

# **The Principle of Modal Realism Equivalence**

By Paul Almond, 13 August 2008

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## Abstract

The principle of modal realism equivalence states that the methodology we apply for making statistical predictions about the world and the results obtained should be the same regardless of whether or not modal realism is true. If modal realism is true then probability calculations would be about where we are likely to be in the set of different, actual worlds. If modal realism is false then they would be about which is likely to be the actual world in the set of possible worlds. Both approaches differ only in the semantics of “possible” and “actual”.

## Introduction

Modal realism [1] is the controversial idea, suggested by David Lewis, that all possible worlds exist. If modal realism is true then any questions about probability are really questions about “where we are” in all the different possible situations.

Suppose modal realism is true and you want to know the probability that it is raining now in Tokyo then, in principle, you can consider the set of different worlds that exist, eliminating those that are not consistent with your experience. You know that one of these worlds must be the one that you inhabit, and the description of one of these worlds, with your situation in it, is the description of your situation, but you do not know which one, so you should consider each equally likely. Your probability, therefore, comes from the distribution of worlds in which it is raining in Tokyo in this set of different worlds. This does not mean that you would literally have to count all the worlds to get this probability: as there is no end for to them it would take forever. Instead, you would use some method which approximates doing this.

Suppose that modal realism is not true. This article will argue that it makes no difference to the methodology you should use to make predictions, or the results that you should obtain. You should make statistical predictions exactly as if modal realism is true, and whether or not your methodology is described in terms of modal realism is just semantics.

## Modal Realism

Modal realism [1] suggests that all possible worlds actually exist, that each is as real as the actual world and that the actual world is merely one of these possible worlds, differing from the others only by index, that we happen to inhabit. Max Tegmark’s ultimate ensemble view of reality [2,3] can be considered a mathematically described form of modal realism as can Jürgen Schmidhuber’s view [4] and *UDASSA* [5]. I have proposed a type of modal realism based on interpretation in my series of articles on Occam’s razor [6], a concept which I have also been developing in my articles about

substrate [7,8,9,10,11], which are developing the idea that a type of modal realism is needed to obtain a coherent view of probability when different situations in which an observer could exist are considered. A type of modal realism based on interpretation features in Greg Egan's science fiction novel *Permutation City* [12].

## **Approaches to Statistics With and Without Modal Realism**

If modal realism is true then all possible worlds exist and we are living in one of all possible worlds, but we do not know which one. We should assume that any possible world which is consistent with our experience is as likely as any other to be the one in which we are living. We can approach statistics by assuming that we live in a world selected randomly from the set of all possible worlds.

If modal realism is false then the real world must be one of all *possible* worlds, but we do not know which one and it is not necessarily true that any of the other possible worlds exist. We should assume that any possible world which is consistent with our experience is as likely as any other to be the real one. We can approach statistics by assuming that the real world is a world selected randomly from the set of all possible worlds.

In one approach to statistics we are trying to find out about the world in which we are living by considering the set of all possible worlds (each of which is presumed to exist). In the other approach we are trying to find out about the actual world by considering the set of all possible worlds (each of which is not necessarily presumed to exist). There is no difference between the ideal methods in each case. *These approaches are exactly equivalent.*

This equivalence may seem obvious to some readers, but I think that it is important that it is explicitly stated and I will call this *the principle of modal realism equivalence*.

The principle of modal realism equivalence comes from the fact that the set of formally describable, *actual* worlds in the event that modal realism is true will be exactly the same as the set of formally describable, *possible* worlds in the event that modal realism is not true.

## **A Simple Way of Considering the Principle of Modal Realism Equivalence**

One way of considering this is as a statement that, in making statistical predictions you may as well assume that modal realism is true. You can assume that all formally describable worlds exist and that you are in one of those which are consistent with your experiences. The probability that your world has certain features, or that certain things will happen in its future, is determined by this set of all possible worlds. For example, the probability that it will rain tomorrow, or that aliens exist, is the proportion of all worlds consistent with your experiences with that feature. After performing your calculation, or

some approximation of it, if you feel uneasy about having just assumed that modal realism is true you can label all the formally describable worlds considered in your calculation as *possible* worlds and your result will remain the same.

## **Formally Describable Situations**

The principle of modal realism equivalence does not, in itself, tell us exactly how we should make statistical predictions. All it does is tell us that whatever method we use should not depend on whether or not modal realism is true. If modal realism is not true then the question being asked in statistical prediction is “Which of all possible worlds is the real world?” If modal realism is true then the question is “Which world am I in?” The principle of modal realism equivalence merely asserts that whatever formal methods we use to deal with both of these questions will be equivalent to each other.

Tegmark’s view [2,3] and UDASSA [5] could be considered attempts to formalize modal realism and provide a basis for such a formalized statistical approach. I have given some consideration to the formal methods that would be used in previous articles on Occam’s razor [6] and substrates [7,8,9,10,11]. The idea that this is just about “which world you are in”, as I have represented it so far, may actually be a little simplistic. You could be in radically different kinds of situations in different worlds, or in different situations in the same world. Therefore, we should really consider statistical prediction from the point of view of what formally described situation, from the set of all possible formally describable situations that are consistent with your mental state, you are in, a position I discussed in the substrate articles [7,8,9,10,11]. The principle of modal realism equivalence would remain the same.

## **Why I Think This Needs Stating**

Some people may view the principle of modal realism equivalence as so trivial as to be not worth stating. I have stated it, however, because some people will view it as wrong. I know this because I have met people who reject the idea that we can approach statistics using any idea of possible worlds and such people would reject the principle of modal realism equivalence. Whether or not you accept the principle of modal realism equivalence is not a trivial issue because it will have a big impact on what you view as the correct methodology for making statistical predictions. For that reason, the principle needed to be explicitly stated so that people can state their agreement or disagreement with it and so that proposed methodologies for making predictions can be assessed in view of their agreement or disagreement with the principle of modal realism equivalence – and you will have your own view on whether agreement or disagreement is desirable.

## **An Example in Which This Is Relevant**

An example of a situation in which the principle of modal realism equivalence, if it is correct, affects things is provided by Barry Dainton’s paper *Innocence Lost – Simulation Scenarios: Prospects and Consequences* [13] which discusses Nick Bostrom’s simulation

argument [14,15]. The simulation argument explores the possibility that right now you are in a computer simulation being run by future humans, or descendants of humans, or aliens, etc, although it does not seek to show that this is likely: it actually argues something a bit more subtle. I will not go into Bostrom's simulation argument in detail here, nor will I get involved in the issue of whether or not it is valid, but instead I will just discuss what Dainton says about the relevance of modal realism to it.

Dainton thinks that being simulated would be a negative thing and describes it as a “menace”. He states that modal realism, if true, increases this menace (the chance that we are simulated), by arguing (it seems to me) that modal realism would imply the existence of a large pool of worlds in which simulations are being run. He says this:

*“If Modal Realism were true, the simulation menace would clearly be very real indeed.”*  
[13]

I do not think there is any “clearly” about this at all. Such a statement only makes sense if you reject the principle of modal realism equivalence. This does not mean that the principle of modal realism equivalence makes the “menace” *not* very real. All the principle of modal realism says is that whether or not modal realism is true has nothing to do with it. If you reject the principle of modal realism equivalence then you may think that Dainton’s statement makes sense. If you accept the principle of modal realism equivalence then you cannot think that modal realism has an effect on anything. If you think that the “simulation menace” would clearly be very real indeed if modal realism were true then the principle of modal realism suggests that you should think that the simulation menace is very real anyway because you should make statistical predictions on the basis that modal realism is true. Likewise, if you think that it would not be very likely that you are simulated if modal realism were true then you should assume that things are no different if modal realism were not true.

As a further example of how disagreement can arise, I was once in a discussion with someone about a type of modal realism, which he rejected. I then proposed that even if modal realism is not true, we should still deal with probability in the same way. The response was that this was nonsense, that I was fundamentally misunderstanding statistics and that if this were true then one world in which God is real could be said to affect all other possible worlds, thereby giving credence to an implausible idea such as God. This is effectively an argument against the principle of modal realism equivalence (though I had not called it that at the time) and it fails, in my view, by ignoring the requirement to formally describe all these possible worlds and by imagining that there is an “anything goes” situation caused by some kind of “effect” that one possible world can have on another, when in fact, any world in which a being could affect all possible worlds, even if we admitted that it was formally describable and self-consistent, would only be a possible world in its own right. Once you know that you disagree with someone about the principle of modal realism equivalence, you know that you disagree about almost everything to do with probability.

## Is this an argument for or against modal realism?

Some readers might view the principle of modal realism equivalence as an attack on modal realism, on the grounds that it seems to suggest that modal realism lacks Karl Popper's requirement of falsifiability. I am not going that far. The principle of modal realism is not intended to say anything about whether modal realism is true or not, but is merely a statement about how we should do statistics. Some people have issues with the requirement of falsifiability or may not regard it as appropriate to apply it to a philosophical position such as modal realism. Other readers might actually view the principle of modal realism equivalence as being *supportive* of modal realism for the same kind of reason that some people may view it as an attack on it: they may view modal realism as the natural position to take, possibly due to viewing it as simpler than the alternative and therefore favoured by Occam's razor, and they may therefore view the principle of modal realism equivalence as stating that an *absence* of modal realism is not falsifiable. Some readers may think that modal realism is logically required by various philosophical arguments which would make falsifiability irrelevant.

Ultimately, any argument that the principle of modal realism equivalence implies *in itself* that modal realism is right or wrong should be viewed with caution.

## Conclusion

This article has stated the principle of modal realism equivalence, which is that the methodology we apply for making statistical predictions about the world and the results obtained should be the same regardless of whether or not modal realism is true.

While some readers will find this trivially true, others will insist that it is wrong. I think it is important to explicitly state it for that reason, because it characterizes a lot of someone's position on probability.

I have used Barry Dainton's article [13] about the simulation argument [14,15] to give an example of how philosophical statements can be made which disagree with the principle of modal realism equivalence.

The principle of modal realism equivalence should not in itself be viewed as for or against modal realism. Arguments for and against modal realism could be made which refer to the principle of modal realism equivalence and they will need to refer to something else, such as a particular understanding of what the "default" position means, or Occam's razor as well.

## Acknowledgements

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