would constitute another possible world. The proposed analysis of possibility also appears to provide an analysis of accessibility relations between possible worlds in systems of modal logic: One world is accessible to another through the potentiality of some entity in the second world that could result in the first world, and inaccessible if there is no chain of potentiality in the second world that could bring about the projected state of the first world. For example, if Friedrich in the actual world could not have become an astronaut, because the state of science when Friedrich existed was insufficiently advanced to enable space travel, then some proposed possible world in which Friedrich was an astronaut would not be accessible to the actual world, unless there were some past entity or a chain of possible entities with the potentiality to advance the state of science by the time that Friedrich existed such that Friedrich would have the potential to become an astronaut, assuming that Friedrich would still have existed had those potentialities been actualized.

A third merit of this analysis is that it offers some means to quantify the distance between possible worlds. I have been suspicious of claims within epistemology that depend upon the notion of close possible worlds. It seems that these claims mainly rely on some vague intuitive notion of the closeness of worlds, and unless that notion could be made more precise, I remain dubious of such epistemological claims. The proposed analysis of possibility in fact provides two different measures for quantifying the distance between possible worlds. One is based on the time involved in the tense logic operator P . Possible worlds projected from the potentialities of entities that existed only a short while ago would seem to be closer to the actual world than possible worlds projected from the potentialities of entities that existed several millennia ago, since much would have happened as a result of the actualization of potentialities that were not in fact actualized longer ago. Another measure is based upon the level of nesting

of the potentiality operators. Possible worlds projected from the potentialities of entities that are themselves merely potential would seem to be much farther from the actual world than possible worlds projected from the potentiality of actual entities, since there would seem to be less chance of the actualization of potential potentialities than the actualization of actual potentialities. It is not clear how these two measures would work together with regard to epistemological claims relying on closeness of possible worlds, but if they did not work at all, I would not consider it an unfortunate situation with regard to those dubious claims, let alone a demerit against the proposed analysis of possibility.

Of course, it is not clear that the proposed analysis will ultimately be adequate to capture the nature of possibility. Nor have I investigated the effect of this analysis on existing controversies concerning modality, such as quantifying into modal contexts, *de re* and *de dicto* modality, identity, and essence. I merely offer the analysis here as a proposal for broader consideration, in the hopes that even if it fails, perhaps greater stimulus will thereby be given to the search for a better explanation of possibility.

Finally, it might be thought that this proposed analysis represents a species of naturalism, since it seems to rely on natural entities and thereby seems to reduce all kinds of possibility to natural or nomological possibility. To the contrary, I would point out that the proposed analysis does not impose any restrictions on the entities that appear within potentiality claims, nor is the notion of potentiality restricted to natural or causal potentiality. Indeed, an analysis of natural possibility in terms of natural entities seems particularly neat and elegant under this analysis. Yet the x term in $\text{POT}_x(\alpha)$ could just as well be a system of logic, such that the potentiality of the system for the truth of a sentence would represent logical possibility, where this potentiality is clearly not causal. I suggest that in this way the various kinds of possibility might be categorized according to the kinds of entities that appear within the potentiality operator. I suspect, though, that some kinds of possibility ultimately depend on the imaginations of certain philosophers. I could be wrong.