

The Reality of the Future and the Space of Possibility

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Introduction

In the early 1970s, Pierre Wack, Ted Newland, and their colleagues in the *Group Planning* department at Royal Dutch Shell sat down and imagined something that most of the actors in the oil industry considered far-fetched: a future in which nations producing oil restrict supply. The exercise was not guessing, prophecy, or what have you. It was what could be called disciplined imagination, foresight even – it was a structured attempt to take a remote possibility seriously and to think through what this possibility of restrictions, in this case, would mean and how one could respond if the possibility was to become reality. Within months, the 1973 oil crisis made that possibility real – it made the possible actual. Shell was better prepared than its rivals. But not because it had guessed right or even predicted the future, but because it had paid attention to, and rehearsed, an alternative one (Wack, 1985a, 1985b; Andersson, 2020).

Wack's exercise rested on an assumption so basic that it is usually taken for granted: that there genuinely are alternative futures that are worth exploring and that we can make decisions about. This premise is a foundation of the entire field of futures studies as we know it, at least when we turn to wider issues than prediction. Early on, Roy Amara built the assumption within the three commitments that have become central in futures studies: the future is not predetermined, the future is not predictable, and future outcomes can be influenced by present choices (Amara, 1981). Among others, Wendell Bell built an entire epistemological framework on the idea that useful knowledge about the future can be gained (Bell, 1997a, 1997b). Joseph Voros's widely used version of the futures cone (see Voros, 2003) with its ever-expanding sections of possible, plausible, probable, and preferable futures (building on Hancock and Bezold's 1994 earlier version) has become perhaps the most widely taught visualisation in the field. It also carries the assumption that there is a set of futures that one needs to pay attention to – an ever-expanding set. Earlier, Fred Polak argued that a civilisation's capacity to generate positive images (in plural, again) of the future is the primary driver of the vitality of the civilisation (Polak, 1973).

While we take such ideas, about possible and alternative futures for granted, these are not merely working assumptions. Rather, they are, in fact, philosophical commitments, and they carry

considerably far more weight than the people in the field of futures studies recognise. To see this, we need to consider only the idea that, perhaps, the future is already fixed. Now, if only one course of events is genuinely possible, then the attempt to study alternative futures may be a practically working illusion that is, deep down, incoherent – a smokescreen to avoid us confessing we are prisoners in time. However, if the number of possibilities is infinite and unconstrained, the field’s talk about alternative futures is, again, a smokescreen to ignore most futures and focus on a limited set of them – while claiming we expand our understanding of agency and so on. Between these extremes lies a rich and contested set of philosophical ideas, a set that futures studies has largely left underdiscussed even as the practicing of futures studies depends upon the resources of these philosophical ideas at every turn.

This text maps those ideas. It proceeds by discussing five questions, each of which turns out to be surprisingly consequential for everyday foresight practice despite their philosophical nature.

Does the future exist at all?

Can the future be genuinely open, or does logic force us toward determinism?

What gives formal substance to the intuitive idea of branching futures?

How wide is the space of possibility?

How do we know what is possible?

Our aim is not, and it cannot be, to settle philosophical debates. Rather, we attempt to show that the debates matter in futures studies; that every time a practitioner draws a scenario tree, judges a future “plausible”, or maybe dismisses one as “impossible”, philosophical commitments about time, truth, and possibility are being made, whether explicitly or not – most of the time implicitly. Making those commitments visible is the first step toward making futures studies able to discuss its ontological foundations, its deepest questions.

Does the Future Exist? Three Ontologies of Time

The most fundamental question for any discipline concerned with the future is deceptively simple: Is the future real? Not real in the sense of “likely to affect us, once, or if, we get there” – everyone agrees on that – but real in the deepest ontological sense: does it exist? Or what does it mean to say that the future exists? The question can be framed in many ways, for example, are future events already out

there (already if not now?), waiting to become the present – in the same way a city exists before a traveler to that city arrives? Or is the future genuinely absent, nothing – something that does not yet exist in any sense at all? We are not taking the easy route, but as the philosophy of time offers three basic answers to such questions, we need to turn to that field now. Each of the three answers defines different conceptual foundations for futures studies – even with different practical consequences, odd as that may sound.

Presentism: only the present is real

The first answer is the most radical. *Presentism* holds that only the present moment exists. The past is gone; the future is not yet here. Neither future nor past has any place in the inventory of what is real (Markosian, 2004). But we say things (true or not) like “Oil price will double” and “Titanic was a mighty ship” – what can presentism say these claims really mean?

On a formal level, A. N. Prior built a logic (1953; also 1967) that, at least in principle, makes this position workable. The standard move in modal-temporal logic would be to treat “was” and “will” as quantifiers ranging over past and future things, the way “some” ranges over present ones – “some things are red”. Prior looked at the issue differently. He treated tenses (“will” and “was”) as primitive logical operators – they are like stamps **was** and **will** that you place on present-tense sentences, without needing past or future objects to exist for the stamped sentence to make sense. Take the sentence “a Mars colony houses a million people” – false right now. Stamp **will** on it, and you get **will**(a Mars colony houses a million people), which can be true or false today, in the present, while we still do not have to commit ourselves to the existence of any world or state of affairs in which the inhabiting of Mars has actually occurred (or failed, or not attempted, or what have you). The technical name for the stamps is *tense operators*, and they give the presentist exactly what futures studies needs from a logic of time (“presentist committed futures studies”): a way to say things about the future without quietly populating the universe with futures that are not yet there. On Prior’s picture, this is what futurists are doing every time they speak of the future – stamping the present.

For foresight practitioners, *prima facie*, presentism provides the strongest philosophical backing for treating the future as open, non-actual, and something we can create. The future, looked at in this way, is not a distant country waiting to be mapped with some cross-temporal telescope. It is a genuinely absent domain that must be imagined, constructed, and chosen into being. This resonates deeply with the activist orientation that people like Gaston Berger brought to futures thinking when they suggested that the future is not something to be passively awaited or mapped but something to

be actively shaped through present decisions (Cournand & Lévy, 1973). Presentism can also be seen as a natural philosophical partner for Polak's insight that images of the future actively constitute the future they describe (Polak, 1973). Creating a statue from marble is one thing; it is another thing to wait for one to be brought to you while waiting to see how it will look, once it comes. Being an artist and reading catalogues are two different activities.

But presentism comes with costs that matter for foresight. If no future this or that exists, what exactly are we talking about when we talk about "the future"? What makes a future-directed statement true or false – and, at the same time, what makes one more justified than another? A claim about the DNA of Donald Duck cannot be more or less justified, or true, because he does not exist. Is this true about the claims about the future too? For example, when Amara says "the future is not predetermined", what is the "future" he is referring to, literally speaking? If future-directed statements lack determinate truth-values and truth-makers (i.e., are not true or false and there is nothing that makes one true or false), how should we understand the knowledge that futures studies claims to produce? These are not idle, meaningless puzzles. They connect directly to the challenge of evaluating scenario plausibility – of saying that some futures are more credible than others – and they lead us straight to the classical, heavily consequential, sea-battle problem we discuss in the next section.

Eternalism: the future is already there

The second answer is the opposite position. *Eternalism* maintains that past, present, and future objects all exist, differing only in their temporal location. Consider London and Tokyo. Both exist; the difference in spatial location does not affect what is real. In eternalism, the universe is a four-dimensional manifold – a "block" – in which events occupy different positions; some in different places, some in different times. A shirt changing color simply consists in the shirt being white at one temporal location and pink at a later one. There is no objective "now" that "moves" through the manifold; the distinction between past, present, and future is perspectival rather than metaphysical, like the difference between "here" and "there" (Sider, 2001). Sometimes when I have tried to explain how it can be real that I am 15, I say "there I am". Then my mother asks "where?" and I answer "There, in the past, in year Y". Once we do not get stuck in the present issues, we can understand that the present just happens to be now – but that does not make it more real, ontologically, than other moments.

Eternalism draws considerable support from modern physics. Physics, specifically special relativity, eliminates a frame-independent present. This elimination of a frame-independent present – the fact

that observers in different states of motion disagree about which distant events are simultaneous – seems to damage any theory that requires an objective “now”, including the presentism we previously discussed and the growing block (see below) (Putnam, 1967).

For futures studies, eternalism presents a paradox. On one hand, it implies that the future has full ontological reality: future events are as real as present or past ones, even though we have not yet experienced them. There is something to study about the future, something we can be, in principle, right or wrong about. On the other hand, precisely because the future is already ontologically real, the idea of alternative futures (or any such idea) becomes harder to sustain unless it is reinterpreted modally rather than temporally. We would have to say that we study possibilities, not the future itself.

This may sound like a natural adjustment, but notice the trap. When, let’s say, a foresight practitioner draws a branching diagram and labels the branches p_1 , p_2 , ... p_n , the natural reading is that these are genuine alternatives, any of which could be realised depending on what happens between now and then. Eternalism does not allow that reading. There is no open set of branches waiting for one to be selected; one of p_1 , p_2 , ... p_n is already there in the future, waiting to be reached rather than chosen. The other branches are not unrealised possibilities “competing” for actuality. They are simply ways things will not be. Whatever we are doing when we construct the branches, we are not mapping real alternatives in the way the practice usually presumes.

This forces a shift in vocabulary. We can still talk meaningfully about alternative futures, but the talk has to be about modality, about possibilities, as such, rather than about real temporal openness. The eternalist “block universe” contains one actual temporal sequence with the future already in the block, not a branching tree. The future is fixed in the block. This means that scenarios and other descriptions of the future become windows into a space of logical or epistemic possibility, not representations of real branches stemming from the present. This means, crucially, that their relationship to the single actually real timeline must be carefully specified. When Herman Kahn urged planners to “think about the unthinkable” (Kahn, 1962), he was, on the eternalist view, inviting them to explore a space of possibilities rather than literal temporal branches. This is not fatal to foresight, but it does mean the field needs an explicit account of what “possible” (and other such terms) mean.

The growing block: reality accumulates

The third theory related to time provides kind of a middle path. The *growing block theory*, developed originally by C. D. Broad (1923) and defended more recently by Michael Tooley (1997), says that

the past and the present exist as parts of reality but the future does not. Reality grows: new events are added at a moving boundary fixed, at any given moment, by the present. The past is fully real and fixed; the future is genuinely open. In a sense, *the futures cone*, a traditional tool to convey futures studies ideas, embeds the growing block idea. The narrow end, the settled past, is a single trunk of accumulated reality. The present is the boundary point where the cone starts to open; the present is the branching point. And the widening cone represents possibilities that may be added to the fixed part of the reality in the future.

The growing block is intuitive in that it fits quite naturally the temporal experience that eternalism and presentism struggle with: we feel that there is a difference between the fixed or settled past and the open future. Take, for example, a foresight practitioner who has lived through an unexpected realisation of an unlikely scenario. That difference between a scenario, even as clearly formulated as possible, and it, is not merely conceptual but is something foresight responds to with the gut-feeling “that is why we formulated the set of scenarios, the future is not predetermined”. Of the three positions, it may appear that the growing block is the most natural philosophical home for futures studies, since it (i) preserves the openness that makes futures studies meaningful, while (ii) granting the past enough reality to serve as a stable foundation for analysis.

However, the growing block inherits the same truth-maker problem we saw with presentism: since no future this or that exists on this view either, it remains unclear what future-directed talk refers to, and what could make such a statement true – or better justified than another. Moreover, there must be some limits to how the growth happens – how do we figure these out? Some continuity with the past is to be taken for granted, but how much?

The choice among these three ontologies of reality of the point in time is not settled in philosophy, and it would be presumptuous for futures studies to tell what the answer is. However, futures studies can contribute here: How much we are able to know about the future and how are, in a sense, questions about futures studies as a field. And answering these questions tells us about the world surrounding us. A naturalist orientation in philosophy does not set grand questions a priori, but looks for the answers from fields of research – how they work and what makes, ontologically in this case, the work possible.

The choice, despite being difficult, is not neutral in its implications. Each position implies a different answer to what it means to “study the future”, and each shapes the kind of epistemic and practical claims a futurist can defensibly make – are the claims about the actual reality or abstract possibilities,

for example. If they are abstract possibilities, why care? If they target the future that is “out there” but beyond our reach, why care – future is fixed and no scenario or other future-related work helps to shape it?

This goes back to very foundation of futures studies. For example, Bell’s nine core assumptions of futures studies – including the propositions that the future is not predetermined and that useful knowledge about it can be gained (Bell, 1997a) – carries an ontological claim about the future – but no real argument to back it up. It is most naturally read as a working assumption; but a completely wrong working assumption can be harmful, to say the least. A field that aims at intellectual maturity must at least recognise that its central concept, the future, is philosophically contested, and that the contest has practical implications for (i) how works in the field are framed, (ii) how possibility is understood, and (iii) how the relationship between present action and future outcomes is understood.

Can the Future Be Open? The Sea-Battle Problem

If the ontology of time determines whether the future exists as a part of the furniture of reality as it is, the problem of future contingents concerns the relationship between our ideas of openness and knowledge. And the relationship is one of the most consequential ones for foresight practice. Consider Amara’s three claims – that the future is not predetermined, not predictable, and can be shaped by choices. These are not self-evident truths. They are hard-won philosophical positions (if they are won), and the struggle to establish them is more than two thousand years old. The jury is still out about the winner.

The trouble starts with a deceptively simple question posed by Aristotle in his work *On Interpretation* (Chapter IX). Consider the pair of statements “Tomorrow there will be a sea-battle” and “Tomorrow there will not be a sea-battle.” Is one of these true today and the other false? If so, then the outcome is already settled: whichever statement is true today will be true tomorrow, and there is nothing anyone can do about it. It seems that the future is fixed. If one of the two statements has to be true now, then only one of those futures was ever really on the table; the other was never a possibility at all, just something we mistakenly imagined (see Øhrstrøm & Hasle, 1995). And the attempt to study alternative futures is conceptually confused from the start – or, at least, descriptions of alternative futures are mere fantasies – if this is the case.

In the generation following Aristotle, the problem was sharpened dramatically by Diodorus Cronus, who formulated the so-called *Master Argument*. Diodorus reasoned, roughly, as follows: Every true

proposition about the past is necessary (what has happened cannot be undone). When the moment *t* comes and event *E* happens, not its alternative *E*, *E becomes part of the past – E is necessary. Therefore, if we say that something is possible but never actually happens, we face a contradiction because the opposite of that something is necessary (meaning its opposite is impossible). To avoid the contradiction, Diodorus concluded that the possible just is that which either is or will be true. (See Gaskin, 1995). For futures studies, the Master Argument is a nightmare. If only what actually happens was ever possible, then every unrealised scenario, to mention just one famous example, in Jim Dator's (2009) four archetypes – every Collapse that did not happen, every Transformation that remained imaginary – was not merely unrealised but strictly impossible. Possible futures would be a misleading label for something that was, in fact, impossible.*

The discussion came more alive again in the Middle Ages, where logicians connected the problem to Christian theology. If God possesses infallible foreknowledge of future “free” choices, then a now-unpreventable truth about each choice appears already settled. This, the argument continues, obviously threatens human freedom and, thereby, moral responsibility. Determinism follows, or so it seems. Richard Lavenham, writing around 1380, gave a useful overview of the available positions that philosophers at that time saw (see more in Øhrstrøm, 1983). Lavenham classified the positions into four possible answers to the deterministic argument:

1. Accepting determinism outright – there is only one future waiting for us in reality.
2. Denying that future-tensed truths have always obtained. On this view, a statement like “there will be a sea-battle tomorrow” may be true or false today, but it was not true or false in the distant past before the battle. Truth values for future-tensed claims come into being over time rather than holding from eternity.
3. Rejecting the principle of excluded middle when it comes to the future – the idea that, for any future-tensed statement, either the statement or its denial is already true. Some statements about the future are neither true nor false right now, because reality has not yet settled the matter.

Think of the difference between options 2 and 3 as follows: Imagine a book being written. The story will end one way or another, but right now we ask: what is the status of the final chapter?

Option 2 says: the final chapter is already fully written – we just cannot read it yet. But here is the twist: the book itself only came into existence recently. So, while the ending is fixed now, it's not as though the ending was fixed a million years ago, because back then there was no book. On the other

hand, option 3 says: the final chapter is genuinely unwritten. It is not hiding from us; it does not exist yet. There is no fact about how the book ends, because the author has not decided. Only when the actual writing happens will there be something true to say about it.

4. Denying the necessity of the past – denying the intuitive idea that what has happened is now fixed and cannot be affected. This is the boldest move of the four, or so it seems. Why?

Writing before Lavenham, William of Ockham had already chosen option 4. Reasons were deep. As a Christian theologian, he was committed to divine foreknowledge: God knows from eternity everything that will happen. But knowledge requires truth, so if God knows today that there will be a sea-battle tomorrow, the statement must already be true today. Future contingents, therefore, must possess determinate truth-values. However, Ockham was equally unwilling to concede that the future is fixed, since human freedom demanded that the battle happening tomorrow be genuinely dependent on the people involved. Something in the deterministic argument had to give – and since foreknowledge blocked him from denying the truth of future-tensed statements, he denied instead the necessity of the past. His move here was clever. Not every past-tense statement, he argued, is really about the past. “Caesar crossed the Rubicon” genuinely is, and nothing can change it. But “yesterday it was true that there will be a sea-battle tomorrow” only looks past-tensed. It is not. Its truth really depends on what happens tomorrow. The principle that the past is fixed, according to Ockham, applies only to real past statements. Statements that disguise as being about the past but still describe the future remain open, because the future they describe remains open. But this raises a further question: what makes statements about the future true or false in the first place? To answer it, Ockham appealed to the notion of a true future: among all the courses of events that remain genuinely possible, one of them is the course that will actually unfold. That “singled-out” future is what makes present statements about tomorrow true or false, and what God eternally knows (See William of Ockham, 1983).

Seven centuries later, the debate is still alive. To mention one recent proposal that does something Ockham and his contemporaries never considered, we may learn from Barnes and Cameron (2009) who keep the future open without taking any of Lavenham’s four options. What they do instead of accepting one of the options is subtler: they locate the openness somewhere else entirely.

Take the statement “there will be a sea-battle tomorrow.” On the view of Barnes and Cameron, that statement is already either true or false right now – there is no third option, no gap, no missing value.

But which of the two it is has not been settled yet. The world itself has not decided. The truth-value is there; what is missing is any fact about which value it has.

To understand this, let us go back to the example of the unfinished book. Option 2 said the final chapter was already written, merely out of our sight. Option 3 said the chapter was not written at all. Barnes and Cameron offer a third possibility, stranger than either. Imagine knowing, with certainty, that exactly one sentence is printed on the last page – either “they all survived” or “they all perished” – but there being, as yet, no fact about which of the two it is. The page is not blank. The ending is not hidden. It is unsettled, in the world itself, which of the two endings is the real one.

The payoff is that three claims that usually travel together can be unbundled. People defending an open future have typically also had to commit to one of three additional things: that logic somehow works differently when we talk about the future, that future events and objects do not yet exist in any sense, or that the laws of nature are not fully deterministic. Barnes and Cameron argue we need none of these assumptions. The future can be genuinely open even if standard logic applies, even if the laws are deterministic, and independently of whether future things “really” exist or not. The openness does not live in our logic or in our inventory of what exists. It lives in the world itself, so to say.

For futures studies, the moral is practical. Consider again how Dator’s (2009) unrealised *Collapses* and *Transformations* could have been genuine possibilities, really open futures, without our having to win any of the usual philosophical arguments first. We do not have to take sides on the metaphysics of time, or on the interpretation of physics, or on whether classical logic holds. We only have to take seriously a simpler and older thought: that reality can be, on some questions, genuinely unsettled – and that this unsettledness is what possibility, in the sense that matters for futures studies, actually amounts to.

The main consequences we wish to draw for foresight practitioners are twofold. First, the open future – the assumption that underwrites the entire field – is philosophically available, but it is not a free lunch. Every route to openness exacts a philosophical price, whether in logic, semantics, or metaphysics. Second, different ways of paying that price imply different formal architectures for the branching structure of alternative futures, and those differences matter for what can be said, consistently and rigorously, about the relationship between present choices and future outcomes. For example, we can say that we are able to choose a future; but this is different from saying the future is what it is because we choose in this or that way. The first requires openness, the second does not, while still giving us agency in the sense that the future is fixed all along *through our actions*.

Branching Futures: From Whiteboards to Formal Frameworks

Almost every person doing futures studies research has stood in a workshop and drawn a branching diagram on a whiteboard – a single line of shared history splitting into several paths in several directions – you have been doing philosophy, whether you knew it or not. There is a family of formal frameworks that is connected to this type of futures, called branching-time semantics, and gives rigor to our intuitive picture about branching futures. Its development is one of the quiet intellectual achievements of twentieth-century logic.

The idea can be tracked to the year 1958, when Saul Kripke, while being 17, would develop and provide the rigorous formal semantics for modal logic (i.e., formal rules of reasoning concerning propositions about possibilities, necessities, impossibilities, and so on). Given the philosophical state of mind at the time, this made the entire apparatus of necessity and possibility philosophically respectable – metaphysics was not highly regarded at the time. (Kripke, 1959, 1963) Kripke, in fact, wrote to A. N. Prior (whom we met above) and suggested that, in an indeterministic system, time should be represented not as a line but as a tree. A branching-time model pictures time as a tree. Each point in time – a “moment” – sits somewhere on this tree, and the complete paths running all the way through it are called “chronicles”. Each chronicle represents a full possible history of the world. The tree has a specific shape. Every moment has a unique past (if two moments precede a given moment, they must be comparable). The future, by contrast, branches: many possible continuations spread out ahead from the present. (See more detailed treatment in Øhrstrøm & Hasle, 1995; van Benthem, 1991).

The parallel to foresight practice, with multiple scenarios, paths, narratives, or what have you, is rather close as one may notice. Chronicles are, in a sense, the formal equivalent of fully developed scenarios, if we consider a scenario simply as “description of a future situation and the course of events which allows one to move forward from the actual to the future situation” (Amer et al., 2013, 23). The tree as a whole is the scenario space, i.e., scenarios taken in one context into account. Moreover, the linear ordering of events of the past that the formal system carries captures the intuition we already have mentioned: that the past is shared and settled, while the future is open and branches out into genuinely different possibilities.

Now, the question is how to handle truth-values within this branching structure; we have already seen the trouble the future truth-values, like in the case of the sea-battle, created. Several approaches in branching time semantics have been developed, each with, again, different philosophical costs and

benefits. Consider, for example, Richmond Thomason's "supervaluationist approach". It offers one of the most elegant solutions. The idea is this: evaluate a future-directed statement not against a single timeline but against all the chronicles that pass through the current moment. If the statement is true on every chronicle, it is true, full stop. If the statement is false on every chronicle, it is false. Crucially, on this view, a future contingent may be neither true nor false at a given moment, even though a disjunction expressing excluded middle – such as "either there will be a sea battle tomorrow or there will not" – can still be true. The price of this result is the abandonment of ordinary truth-functionality (i.e., the truth of a compound statement is no longer determined solely by the truth-values of its parts, so a disjunction, the or, can be true even when neither disjunct is itself true). (Thomason, 1970) The great advantage is that this position preserves excluded middle when it comes to futures: the disjunction "either there will or there will not be a sea-battle" is true on every chronicle (on each one, one disjunct holds), even though, as we saw, neither disjunct is individually settled. We can say "several futures are genuinely live" without paradox. The cost in terms of the sacrifice of truth-functionality, the philosophical cost, may feel natural to those who practice foresight, while for philosophers it is harder to swallow. The lesson, however, is not in the details. The point we are driving at is that philosophy of futures studies must dig deep in order to establish with utmost rigor what the field is committed to.

Worthy of mention is that Nuel Belnap and his collaborators developed (2001) a closely related framework, known as *STIT* theory, short for "seeing to it that" – which extends branching-time semantics by incorporating agents and choices. In this, the theory is worthy reading for futures studies scholars and practitioners. On this picture, the future is represented as a tree of branching histories. The key distinction is between plain truth and settled truth: a claim is plainly true if it is true in one particular possible future branching out from the present, and settled true only if it is true in every possible future branching out from the present. For example, when Shell's scenario team warned in 1972 that oil supply could be disrupted, they were not presenting the "could" outcome as settled, of course. They were identifying a possibility that was true in some histories but did not exclude others in which no such disruption occurred. This shows how close a formal framework can come to the study of the future: We can say without formal vacuum propositions such as "In this scenario, X happens," without implying that X belongs to the one fixed future.

The framework becomes especially useful for futures studies once agency enters the picture. In *STIT* models, an agent's choices at a moment split the possible futures into groups. Each group contains

the histories that remain possible if the agent picks that option. On one particular STIT reading, i.e., in the deliberative STIT reading, an agent sees to it that something happens only if a choice of the agent guarantees the outcome (and the outcome was not already settled independently of that choice). This captures a distinction that is dear to futures studies: There are developments that decision-making of an agent can genuinely influence and those it must simply adapt to. In that sense, scenarios function like histories, while choice points mark the places at which agency can make a difference. However, the philosophical price of the system is that it can be secured only by sacrificing some intuitive logical or metaphysical commitment, like bivalence or ordinary truth-functionality.

Now, it does not matter for our purposes in this text which of these solutions is “correct” but what the debate as a whole reveals. The notion of an open future is available but not for free. It requires giving up at least one intuitively plausible logical or metaphysical principle; formal systems cannot leave gaps in them, so price tags are to be found. Different ways of securing an open future can be found in different formal architectures (only a few of which we even have space to mention here) for the branching structure of alternative futures. However, the informal picture – branches, scenarios, alternative pathways – has a rigorous formal counterpart. “Multiple futures” is not merely a metaphor to make workshops roll. It can reflect a formally representable structure with precise semantic properties, and understanding those properties is a necessary step to understanding the ultimate foundations of futures studies.

How Wide Is the Space of Possibility?

The previous sections asked whether the future is open. This section asks a different but equally important and difficult question: How wide is the space of possibilities? Even if the future genuinely branches, a further question remains about the nature, forming, and counting of the branches. When Bertrand de Jouvenel coined the term “futuribles” (“futures possibles”) he literally stated that there are possibilities regarding futures and that futures studies focuses on them (de Jouvenel, 1967). But what kind of space is it? How broad is it? What are its boundaries? In philosophy, these questions are asked when possible worlds are discussed. There are three interesting theories about possible worlds we may discuss, and the choice among them has practical consequences for the scope of foresight.

The widest and most ontologically ambitious conception belongs to David Lewis’s *concrete modal realism*. Lewis argued that every logically consistent way things could be is a full, concrete physical universe. These universes are as real as our own but causally and spatiotemporally isolated from it.

“Actual”, on his view, is merely an indexical when it comes to possibilities (like “here” is indexical). It picks out the world the speaker happens to inhabit, with no metaphysical privilege over non-actual worlds (Lewis, 1986).

Lewis proposes a principle of recombination to help secure *modal plenitude*: Roughly, any objects from any worlds can coexist in a single world via duplicates – you and I have duplicates in the possible world, and so does everything else. Then these duplicates can be combined in many ways, covering all possibilities. Critics argue that this recombination, since it proceeds by rearranging duplicates of what already exists, cannot by itself generate genuinely novel possibilities and thus cannot guarantee full modal plenitude. What about alien properties, for example, not to be found in our universe? For futures studies, Lewisian realism, while sounding odd, philosophically speaking, provides the maximal back-up. If every possibility is real somewhere, then the alternative futures studied by futurists are not just imagined – they actually exist as real worlds among countless others. The obvious objection is what Lewis himself called the “incredulous stare”: the sheer implausibility of an ontology of infinitely many concrete universes. Lewis did bite the bullet and argued that the theoretical benefits – a genuinely reductive analysis of necessity, possibility, and counterfactuals – justify the cost, but most philosophers prefer more modest ontologies, to say the least.

Abstractionism is a fundamentally different theory about possible worlds. On Alvin Plantinga’s account they are complete *reality-descriptions* or ways things might have been, not concrete objects. Plantinga’s basic move is: possible worlds are “maximal” possible states of affairs of which something either is true or not, not concrete universes. The actual world is the unique state of affairs that does obtain (Plantinga, 1974). For Plantinga, it is possible that there could have been, let’s say, a speaking duck. This just means reality could have been that way. It does not mean there is another concrete world where the duck is real. In Robert Adams’ version, possible worlds are treated as maximally consistent sets of propositions (Adams, 1974). The trade-off is that abstractionism does not reduce modality: possible worlds are defined in irreducibly modal terms (a world is a state of affairs that possibly obtains). While worrisome, this is not fatal; the abstractionist framework does not eliminate the concept of possibility but provides a structured explication of what possibilities (and necessities, and so forth) are. For futures studies, abstractionism provides a philosophically respectable way to talk about alternative futures. They are descriptions of possible states of affairs, and these states are abstract – we do not have to commit to the view that claims about the future must be about something as concrete as the world surrounding us. For example, to continue a bit further,

any scenario can be understood as a partial sketch of an abstract possible world without anyone needing to believe that the scenario describes something concrete.

David Armstrong's *combinatorialism* represents a third approach (Armstrong, 1997). In this approach possible worlds are recombinations of the actual world's basic objects and properties. Any actual simple objects (my red shirt) and any actual simple universals (like blue) may combine in any arrangement (meaning we can say "my shirt could have been blue"). The worlds are not subject to any restriction other than formal consistency. This keeps possibility tied to non-modal ingredients already present in reality.

But it is here that the approach faces a significant limitation: it struggles to make sense of genuinely novel things that do not exist. "Alien universals" that cannot be found anywhere in our universe cannot be talked about – while it seems that there clearly is more to possibilities than what the real world has as constituents (perhaps there could have been a stone that has a wholly new kind of glow, call it "glitterenhanced"). For a field that often values opening up imagination and transformative change, this constraint is worth taking seriously. If it turns out that combinatorialism is the correct position, futures studies might be a castle built on sand. This is only mentioned to show why obscure philosophical issues must be taken seriously, if futures studies is to stand on as stable ground.

The contrast among these three approaches maps directly onto a practical question about the scope of foresight. If we accept Lewisian concretism, the imagination of futures studies is constrained only by logical consistency, anything goes (as long as it is not self-contradictory). If combinatorialism is chosen, alternatives must be built from ingredients already present in reality, and genuinely alien futures are harder to accommodate. In this regard, abstractionism provides a middle position that permits a wide set of possibilities without murky ontological commitments. Be that as it may, every time we, in futures studies, judge a scenario "possible" or "impossible", an implicit modal ontology is at work. Ontological choices matter for what can be said, rigorously, about the future. We must be careful in this regard. Again, futures studies' ways of working come with philosophical price tags.

How Do We Know What Is Possible?

Thus far we have discussed mainly the ontology and semantics of time, future, and possibilities. Some words about modal knowledge (i.e., knowledge about possibilities) need to be said after all that was written above.

Assume – for the sake of argument; we saw nothing comes for free – that the space of possibility is ontologically well-grounded and that the future is something we can make claims about. Futures studies still faces an epistemological challenge: how can we have modal knowledge? This question is pressing for futures studies because the field attempts to generate and assess claims about what is possible, plausible, or impossible. Not only is this how we speak, but what we do: when a Delphi panel evaluates the likelihood of a technological breakthrough, when a horizon scanner flags a weak signal as a harbinger of change (see e.g., Linstone & Turoff, 1975; van Veen & Ortt, 2021; Ansoff, 1975; Hiltunen, 2008), when a scenario team judges an outcome plausible or dismisses it as “too sci-fi”, modal claims are being made. What justifies such claims? Possibilities are not usually living in our world as such. How do we gain access to them?

One influential tradition grounds modal knowledge in conceivability. Stephen Yablo argues that conceivability provides (defeasible, can be overridden later) evidence for possibilities: Imagining of *p* is having the experience of *p* seeming possible – much as perceiving a tree is having the experience of a tree seeming to be there (Yablo, 1993). The idea is that imagination provides an appearance of possibility in the same way as perception provides an appearance of fact: fallible, but still evidential. In terms of futures studies, imagined alternatives are not self-validating, but they are not worthless either. The fact that a scenario can be coherently imagined counts epistemically toward it being possible, even though further analysis is needed to determine whether it describes a real possibility.

Timothy Williamson has developed another influential alternative that grounds modal knowledge not in conceivability but in our capacity for *counterfactual reasoning*. On his account, we can know what is possible by imaginatively developing “what if?” suppositions against background knowledge. We create a counterfactual scenario, insert into that scenario what follows, and see what follows. “Had I put on a blue shirt, I could have worn a red shirt in the afternoon” makes “wearing a red shirt” possible – I could have changed my shirt, for all we know. This capacity to counterfactual reasoning, Williamson argues, is deeply integrated into almost all central cognition, most of which is directly relevant to futures studies. Planning, decision-making, and scientific theorising all involve asking what would happen if things were different, i.e., counterfactual questions (T. Williamson, 2007). For futures studies, this is one of the strongest philosophical bridges from abstract metaphysics to practical foresight. The cognitive capacity practitioners exercise when building scenarios is, on Williamson’s account, the same capacity that gives us access to the modal realm.

Interestingly, this shows how philosophy is relevant to more specific ideas in futures studies than merely to shared modal struggles. Notice how Riel Miller's concept of "futures literacy", which refers to the cultivable ability to use the future effectively in the present (R. Miller, 2018) – can be grounded philosophically, given the discussion above. Futures literacy is not merely a professional skill but the development of a fundamental human capacity for understanding and using possibilities in their lives broadly.

The philosophical approach on modalities also provides a formal treatment for counterfactuals, the "what-if" analysis. Robert Stalnaker (1968) and David Lewis (1973) independently developed the so-called *similarity analysis of counterfactuals*: a counterfactual is true when the closest possible worlds in which the antecedent holds ("had it been the case...") are worlds in which the consequent ("it would have been the case") also holds. To answer 'what would happen if oil prices doubled?', one needs to focus on the possible world most similar to ours in which oil prices double, and ask what follows. Good counterfactual reasoning thus requires reliable background knowledge and a sound sense of which possibilities are "closest". Defining *closeness* has proven difficult, but we do not go into that now. What matters to us is how well someone can recognise when a counterfactual world and its workings are closest to us – and one could argue that this is why experienced people in futures studies, well acquainted with the domain-related knowledge, produce better scenarios than novices. Opening up imagination is one thing; following rigorously "what-if" paths is completely another thing (Virmajoki, 2024).

Anand Vaidya and Michael Wallner (2021) usefully distinguish between the *Access question* – how we initially gain epistemic access to modal claims – and the *Navigation question* – how we move from knowledge of one kind of possibility to another. They also identify what they call the problem of "modal epistemic friction": what constrains the movement from imagined possibilities to stronger claims about what is really possible? This distinction matters in futures studies. Consider a situation where a scenario team brainstorms. They are accessing possibilities – opening a space of alternatives. When they evaluate those alternatives for, let's say, plausibility, they are navigating between possibilities, moving from broad possibilities toward claims about plausibilities that are more "realistic". And the friction problem then sharpens the difficulty further: What allows (makes it non-arbitrary) the team's leap from "I can imagine this" to "this is genuinely possible"? This is, in a sense, the quality-control question for all claims about future possibilities. Peter Schoemaker (1995) argued

that the value of scenarios lies in disciplining the imagination; easier said than done, would a philosopher say.

Not everyone is optimistic about the reach of our modal capacities. Peter van Inwagen (1998) argues, by analogy with the limits of vision, that we should be skeptical about modal claims beyond the reliable range of our cognitive abilities. Undeniably, the argument goes, we can trust everyday modal judgments – that I could wear a red shirt, that the game is cancelled – but we should withhold confidence about what could be called exotic or far-from-actual (“far-fetched”) possibilities. If Van Inwagen is right, the field’s ability to explore genuinely novel futures is badly damaged – at least we need to stay away from saying that we have any claim for knowledge about genuinely novel futures.

What is said above are general considerations about modal knowledge. As such, they tell us that philosophical work is done when it comes to existence of the future and possibilities and our knowledge of them, but philosophical positions on the matters are not straightforward. To build futures studies on ideas like “the future is open”, “we can affect the future”, “we study possible futures”, the philosophical underpinnings of such claims must be made clear rather than taken for granted. Philosophy is not a bedrock, however. It has consequences. Before wrapping up, we wish to sketch some of the consequences – how to move from abstract and sometimes nitpicking-sounding philosophy to research practices in futures studies.

From Philosophy to Practice

The philosophical issues discussed bear surprisingly directly on the intellectual coherence and practical credibility of futures studies as a field, as we have pointed out throughout. Three further but connected ideas about the bridge are to be emphasised.

First, while we have not discussed the notion of understanding as such, a common idea is that understanding requires the ability to deal with possibilities. For example, causality is often understood as a dependency-relation concerning what would have happened to the effect if the cause had been different (e.g., Woodward, 2003). In general, the idea that understanding can be defined as the ability to navigate spaces of possibility provides one suitable philosophy for futures studies. According to Soazig Le Bihan (2017), a person has (modal) understanding of a phenomenon when that person possesses the know-how to move around within some region of the space of possibility associated with that phenomenon. We do not have understanding when we can see possibilities here and there, but we have to competently navigate a space of possibilities. Consider a traffic jam: knowing one

way it can arise (for example, a rush-hour collision) provides some modal understanding, but robust understanding is associated with navigating a wider space, for example, understanding what would happen if the driving lines were rearranged or if the collision can be solved quickly.

This, in a sense, captures much of what futures studies, at least, aims to do. Consider the following words that are worthy to cite at length:

“Long-term planning often demands an understanding of multidisciplinary connections, for example the interdependence of demographic, social, technological, economic and political developments. [–] However, more is needed for strategic decisions. They demand an overall image that expresses in which combinations the lower, middle or upper variants of the disciplinary prognoses can possibly occur, because it is clear that for such quantities as have been mentioned above the variants do not occur or fail to occur independently of each other”. (Weimer-Jehle, 2006, p. 335 [emphases added]).

The idea is similar: to provide understanding relevant to decision-making through futures studies, we need to navigate spaces of possibility. Moreover, morphological analysis (e.g., Ritchey, 2018), or system dynamics (e.g., Sterman, 2000), to mention some approaches, are not merely listing possibilities. They aim at understanding what we are navigating and how. Philosophy provides tools to understand how and why this “modal navigation” happens; or how it can happen in the first place. Grasping the modal structure of the system under study: which configurations are possible, how they depend on one another, and where the leverage points lie. Futures studies, on this view, is not an exotic supplement to ordinary inquiry but a natural expression of the drive toward understanding.

Second, James Woodward’s interventionist account of explanation treats explanations as answers to “what-if-things-had-been-different” questions (Woodward, 2003). This way of thinking can relatively easily be turned into future-oriented thinking: we ask about a system, what would happen, if this very particular variable of the system was changed. Consider a foresight team that asks how the world would change if a key assumption does not hold in the future; for example, if a technology matured a decade earlier than expected, if a political coalition collapsed, if a pandemic struck. Here, they are, at best, engaging in the kind of reasoning that Woodward identifies as the core of good explanatory practice. The team generates explanations of possible states of affairs in the future. By providing understanding they provide useful future-knowledge. The study of alternative (or possible, or what have you) futures is not separate from scientific explanation but intellectually continuous with it.

Third, Sohail Inayatullah's Causal Layered Analysis (Inayatullah, 1998) can be understood, in the light of the discussion in this text, as a relatively different type of method to navigate possibilities: It does so by grounding them, interpretatively speaking, on different levels of our ways to see and "read" the world at different depths. CLA's four layers, i.e., litany, causal, discourse and worldview, and myth and metaphor, may be read, if we wish to interpret in the light of the philosophy in this text, as corresponding to progressively deeper levels at which the space of possibility is shaped and constrained. At the surface level, alternative futures are variations on current trends: rearrangements of familiar elements, close to what Armstrong's combinatorialism says. At the level of causes, we may use interventionism to understand what happens in our thinking. At the level of worldview, we may need to go to the very basis of the questions, such as Williamson, among others, answers, about ways of grounding possibilities in the first place. At the level of myth and metaphor, we may need to question if our modal thinking is on the right tracks in general: whether we are restricted by current understanding of modalities. For example, genuinely alien possibilities that combinatorialism struggles to accommodate (see above) may be probed at on this level. If we do this and read CLA through the lens of modal epistemology, it becomes a method for navigating space of possibility at multiple levels of depth, and the philosophical discussion of conceivability, counterfactual reasoning, and modal friction are tools to make sense of what it means to navigate possible futures at different depths.

Together, these three points, that are an admittedly limited set of examples, point toward the possibility of bridging the ontological issues and foundations discussed in this text and futures studies methods. Ontological questioning is not an obstacle to the practice of futures studies but a resource for it. Understanding systems in terms such as spaces of possibility, cultivating the ability to reason counterfactually, and recognising that good explanation is inherently providing understanding about alternatives are important to see the field as seriously thought-through. The issues discussed in this text are not exotic philosophical doctrines or decorations but attempts to map what competent foresight practitioners already do. What philosophy adds is precision, self-awareness, and a set of tools for distinguishing well-grounded possibility claims from wishful thinking and far-fetched pondering.

Conclusion

This text has argued that the philosophical underpinnings of futures studies are neither trivial nor optional. The question of whether the future exists at all – answered differently by presentism,

eternalism, and the growing block theory – is central to what it means to study something that may or may not (yet) be part of reality. Aristotle’s sea-battle problem, debated across centuries for the logical and theological implications of such problems, shows that the openness of the future is not to be taken as given but is a deep philosophical commitment. We must purchase it at the cost of giving up at least one intuitively plausible philosophical principle, it seems. That makes the philosophy of futures studies much more exciting: what are we willing to be to keep the field going, philosophically speaking?

Moreover, the metaphysics of possible worlds can be used to understand how wide the space of possibility (if any exists) the field can claim to engage with. Lewis’s concrete modal realism provides the maximally expansive backdrop; Plantinga’s abstractionism offers breadth without concrete ontological commitment; and Armstrong’s combinatorialism ties possibility to the rearrangement of actual ingredients. Then, associated with the metaphysics of possibilities, modal epistemology – from Yablo’s conceivability as defeasible evidence about possibilities through T. Williamson’s (2007) grounding of modal knowledge in counterfactual reasoning to the skeptical challenges of Van Inwagen and others – is badly needed to understand what allows and, equally importantly, constrains the movement from imagination to justified claims about real possibilities.

For futures studies, these are not abstract puzzles to be dismissed as being someone else’s problems. Every time a futures studies scholar or a foresight practitioner distinguishes, let’s say, a plausible scenario from an implausible one, or a possible future from an impossible one, philosophical commitments about time, truth, possibility, and knowledge are being made, whether we like it or not. Making the field’s ontological commitments visible and debatable; showing that they are not mere assumptions but positions with arguments behind them and alternatives beside them – is the contribution this text has sought to make. The lesson is, as long as we discuss possibilities and the future (as open), we make ontological commitments, whether we say them aloud or not. And to build the field’s ontological foundations, one needs to say something. After speaking aloud our position, we must put our money where our mouth is, and only do ontologically sound futures studies without tripping on one’s own feet.

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