

# Possibility and Necessity

**1. Modality:** Modality is the study of possibility and necessity. These concepts are intuitive enough.

Possibility: Some things could have been different. For instance, I could have been a truck driver. Britain could have won the Revolutionary War. The Earth could have never formed at all. We say that these things are POSSIBLY the case.

Necessity: On the other hand, some things could NOT have been different. There could not have been square circles.  $2+2$  could not have equaled something other than 4. We say that these things are NECESSARILY the case.

[Possibility and Necessity Interchangeable: Note that possibility and necessity are really just two sides of the same thing. For instance, if I say 'Necessarily,  $\langle 2+2=4 \rangle$ ', this is the same thing as saying that 'It is not possible for it NOT to be the case that  $\langle 2+2=4 \rangle$ '. We can translate a statement about possibility into one about necessity, and vice versa:

- (1) Possibly P  $\Leftrightarrow$  Not necessarily not-P
- (2) Necessarily P  $\Leftrightarrow$  Not possibly not-P

For instance:

- (1) Possibly, Big Foot exists.  $\Leftrightarrow$  It is not necessarily the case that Big Foot doesn't exist.
- (2) Necessarily, I am human.  $\Leftrightarrow$  It is impossible for me to not be human.]

[Logical vs. Nomological Necessity: I mentioned that  $\langle 2+2=4 \rangle$  is necessary. It might also seem that, e.g.,  $\langle$ Nothing travels faster than the speed of light $\rangle$  is necessarily true. But, this is not the kind of necessity that *philosophers* are generally concerned with. It is the sort that *scientists* are concerned with. Scientists ask, what is possible ACCORDING TO THE LAWS? And, what is necessary ACCORDING TO THE LAWS?

But, in some sense it is 'possible' that the laws that govern our universe could have been different. Surely, I can at least IMAGINE myself jumping to the moon, or flying faster than light. That is, I can imagine that the world is such that the laws of gravity and light-speed are different. So, if it is "necessarily" the case that I could never do these things, it is only in a weaker sense. For, I cannot even IMAGINE myself drawing a square circle, or meeting a married bachelor, or putting 2 things next to 2 things to get 5 things.

In philosophy, we say that these latter things are **logically impossible** (i.e., they would violate the laws of logic) while the former things are only **nomologically impossible** (i.e., they would violate the laws of science; from the Greek word 'nomos' for 'law').]

**2. Possible Worlds Semantics:** Philosophers have devised a way of modelling truths about possibility and necessity, using a device of a framework of “possible worlds”.

To understand how this modelling device works, first, let’s define some terms:

**The World:** Everything that exists.

Now, “The World” IS a certain way. But, surely The World could have been different. For instance, you might never have been born, stars and planets might not have formed, and so on. In short, there are many possible ways that “The World” could be, or could have been (perhaps infinitely many). When we contemplate one of these “ways The World could be”, we are contemplating a specification of The World.

**Possible World:** A specification of a way The World could have been.

One of the “ways The World could be” is the way things REALLY ARE. That is, one of the “possible” worlds is the way the world IS; i.e., the ACTUAL world.

**Actual World:** The possible world that specifies the way The World actually is.

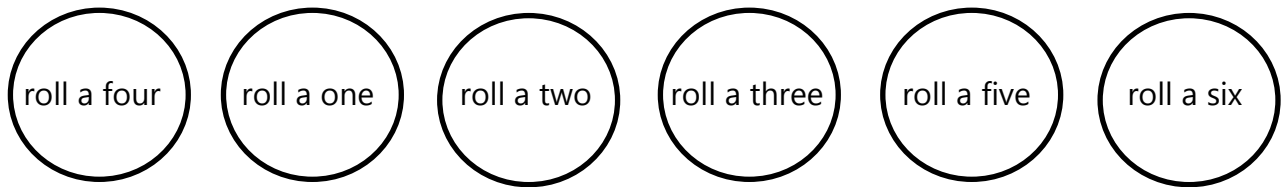
Possible State Spaces: The idea of there being various specifications of “ways things could have been” is not so foreign. For instance, consider the toss of a single 6-sided die. Imagine that it actually lands on 4.



The picture above represents the way the ACTUAL world—or the way the world ACTUALLY is. But, there are 5 other ways things could be. The pictures below represent 5 other possibilities regarding how things COULD be right now:



Before I rolled the die, ALL SIX of these outcomes were “possible”. As it turns out, the way the die ACTUALLY landed was a “4”. But, I COULD HAVE rolled any of the other 5 numbers. So, propositions like <Possibly, I rolled a six> seem intuitively true; and we can represent these six possible outcomes by picturing each of these six scenarios as six possible WORLDS—one for each of the possible outcomes:



World 1\*

World 2

World 3

World 4

World 5

World 6

(\* the actual world)

**Possible Worlds Analysis:** Philosophers typically analyze the notions of possibility and necessity in terms of these possible worlds:

(1a) **Possibility:**  $\langle P \rangle$  is possibly true if and only if  $\langle P \rangle$  is true in AT LEAST ONE possible world.

(1b) **Necessity:**  $\langle P \rangle$  is necessarily true if and only if  $\langle P \rangle$  is true in EVERY possible world.

For instance, it seems that  $\langle I \text{ rolled a } 5 \rangle$  is possibly true. If that is correct, then (in possible worlds speak) we say that there is at least one possible world where I rolled a 5—i.e., some “state space” which represents the possibility of me rolling a 5.

It also seems that  $\langle 2+2=4 \rangle$  is necessarily true. If that is correct, then (again, in possible worlds speak) we say that  $\langle 2+2=4 \rangle$  is true in every possible world. That is, there is no specification of a “way The World could be” where  $\langle 2+2=4 \rangle$  is false—at least, not one that correctly describes a way The World could be. Imagine, for instance, all of the different ways the die could have been rolled. While, in each of those possibilities, the DIE comes up differently,  $\langle 2+2=4 \rangle$  remains true in ALL of those scenarios.

[Note About The Arbitrariness of Utterances and Symbols: Now, this is not to say that the vocalization or the utterance of the syllables “Too pluss too ekwalls fore” is necessarily true. For instance, in SOME possibility (possible world), our ancestors might have applied the vocal utterance “TOO” to the object on the left, and designated it in writing by the symbol “2” on the right:



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In that case, the utterance of the syllable “too”, as well as the written symbol “2” would refer to a banana rather than a number. So, what vocalization or written symbol we attach to various concepts is arbitrary. Still there is SOME truth that our arbitrary string of symbols “ $2+2=4$ ” picks out; namely, the true proposition that our utterance REFERS to,  $\langle 2+2=4 \rangle$ . And THAT is what’s true in all possible worlds.]

**3. Possible Worlds EXIST:** Most philosophers believe that possible worlds must EXIST; i.e., they are THINGS. The short explanation is this: We say that unicorns are possible just as long as there is a 'way things could be' that includes unicorns. But, then, there must be **ways things could be**; i.e., these "ways" EXIST. Philosophers call these ways 'worlds'.

[Here is the more complicated explanation. Consider the following true statements:

- (1) All dogs are mammals.
- (2) Some mammals are dogs.

In logic, we say that these statements "quantify" over things. To see why, consider the way in which a logician would translate them:

- (1) For EVERY thing, it is true that, if it is a dog, then it is also a mammal.
- (2) Out of ALL the things, at least one of them is both a mammal and a dog.

Or, alternatively:

- (1) When considering the set of all things, it is true of thing 1 that if it is a dog then it is a mammal, and thing 2 that if it is a dog then it is a mammal, and thing 3 that if it is a dog then it is a mammal, and ...
- (2) When considering the set of all things, either thing 1 is a mammal and a dog, or thing 2 is a mammal and a dog, or thing 3 is a mammal and a dog, or thing...

These statements take the "domain" of ALL things and "quantify" over them—or in other words, assert something of each of them (via universal or existential "quantifiers"). But, we translate modal statements in the same way. Consider this modal claim:

- (3) I could have been a truck driver.

This translates as:

- (3) There is at least one possible world where I am a truck driver.

Or, alternatively:

- (3) Out of all the ways the world could be, either I am a truck driver in "way" #1, or I am a truck driver in way #2, or in way #3, or in...

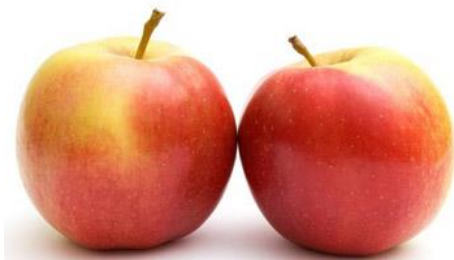
Just as (1) and (2) quantify over things in the world, (3) quantifies over possibilities, or 'ways the world could be'. Philosophers call these 'ways' POSSIBLE WORLDS.]

#### **4. What are Possible Worlds? Realism vs. Ersatzism:** What sorts of THINGS are they!?

- a. **Concrete Worlds:** David Lewis proposed something rather surprising. He said that these other possible worlds are REAL, MATERIAL worlds. That is, there really exist other universes out there where unicorns are running around, donkeys are talking, and where you (or your counterpart) are president of the United States. For every way that the world COULD be, there is a world out there that IS that way. An infinite number of concrete universes really exist. This view is called **Modal Realism**.

Lewis defined a possible world as a spatio-temporally isolated region. If something exists that is connected to us in space or time, then that thing is a part of OUR world (or universe). Other worlds are not “over there” to be discovered or observed. They are beyond the boundaries of space and time. We could never observe them.

If we can never observe other possible worlds (not even in principle!), then why did Lewis claim that there must be such things? Well, he was operating under a certain assumption—one that scientists also accept. Namely, one should accept the existence of entities if they serve to EXPLAIN things. For instance, we can't SEE electrons or protons. Yet, scientists postulate their existence because their existence explains certain phenomena that we observe. Similarly, mathematicians work with numbers. We can't SEE numbers, but the existence of numbers would serve to make sense of math. For instance, surely the following groups have something in common:



There are TWO apples and TWO pandas. If there is no THING that they have in common, then they have nothing in common. So, positing the existence of numbers (such as the number two) is helpful. David Lewis thought that positing the existence of concrete possible worlds was helpful in just the same way.

- b. **Abstract Worlds:** Lewis's view seems crazy. The most common objection to his view was the 'incredulous stare'. Now, Lewis is right that modal claims need to quantify over SOMETHING. In mathematics, it is hard to make sense of claims like  $\langle 2+2=4 \rangle$  unless we are quantifying over some THINGS (in this case, NUMBERS). Similarly, we need 'possibilities' or 'ways the world could be' to be in some sense REAL. But, perhaps they need not be concrete. Maybe possible worlds could do the same amount of work if they were abstract (like numbers). This view is called **Ersatzism**.

For example, many philosophers believe that possible worlds are just abstract sets; specifically, **sets of propositions**. For instance, recall the fatalist says that there exists a complete set of propositions which perfectly describes the actual world (past, present, and future) down to the last detail. But, now imagine that there are OTHER sets of propositions—ones which describe not how things ACTUALLY are, but rather how they COULD HAVE BEEN.

Much like *The Book of Osmo*, we might think of these other sets of propositions as “books” too, each one a COMPLETE description of a way the world could be. In each book, EVERY proposition is accounted for, and is listed as either true or false. E.g., if:

<Chad is 5’11” tall> is listed in the book as true, then

<Chad is 6’ tall> will be listed in the book as false.

Each book is both **maximal** (i.e., it contains EVERY proposition) and **consistent** (i.e., none of the books contain contradictory statements). After all, we don’t want any of our possible ways things could be to include Chad existing AND NOT existing!! That’s precisely one of the ways things COULDN’T BE!!

[Alternatively, Alvin Plantinga believed that possible worlds are maximally consistent sets of abstract states of affairs. For instance, consider each of the following:

The ground’s being covered in snow.

A monkey’s being in this room.

An apple’s being purple.

Surely, these descriptions refer to SOMETHING. After all, what were you just thinking of if these descriptions refer to nothing? Each of the phrases above refers to a state of affairs (i.e., a thing’s instantiating a property). But, at the same time, these states of affairs are not CONCRETE—as Alvin Plantinga would say, they do not ‘**obtain**’. So, he concludes that they are merely abstract entities. And Plantinga’s claim is that possible worlds are just maximally consistent sets of these sorts of entities.]

Problem: Now we’re able to see more clearly why Lewis thought that the things that ground our modal claims needed to be concrete. For, on the ersatzer’s view,

<Possibly, unicorns exist> is true if and only if there exists a set of propositions where <Unicorns exist> is true.

But, that's not quite right. For, not just ANY set of propositions will do. Some sets of propositions will contain <Unicorns exist> AND <Unicorns do not exist>. To rule out such sets, the ersatzist must invoke **consistency**, as we have said. But, 'consistent' just seems to be a veiled synonym for 'possible', so that:

<Possibly, unicorns exist> is true if and only if there exists a POSSIBLE (i.e., consistent) set of propositions where <Unicorns exist> is true.

Here, our explanation of possibility itself invokes the notion of possibility! In short, the abstract (ersatz) view hasn't really explained the notion of possibility at all! In the end, she must take 'possibility' as a "**primitive**" (that is, it is a notion that is irreducible, or cannot be further analyzed). The notion of possibility is unexplained.

Contrast this with David Lewis's account. On his view,

<Possibly, unicorns exist> is true if and only if, at some world, it is true that unicorns DO exist.

Lewis's view "reduces" the notion of possibility. Note that the idea of reduction is already familiar to you. For instance, it seems like some properties (e.g., heat) are "reducible" to other properties (e.g., molecular motion). Later in this semester, we'll ask whether or not consciousness is reducible to brain functions. For instance, are there really distinct things in the world called thoughts? Or are they, rather, nothing more than certain neurons firing in certain ways?

Lewis says that "possibility" is like heat or consciousness (if we think that those things are reducible). Possibilities are nothing more than concrete worlds. Thus, he has "explained away" the notion of possibility by analyzing it in terms of something else (namely, concrete worlds). Lewis takes this to be a huge advantage of his view over this abstract view. His account REDUCES the notion of possibility (that is, he can do away with it, analyzing it in purely non-modal terms); i.e., he can explain what possibility is in non-modal terms, rather than taking it as a primitive, as ersatzers do.

- c. **Fictionalism:** There is a third option. Some philosophers believe that possible worlds are mere fictions. Just as a mathematician might claim that all that is needed in order to do mathematics is to quantify over FICTIONS (a useful device that WE made up), philosophers might also claim that modal claims ALSO quantify over fictions.

Are numbers mere fictions? And if they are, is mathematics still coherent? Similarly, we might ask, are possibilities mere fictions? And if they are, is an investigation of modality still coherent?