Beyond the Dynamic-Static Dichotomy

Reshaping the Landscape of Metaphysics of Time Through the Works of Jenann Ismael and Sebastian Rödl

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Introduction

A Metaphysical Crossroad

The topic

In Ursula Le Guin's science fiction novel *The Dispossessed*, Shevek, a physicist from the anarchist Anarres, travels to the neighbouring world of Urras to present his breakthrough theory of time to the capitalist societies that inhabit this planet. He has managed to reconcile the theory of sequence with the theory of simultaneity, which constitutes a great advance in physics. Since his discovery does not arouse much interest from the scientific community of Anarres, he goes to Urras to share his work with the scientists there, who he thinks may properly appreciate it. Once Shevek arrives in Urras, he is shocked by all the ways capitalism pervades the lives of people, and struggles to understand 'basic' things like private property, wage labour and even academic meritocracy. Progressively, he becomes aware that everyone is interested in his theory just because they want to find ways to exploit it and profit from it, which conflicts with his most fundamental ideals.

Although the theory of time may not seem to be that relevant to the plot, its importance becomes more evident in the larger picture as the technology used for faster-than-light communication in other books of the Hainish Cycle is a direct application of Shevek's theory. Furthermore, Le Guin's novel subtly addresses some topics in philosophy of science — especially constructivism and the value-ladenness of science — through the relations of Shevek's theory with himself and the other actors involved. There is an aspect, however, that I think can trigger the discussion that concerns my project here. Something she captures from the real and ordinary world, though perhaps coincidentally, is the philosophical need to reconcile a tension that seems implicit in the very notion of time. Shevek wants to let everyone know that there is no problem with time, as many of his contemporary physicists tend to think.

Well, I believe that the apparent dichotomic nature of time that has monopolised all the scientific and philosophical discussions on the topic can be overcome in our world too. I present in this thesis two ways in which it can be done. For Urrasians and Anarresian physicists, as well as Heraclitus and Parmenides and many present-day non-fictional

philosophers, there is an implicit tension in the conception of time. There are two irreconcilable opposites, and thus one must be given up over the other. Broadly speaking, some current philosophers advocate for an A-theory which takes time to be a dynamic feature of the universe, whereas others defend a B-theory that conceives time as another dimension of a static block universe.

On the one hand, the advocates of science and physics tend to gravitate to a static conception of the universe, as there is nothing in the equations of the theory of relativity — the currently accepted scientific theory of spacetime — that indicates that the passage or flow of time is something physical. Whereas, on the other hand, the defenders of the dynamic universe prioritise the phenomenological account to build a metaphysical theory of time that does not necessarily match with the physical theories. It is like a tug-of-war between physics and philosophy, each of the fields fights for the power to decide over the other about the true nature of time. This whole debate must be understood, in my opinion, in the context of analytic philosophy in recent times, and we should avoid generalising it to the discipline of philosophy, or more specifically metaphysics, as a whole.

In this thesis, I explore two philosophical proposals that, like Shevek's theory, overcome the implicit tension of time and compare them. These have been developed by Jenann Ismael and Sebastian Rödl, two philosophers coming from quite different backgrounds. In short, I aim to study and compare their strategies to end this classical debate. I want to know what they have in common and why they are so different.

The motivation to explore this particular topic comes mostly from my interest in it. As a History and Philosophy of Science student with a Physics background, I am fascinated by something that seems so fundamental and obvious, but at the same time, so difficult to put into words. Time is something that shapes everything that we do, everything we care for and even everything that constitutes who we are. We are not even capable of imagining what it would be like to live in a world without time, we would just not *be*.

Structure and Research Question

To introduce my research question to the reader, I deem it necessary to give a short outline of my thesis to understand the context in which such a question arises. My object of inquiry was more or less defined before the bulk of the work I put in, but I had already

done some research when I first delimited it and knew approximately how my thesis would look like. This question served as a guide throughout the process, though it also underwent some changes as I moved forward. Its current formulation is the final version, which I think suits best the structure of this work.

My thesis is organised in three main blocks or stages. The first of them is the most contextual one and is covered in Chapter 1. There, I give an overview of Western 'thinking of time', including the relevant scientific and philosophical accounts of time that have been given from Newton to the present day, passing through Kant, Einstein, McTaggart and many others. Moreover, I introduce the current debate going on in analytic philosophy of time regarding its fundamental nature, whether it is dynamic as we feel it, or static as modern physics indicates. I will present some of the most significant arguments that philosophers who align themselves with either the Dynamic Theory or the Static Theory have used to defend their position. This first part of my thesis is quite important in laying the grounds for the rest of my project, as the dichotomic debate on the nature of time will be the parting point for what comes next.

The second block is dedicated to presenting and studying thoroughly two independent theories that work their way out of the debate by using different strategies. In Chapter 2 and Chapter 3, I describe Jenann Ismael's and Sebastian Rödl's work, separately, paying special attention to what specific features of their theories are key to moving beyond the dichotomic debate on time. We will see that this is more obvious in Ismael's case since it is the actual goal of her work, and that for Rödl is more like a by-product of what he is aiming for. On the one hand, Ismael aims to solve the debate on the same grounds it is formulated by reconciling the opposite sides. She puts the agent in the centre of her metaphysics and reduces both views to complementary representations of time — we will later see what all this means. On the other hand, Rödl resorts to Kant's and Hegel's heritage to redefine the logical foundations of the analytic tradition, which leads to an alternative conception of time as the form of thought and being. Although Rödl's work may seem a bit disconnected from the initial point — the dynamic-static debate — I will show how he indeed addresses the same problem, but way more radically. Furthermore, in Rödl's chapter, I will study a possible conciliation between his metaphysics and contemporary physics.

The third and final block is a comparative analysis. In Chapter 4, I put to work all the information that I have gathered about both authors. My goal in this part is to find the

differences between the two theories that go beneath the surface level. I also put them in the wider context of different ways of doing metaphysics. From this direct comparison between Ismael and Rödl, I draw some general conclusions regarding metaphysics itself.

That said, I can now formulate my research question, which will, I hope, help the reader understand the structure of my thesis.

RQ: *How do Ismael and Rödl move beyond the dynamic-static dichotomy and what are the similarities and differences between their theories? Are they compatible, or at least, commensurable?*

Let me elaborate on the various aspects of my question. Firstly, I am interested in understanding and describing how Ismael and Rödl independently deal with the dichotomic debate on the nature of time. This is mostly done in the second block, in the separate chapters for each of the authors. The other part of the question is about comparing their work, finding what they have in common and how they differ, and discerning whether the theories fit together (compatibility) or if at least they can be understood from a common set of assumptions (commensurability). I deal with this second part of the research question in the third block.

An early conclusion of my work is that Ismael's and Rödl's theories are highly incompatible, but this is only revealed at the fundamental level. All the work in the third and fourth chapters will prove useful when I break through the superficial level to conduct the comparative analysis. We will see how their metaphysical theories do not differ just in content but are done completely differently, as metaphysics is conceived in two very particular and distinct ways. Thus, I will focus on identifying the fundamental differences between these approaches that make them incompatible, without renouncing the idea of finding any similarities. Furthermore, I will discuss the possibility of a common ground to assess the commensurability between the theories.

Just to be clear, this is not a physics of time thesis. Do not expect me to discuss in detail the spacetime according to general relativity. Neither will I be going into the topics of the time's arrow or the direction of time, which is what many people associate with philosophy of time when I first tell them about it. As I already explained, I am interested in the philosophical approach to the nature of time, even if that philosophy is leaning toward a highly scientific and scientist view of philosophy itself. What I am concerned with in my thesis, broadly speaking, is the overlap between philosophy of physics, more

general philosophy of science, metaphysics, and meta-philosophy or meta-metaphysics. More specifically, my focus is on the parts of these subdisciplines that deal with the topic of 'time' in the more (meta)physical sense. I do not treat time from a social or historical perspective, but rather time in the most immediate and perhaps measurable form, how it is directly experienced or felt stripped from all cultural meaning, as far as that can be done.

Reshaping the landscape

My thesis as a whole is aimed at providing an overview of the current landscape of metaphysics of time, but also an analysis and an assessment of two relatively recent theories that seem to be overcoming the current big issues in the field. Their starting point is the tension between the two ever-lasting opposite views of time, and they both get rid of this dichotomy in different ways. We will see that the apparent persisting nature of the dynamic and static theories is an over-simplification, as these theories as they are formulated today have evolved significantly and have become much more nuanced since the ancients' time. I believe Ismael and Rödl have the transformative potential to make real changes in philosophy of time and alter the landscape of the field. In this regard, I will reflect on how the integration of these two theories in the general picture may constitute a breakthrough in metaphysics.

I like to think of my thesis as a crossroad, a metaphysical crossroad, in which Ismael and Rödl, coming down different paths, face a common obstacle, but having overcome it, they end up parting in different directions. Ismael comes from an analytic tradition that has lost some of its philosophical heritage in the name of intellectual rigour, originality and the scientific worldview. Rödl comes from a very traditional German idealist school that is still loyal to the works of Kant and Hegel but is also knowledgeable of the origins of analytic philosophy. They both face the dichotomic debate the analytic metaphysicians are stuck in and solve it in different ways, just to keep working in separate frameworks. This metaphor will hopefully make more sense to the reader as they progress through the chapters.

Chapter 1

History of Time: Between Physics and Metaphysics

Time is an intuitively simple concept that begins to show its true complexity when we try to analyse it. In any case, it is not easy to choose one right approach to study it, since it is a concept that pervades many fields. Perhaps physics and philosophy are the ones that address it most directly, but it is also crucial in other scientific and humanistic disciplines like psychology, biology, history, or even law. It is almost impossible to think of a field of study that is not in one way or another dependent on the passage of time or the temporal mechanisms that unfold alongside it. Logic and mathematics could be the only exception, though not everyone would agree. As we can deduce from this, time is central to human life and cognition, and therefore fundamental to understanding anything whatsoever. Its study seems to be necessary for constructing any consistent system of knowledge.

In this chapter, I shall present the main theories of time that have dominated physics and philosophy. I will introduce and define some positions and concepts that will be used throughout my thesis. I intend to sketch a physical and philosophical background, against which I will later place two recent theories currently on the table in the field of metaphysics of time. In the first section, I focus on the two scientific theories that most strongly influenced our conception of time: Newton's classical mechanics and Einstein's theory of relativity. Throughout this part, I will explain the different assumptions and consequences that each theory carried and why they had such a great impact upon the understanding of the nature of time. The second section is centred on the typical debates that have prevailed in philosophy of time — mainly metaphysics. I will delve into the rival theories of temporal sequence introduced by McTaggart — the A-series and the B-series — as well as the other aspects of the two metaphysical theories of time, the Dynamic Theory and the Static Theory. Furthermore, I will mention the main arguments used by defenders of both theories. In addition, I shall briefly present the Kantian conception of ideal time in the last section and how it can enter the metaphysical debate.

1.1 Physics of time

When asking ourselves questions about the nature of time, many of us would first turn to science to try to answer them. In the modern sense, science is understood as the study of nature through empirical observation and the contrast of hypotheses. More concretely, physics is concerned with formulating the fundamental laws of nature that determine how the universe works. Given current disciplinary boundaries, the study of time would fall within the scope of the physical sciences. So, what does physics say about time?

The most relevant physical theories that have influenced the understanding of time are Newton's classical mechanics and Einstein's theory of relativity. In this section, I will present what each of the theories said about time and why the change from one to the other constituted a paradigm shift. But first, please note that it does not make sense to talk about physics and philosophy as separate things before the 19th century, it would be a naïve mistake to try to separate these fields of study. To talk about 17th-century physics — in its current meaning — would be to impose our present disciplinary boundaries onto a past academic landscape that looked quite different from today's. Back then, the terms 'natural philosophy' or 'physics' were used, but they meant something different and were part of the wide-encompassing discipline of philosophy. If I decided to call this section "Physics of time" it is not because I consider Newton a modern physicist — again, he was not. It is because he set the foundations of a paradigm in the physical sciences that slowly built up over 200 years until it clashed with Einstein's relativity theories in the 1900s. The change of paradigm involved a radical revision of the foundations of the field, especially the metaphysical assumptions about space and time that had not been questioned for a long period.

Newtonian Mechanics: Absolute Space and Time

Isaac Newton published his *Philosophae Naturalis Principia Mathematica* in 1687. In this work, he introduced the laws of motion and the theory of universal gravitation in a highly mathematical language, which later became the foundations of classical mechanics (CM). These laws provided a quantitative framework for predicting the behaviour of simple and complex physical systems. The whole of Newton's mechanics unified the motion of all bodies across the universe, from a ripe apple falling from a tree to the planets orbiting around the Sun. Furthermore, besides the immediate content of the *Principia*,

Newton's great methodological contribution to the physical sciences was the geometrisation and mathematisation of space, time and motion.

In a Scholium at the beginning of the *Principia*,[1] Newton developed his views on space and time, which would be the ground for building up his mechanical system.[2] He postulated an absolute 3-dimensional Euclidean space that is completely static and exists independently of matter — hence it can be empty. Similarly, absolute time passes uniformly in every point of the universe without relation to anything external. Every moment is like a snapshot, it defines a plane of simultaneity across the whole universe. Absolute motion was then defined as the change in time of the position of a body in the absolute space, whereas absolute rest was the absence of motion, that is, maintaining the same position in the absolute space. On the other hand, Newton described the relative counterparts. Relative space is a measure of the absolute space relative to some bodies that may or may not be in absolute motion, such that those bodies are at rest in this space. Relative motion is the motion of a body in a relative space, and relative rest is maintaining the position in a relative space.

It is worth noting that, within the Newtonian framework, there is no empirical way to distinguish in general absolute motion from a relative one. Furthermore, absolute space and time are not necessary for his whole system to work. Newton's claims about absolute space and time could be considered metaphysical, in the sense that they are not directly necessary for his work to be empirically adequate. Another metaphysical claim was the action-at-a-distance nature of gravity, which made his physical system non-local. This aspect of Newton's theory of gravity challenged the strictly local physical views that were popular at the time, like Renée Descartes' theory of vortices.

Keep in mind that, as I mentioned earlier, it is difficult to separate physics from philosophy in the work of a natural philosopher of the 17th century, and Newton's views on absolute space, absolute time and gravity are quite related to his other philosophical

[1] Isaac Newton, Joseph Streater, and donor DSI Burndy Library, *Philosophiae naturalis principia mathematica* (Londini : Jussu Societatis Regiae ac Typis Josephi Streater. Prostat apud plures bibliopolas, 1687): 5-11, http://archive.org/details/philosophiaenat00newt.

[2] Robert Rynasiewicz, 'Newton's Views on Space, Time, and Motion', in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Spring 2022 (Metaphysics Research Lab, Stanford University, 2022), https://plato.stanford.edu/archives/spr2022/entries/newton-stm/.

views, especially on theology. In the general Scholium at the end of the *Principia*,[3] he reveals his religious motivations for his overarching project of studying the nature of God, which his natural philosophy is just a part of.[4]

Throughout the 18th and 19th centuries, Newton's work inspired many natural philosophers and later scientists to adopt a mathematical and experimental approach to study nature. By the hand of several scholars, among which Joseph-Louis Lagrange, William Hamilton and Emmy Noether, Newtonian mechanics was enhanced and eventually reformulated, and became what we know today as classical mechanics.

An important addition was the notion of reference frame, first introduced by Galileo Galilei, but that Newton himself did not formulate in the Principia. A reference frame is a system of coordinates centred in one point, that allows determining the positions and velocities of objects in that frame. Different frames can move relative to each other, and they are considered inertial if they are moving uniformly, that is, not subject to any acceleration. In Newtonian mechanics, the laws of physics are the same in all inertial frames. This is also known as the Principle of Relativity, and Einstein retained it as we will later see. The geometrical space that formalises CM and that includes this principle is known as the Galilean spacetime. In it, all the dynamical symmetries of the physical theory have their respective geometrical symmetries.

To sum up, Newtonian mechanics not only constituted a branch of physics, but set the foundations of a scientific paradigm that dominated modern physics until the 1900s. This was based on the idea of a deterministic universe that could be formalised by mathematical equations, as Newton had done in the *Principia*. In addition, time and space were considered to be an absolute framework that was completely independent of anything existing in it.

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[3] Isaac Newton, 'GENERAL SCHOLIUM', in *The Principia: The Authoritative Translation and Guide* (University of California Press, 2016), 939–46, https://doi.org/10.1525/9780520964815-025.

[4] Theology played an important role in Newton's philosophy, which was not limited to physics as it is usually presented. For a detailed historical account on this, see: 'General Scholium', accessed 19 November 2023, https://web.archive.org/web/20210916214352/https://gravitee.tripod.com/genschol.htm.

Theory of Relativity: Minkowskian Spacetime

In 1905, Albert Einstein published the article in which he proposed his special theory of relativity (STR).[5] This theory meant a huge break with the Newtonian paradigm, as it challenged the nature of quantities that had been considered to be invariant or absolute, like time, mass and length. Furthermore, it rejected the notion of absolute simultaneity, which had been part of the very fundamental assumptions of CM up until that moment.

During the 19th century, a new branch of physics, electromagnetism, was developed and perfected in the works of physicists like James Clerk Maxwell, Oliver Heaviside, George FitzGerald and Hendrik Lorentz. Contrary to Newtonian mechanics, electromagnetism seemed to be a local physics, that is, electromagnetic interactions appeared to be bounded by a finite velocity across space. This was deduced from the fact that the value of the speed of light in the vacuum c could be derived from Maxwell's equations as a constant. A primary interpretation of this aspect of the theory involved the existence of a medium through which c was constant, the ether. This was supposed to be in absolute rest with respect to Newton's absolute space, so at first glance, it was a feasible posit insofar as it fitted with the established mechanical paradigm. However, all attempts to measure the empirical implications of the ether, like Michelson and Morley's experiment to determine the Earth's speed through it, consistently failed.

Following some work done by Heaviside and partially in parallel to FitzGerald, Lorentz proposed that bodies undergo physical distortions when they are in motion through the ether, they contract their length in the direction of motion with respect to that of bodies in absolute rest.[6] This could account for the apparent lack of evidence of the ether and other problems of electromagnetic theory such as stellar aberration.

Despite the advantages of Lorentz's assumptions, they could only hold if there was a privileged frame that could define absolute rest, a supposition that was already requiring a bit too much theoretical manoeuvring. Newton's Principle of Relativity would have to be abandoned since the laws of physics did not hold equally in all inertial reference frames. Einstein's revolutionary approach was to redefine the mechanical

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[5] Albert Einstein, 'On the Electrodynamics of Moving Bodies', in *The Principle of Relativity* (Dover Publications, 1923), 35–65.

[6] Harvey Brown, 'Michelson, FitzGerald and Lorentz: The Origins of Relativity Revisited', (2003): 2-4.

foundations of the field. He rejected the idea of the privileged frame of the ether while maintaining the formalism of Maxwell's theory of electromagnetism and especially its local aspect.

Einstein based his special relativity on two postulates. First, he kept the classical relativity principle that states that the laws of physics are valid in all inertial frames of reference. Second, he took from electromagnetism the constant light speed principle, which enunciates that light propagates through the vacuum at the same velocity, independently of the state of motion of the emitting body.[7] Einstein combined relativity with the light principle, and this resulted in quite anti-intuitive implications when comparing quantitive measurements performed from different inertial frames. In STR, the inertial frame has the same definition as in CM. It would later change with Einstein's general theory of relativity (GTR), in which he described gravity as an intrinsic property of the curved spacetime and thus completed the new mechanical framework that could replace the Newtonian one. Nonetheless, the classical description I earlier introduced is adequate for understanding special relativity.

Let us see some of the implications of the two postulates of STR. Unlike in CM, simultaneity in STR cannot be reconstructed in an absolute or frame-independent way. When imposing the light speed invariance, simultaneity becomes relative to the reference frame. Depending on the state of motion of the observer, two events A and B may be measured to be simultaneous, but also another observer could measure A happening before B, or vice versa. An essential part of relativity is that it denies that there is a privileged frame that determines the absolute magnitudes and order of events. Observers in different reference frames can disagree on the order of A and B, yet they are all correct since there is not a single true order.

Two other well-known kinematic consequences of the postulates are length contraction and time dilation, both dependent on Lorentz's gamma factor, γ. At low speeds compared to the speed of light, the gamma factor approaches one, $\gamma \approx 1$. Whereas at speeds closer to the speed of light, gamma becomes significantly greater than 1, $\gamma \gg 1$. Hence, the relativistic effects are observable only at very high speeds.[8]

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[7] Einstein, 'On the Electrodynamics of Moving Bodies', 35-6.

[8] Wolfgang Rindler, *Introduction to special relativity* (New York: Oxford University Press, 1991), 24-31.

$$\gamma = (1 - \frac{v^2}{c^2})^{-\frac{1}{2}}$$

Let us consider two inertial frames, *S* and *S'*, and the latter is moving with respect to the former at a constant velocity *v*. A rod is placed in rest in the moving frame in the same direction of motion. If two observers, one in *S* and one in *S'*, perform measurements on the rod's length, they will obtain different results. The first will measure it to be *L*, while the second will measure *L'*. According to Lorentz's transformations, the observer who's in relative motion with respect to the rod will see the rod shorter than the one that is moving alongside it, so *L* will be shorter than *L'*.

$$L = \frac{L'}{\gamma}$$

Similarly, a clock in *S'* will tick slower as seen by the observer in *S*. When measuring the time between two instants, the observer in *S* will obtain *T* in their own clock whereas they will see the one in *S'* get *T'*.

$$T = \gamma T'$$

So as a moving body approaches the speed of light, from our perspective, it will contract in length and the clocks in its reference frame will slow down. These are not the only relativistic effects, there are many others, such as the mass increase or the relativistic Doppler effect. All this has been confirmed experimentally. Nonetheless, since these relativistic effects only become relevant at high speeds, they are insignificant for humans to appreciate at the scale of our ordinary velocities, so much smaller than *c*.

All these strange phenomena are enclosed and formalised in the geometry of the Minkowskian spacetime. This is a non-Euclidean, 4-dimensional space developed by Hermann Minkowski in 1908 and that Einstein took to be an accurate mathematical representation of the spacetime described by STR. In it, events occupy specific spacetime points and they are separated by spacetime intervals. The spacetime interval between two events is independent of the reference frame, but time and space intervals, separately, depend on it.

In order to visualise this, let us consider a point in the Minkowskian spacetime. Though we can take that point to accurately represent the present, the future and the past can only be relatively defined as the causal relation that this point bears to the rest of the

spacetime. Due to the local aspect of relativistic mechanics, causality is bounded by the speed of light, thus the causal future and causal past can be described as light cones along the temporal dimension growing from the present spacetime point. Every two points that fall within the light cones can be connected by a timelike interval, which means that there is a reference frame in which they have the same spatial coordinates and the distance between them is just temporal. Conversely, two points that fall outside the lightcones can be connected by a spacelike interval, since there is a frame in which they are simultaneous, i.e. they have the same temporal coordinate and they are only spatially separated.
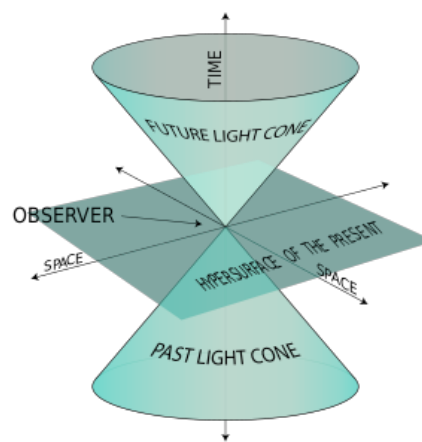
Figure 2.1: Future and past light cones defined from a present spacetime point.[9]

Ultimately, what STR is telling us about time is that there is no global time that is absolute or independent of any frame of reference. Time must be either local or relative. For a given spacetime point there is a division of the spacetime in past and future lightcones, which is frame-independent but does not give temporal positions for other events. On the other hand, global temporal coordinates can be given to any event in spacetime only if a particular reference frame is chosen, which therefore means that those coordinates are relative. Due to this, absolute simultaneity cannot be reconstructed, and the idea of a universal now or a steady, universal clock no longer makes sense in relativity.[10]

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[9] Image taken from: 'Albert Einstein's Theory of Relativity: Special & General', Totally History (7 September 2022), https://totallyhistory.com/albert-einsteins-theory-of-relativity/.

[10] Simon Saunders, 'How Relativity Contradicts Presentism', *Royal Institute of Philosophy Supplements* 50 (2002): 277–92, https://doi.org/10.1017/S1358246100010602.

Einstein was well aware of the philosophical consequences of his theory and had to face several criticisms concerning his work. The dispute between him and the French philosopher Henri Bergson was one of the most heated debates of the 20th century. This historical episode has been studied in thorough detail by Jimena Canales, who published her conclusions in the comprehensive volume *The Physicist and the Philosopher: Einstein, Bergson, and the Debate that Changed our Understanding of Time*.[11] Canales traces back the dispute to an encounter between the two men in 1922, at the Société Française de la Philosophie, and follows the development of the long-term debate. Bergson accused Einstein of taking relativity beyond the boundaries of physics and claiming a space that belonged to philosophy. Especially concerned with what relativity said about time, the French philosopher introduced capitalised Time, which corresponded to the real, universal time. Einstein, on his part, called that philosophical time, while he took the physical time of the theory of relativity to be the real time.[12] Canales pays careful attention to the historical context these scholars were immersed in and the implications that their quarrel had on society and academia.

Ultimately, the dispute was not only a disagreement about the nature of time, but also a discussion over which discipline — science or philosophy — had the authority to decide about it. Canales points out this event as crucial for the division between the continental and analytic schools of philosophy that took place in the early-to-mid 20th century.[13]

Although Bergson was mistaken in his understanding of relativity, the fall of logical positivism taught us that science does indeed need some metaphysics to hold, and thus he was right about relativity being more philosophical than Einstein claimed. Mumford describes metaphysics as an intellectual enterprise to study the nature of reality in a non-empirical way, focusing on the abstract, the general and the unverifiable; it differs from physics (or science), which studies the same but empirically, through the concrete, the particular and the verifiable.[14] Furthermore, he suggests that a more

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[11] Jimena Canales, *The physicist & the philosopher : Einstein, Bergson, and the debate that changed our understanding of time* (Princeton, New Jersey: Princeton University Press, 2015).

[12] Canales, 20-1.

[13] Canales, 349-58.

[14] Stephen Mumford, *Metaphysics : a very short introduction*, Very short introductions ; 326 (Oxford: Oxford University Press, 2012): 98-108.

complete view of nature should be given by a combination of metaphysics and science, continuous with each other. However, there are several views of what metaphysics is, and metaphysicians are quite far from reaching a consensus on its definition, let alone on the nature of time.

In this section, we have seen that although science has a lot to say about time, it becomes too difficult to disentangle physics from philosophy when dealing with fundamental definitions. Scientific theories make use of time as another variable that varies along the temporal dimension, or also a quantity that can be accurately measured by clocks and that, according to STR, is local and relative. However, even when scientists make strong claims about empirical reality, a metaphysical anchor is necessarily added, consciously or unconsciously, to the physics, and that does not remain undisputed. We should expect scientists and philosophers to build together a combined theory of time, while keeping in mind the differences between their claims and their methods. In the next sections, I will show what philosophers, either in agreement or disagreement with scientific theories, have to say about the metaphysics of time.

1.2 Philosophical time in the analytic tradition

In the field of philosophy, the nature of time has already been disputed for a long time. Philosophers have identified and discussed some of its features, such as its passage and its asymmetrical appearance — the definiteness of the past and the openness of the future. Some have reified those features, whereas others have dismissed them as illusory or derivative.[15] A debate between these two opposite views seems to have been going on forever. On one side of the argument, it is argued that time really is as we experience it, it flows unstoppably and nothing ever remains the same. On the other hand, some might claim that the passage of time is a subjective illusion and that it is not part of an objective, mind-independent reality. Currently, this disagreement is still a heated dispute in analytic philosophy.

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[15] Note that calling the passage of time 'illusory' and 'derivative' does not necessarily mean the same. The first term entails that temporal passage is exclusively a mental phenomenon. In contrast, the second allows for non-mental processes to be involved, but denies it to be a fundamental feature of the world. I will focus on this distinction in Chapter 3. For the argument's sake, in this section I will not consider these two views to be so different, but as two variants of the static conception of time. We will see that this differentiation becomes more relevant throughout the thesis.

In order to describe the recent version of this debate, I need to go back to 1908 to lay out two key terms that still pervade the current discussion on metaphysics of time: the A-series and the B-series.

McTaggart's A-series and B-series

John M. E. McTaggart, one of the greatest metaphysicians of the early 20th century, published a very influential paper in 1908 called "The Unreality of Time".[16] By introducing two different ways of describing temporal order and showing that neither could represent time accurately, he argued that time was not real. My interest here lies in the A-series and B-series concepts rather than in McTaggart's argumentation. However, I will give a short summary of his paper to understand the context in which he brings up the temporal series.

McTaggart defined two series to capture the sequential aspect of time. The A-series orders events by allocating them into present, past or future, whereas the B-series does that only in relative terms, such as earlier than, later than or simultaneously. An event is said to change its A properties of being future, then present, and finally past. Events are fixed in different temporal locations of a B-series, and the relative B properties between them are permanent. Both series somehow depict our understanding of time, but McTaggart stresses that the A-series is essential to it. The B-series depends on the A-properties of the events to order them temporally, and without them, it collapses into a non-temporal order. Therefore, the A-properties make the ordering of the events in the B-series different from a mere ordering like that of the real numbers. He calls the ordering of events without temporality the C-series.[17]

A crucial aspect of the differentiation between the series is the linguistic concept of tense. Tensed sentences change their truth value over time, whereas tenseless ones do not. Tensed propositions play an important role in an A-series, since the position of events is constantly changing — from future to present, and then to past. On the contrary, tense

[16] J. Ellis McTaggart, 'The Unreality of Time', *Mind* 17, no. 68 (1908): 457–74, https://www.jstor.org/stable/2248314.

[17] McTaggart, 459-60.

is useless in the B-series, the propositions about the temporal ordering of the events are tenseless.

For McTaggart, change is essential to the nature of time, and it can only be accounted for by the A-series. However, the existence of an A-series involves a contradiction. All events in the A-series are at some point present, past and future, and this is contradictory since those properties are mutually exclusive. An event cannot have both properties being past and being future. They are irreconcilable because there is no way to explain the change of properties without presupposing time — i.e. another A-series in which events constantly change their properties. This would result in an infinite regress that cannot explain away the initial problem, every posited A-series requires another A-series to account for the change in the A-properties of the events.[18]

Since the B-series depends on the A-series to portray time genuinely and the A-series is self-contradictory, McTaggart sees no coherent way to order events temporally and therefore concludes that time is unreal. What is left is the C-series, which comes from removing any temporality from the B-series. It represents an ordered manifold of events which involves neither change nor directionality that could, in McTaggart's view, actually account for the reality of our universe.[19]

Many philosophers of time have engaged with McTaggart's argument, which has since been revised, revamped and refuted in various ways. It is almost impossible to find a recent paper on philosophy of time that does not refer to "The Unreality of Time". However, it is not McTaggart's argumentation that makes his work so important, but rather his definitions of the series of temporal order that have marked the later debates in the field. The division between A-theorists and B-theorists has since arisen, as philosophers of time have aligned themselves with either series and defended them as the proper way of describing temporal order.

On one side of the debate, some claim that the A-properties of being past, present and future are objective, and events change and eventually have them all — everything is, has been and will be first future, then present and finally past. The passage of time is therefore a true feature of the universe, and tensed facts are irreducible to tenseless

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[18] McTaggart, 466-69.

[19] McTaggart, 461-4, 473-4.

propositions.[20] On the other side, the B-theorists deny that past, present and future are fundamental, and insist that events are only past/present/future relative to a given moment on the B-series. They deny McTaggart's initial claim that the B-series's account of genuine temporality depends on the A-series. For them, the passage of time is subjective or derivative rather than objective, and the universe can be fully described by tenseless facts.[21]

By looking back to McTaggart's 1908 paper, we can recover some of the key questions of metaphysics of time that still resonate today. What is time, or what is essential to it? Is change a necessary and sufficient condition for time to pass? Is the passage of time an objective feature of the universe, or is it subjective? But this does not end here, metaphysicians have extended the debate to other aspects that were not present in McTaggart's 1908 paper. I will discuss the most relevant ones in the part that follows.

Dynamic time vs static time

The current landscape in metaphysics of time is a quite complex one, with many nuances and disagreements in every apparently solid position. Some authors have identified two main theories that unify positions across the various debated aspects of time. Markosian draws a clear distinction between the Dynamic Theory of Time and the Static Theory of Time.[22] Each of them is defined by its position with respect to the following aspects: temporal series, tense, ontology, dimensionality and persistence. These aspects are not independent of each other, but they all have different nuances that I find worth noting. Let me briefly explain what is at stake in these various aspects of the theories.

The choice of temporal series usually determines the position about tense. A-theory requires realism about tense, whereas B-theorists are most likely to argue for the

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[20] Some examples: Kevin Falvey, 'The View from Nowhen: The Mctaggart-Dummett Argument for the Unreality of Time', *Philosophia* 38, no. 2 (June 2010): 297–312, https://doi.org/10.1007/s11406-009-9227-z; E. J. Lowe, 'The Indexical Fallacy in Mc Taggart's Proof of the Unreality of Time', *Mind* XCVI, no. 381 (1987): 62–70, https://doi.org/10.1093/mind/XCVI.381.62; Arthur N Prior, *Changes in Events and Changes in Things* (University of Kansas, Department of Philosophy, 1962).

[21] D. H. Mellor, 'The Unreality of Tense', in *The Philosophy of Time*, ed. Robin Le Poidevin and Murray MacBeath (Oxford University Press, 1993), 47--59; John JC Smart, 'The River of Time', *Mind* 58, no. 232 (1949): 483–94; Donald C Williams, 'The Myth of Passage', *The Journal of Philosophy* 48, no. 15 (1951): 457–72.

[22] Ned Markosian, 'The Dynamic Theory of Time and Time Travel to the Past', *Disputatio* 12, no. 57 (1 November 2020): 138–43, https://doi.org/10.2478/disp-2020-0006.

eliminability of tense in a logical language.[23] One could argue that these two aspects are deeply connected, if they are not the same, though the connotations can be a little bit different. The temporal series emphasize the metaphysical changing or unchanging nature of the temporal properties of events, and therefore the passage of time. The disagreement about tense points to a debate in linguistics and logic, whether tensed propositions can properly describe the world or they could be reduced to tenseless ones. Tense realists are necessarily A-theorists, and tense eliminativists are necessarily B-theorists.

At another level, we can also question the reality of things that happen in time. If time really passes, what is the ontological status of things that existed in the past and that will exist in the future? Do only present objects exist or does everything — past, present and future objects — exist? The two main metaphysical positions with respect to these questions are presentism and eternalism. Presentism holds that only present objects exist, the present is ontologically privileged over the future and the past. Presentists claim that future objects come into existence when they enter the present and cease to exist right away once they recede into the past. On the other hand, eternalism states that things at all times exist equally, that is, everything that exists in the present, has existed in the past and will exist in the future has the same ontological status.

Presentists must adopt the A-theory, since it is the one that provides them with a privileged present, which cannot be recovered in the B-series. Though not all A-theorists are presentists, presentism is the soundest option for A-theorists. For instance, the Moving Spotlight is an eternalist A-theory, and it portrays the property of presentness as a 'spotlight' that moves forward in the temporal dimension affecting all objects at each time and defining a universal Now. An extra metaphysical property — being 'lit up' — needs to be added *ad hoc* to justify the difference between past, present and future objects, in a way that does not affect the objects' ontology. Simplicity then plays in favour of

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[23] Rudolf Carnap developed the idea of logical language in which meaningless statements cannot be uttered. He aimed to dismantle metaphysics since, according to him, it did not make meaningful claims; but his idea of a logical language has remained useful after the fall of verificationism. In this context, the question of whether tense would be part of such a language can also be expressed as whether tense is logically fundamental. I will return to this topic when discussing Rödl's work in Chapter 3. Rudolf Carnap, 'The Elimination of Metaphysics Through Logical Analysis of Language', in *Logical Positivism*, ed. A. J. Ayer (The Free Press, 1959), 60–81.

presentism.[24] On the other hand, B-theorists necessarily take an eternalist stand, since the B-series does not provide tools to distinguish between present and non-present objects.

Seeing time as another of the spacetime dimensions opens a new question, the dimensionality of the universe. We can see the Universe as existing in three dimensions, and time representing the change in it, this view is called 3-dimensionalism. It is closely related to presentism since the Universe is taken to exist just in the present. Otherwise, we can consider a 4-dimensional Universe, with three spatial dimensions and time as the fourth dimension.[25] This view, combined with eternalism, gives rise to the idea of the Block-Universe, a 4-dimensional manifold of events which encompasses the whole history of the universe along the temporal dimension.[26]

In this regard, we need to be careful when we talk about time as a spacetime dimension. Smart advised against spatialising time in the sense of understanding it as another spatial dimension.[27] That view can lead to trouble since it prompts us to substantialise time, and therefore see events in time as something that could endure and change through a hypertime. It is not in this sense that time must be understood when it is said to be a spacetime dimension. Smart claimed that time should be understood as another geometrical dimension of an n-dimensional space that exists timelessly, since time is already included in it. It is also in this geometrical sense that time is part of spacetime in the Theory of Relativity.

The dimensionality of the Universe is likewise related to the famous debate on persistence. That things persist means that although they may change as time passes, they maintain their identity. The dispute arises from the question: how can objects change while being the same as time passes? Two competing views account for change and identity in different ways: endurance theory and perdurance theory.[28] Endurance theorists claim that objects are 'wholly present' at every moment. Conversely, perdurance theorists

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[24] Dean Zimmerman, 'The Privileged Present: Defending an 'A-Theory'of Time', *Contemporary Debates in Metaphysics* 10 (2008): 212–16.

[25] Theodore Sider, 'Four-Dimensionalism', *The Philosophical Review* 106, no. 2 (1997): 197–231, https://doi.org/10.2307/2998357.

[26] Williams, 'The Myth of Passage'.

[27] John JC Smart, 'Spatialising Time', *Mind* 64, no. 254 (1955): 239–41, http://www.jstor.org/stable/2251470.

[28] Katherine Hawley, *How Things Persist* (Clarendon Press, 2002): 9-24.

state that objects are temporally extended and made of temporal parts, which are present at different times. For the latter, things are spread across time in a similar way to how they are spread across the spatial dimensions. For the perdurantists, change is then due to the difference between the temporal parts of the same atemporal object, seen from an atemporal perspective. It is not that clear how the endurantists account for change and there are various possible versions.[29]

Perdurantism makes use of the space-time analogy, which links it to the 4-dimensionalist view of the Universe. The objects exist in four dimensions, hence their whole is a sum of all the temporal slices that are present at different moments. Conversely, endurantism conceives objects, and the universe, as 3-dimensional, since they are wholly present at every moment of their existence.

Neither endurance nor perdurance theory is strictly associated with either temporal series. According to Hawley, both tensed and tenseless theories are compatible with endurance and perdurance.[30] However, perdurantism is usually linked to eternalism and the B-theory, since it makes use of the space-time analogy. In contrast, endurantism is more likely to be related to tensed views and the A-theory.

Now that I have presented the various debates that are currently open in metaphysics of time, I will introduce the two big theories that unify or put together positions with respect to these different aspects. These are the Dynamic Theory of Time and the Static Theory of Time. I should first add a disclaimer here, as not every author would agree. The two theories should be understood as general trends that philosophers follow when they engage in metaphysics of time, and that can have exceptions. I have taken this classification from Markosian.[31] Other authors use the same terminology or a similar one. For instance, Jenann Ismael also refers to them as the Heraclitan view and

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[29] Hawley herself presents the relations-to-times account as the most reasonable way to explain change in endurance theory. According to this view, objects stand, atemporally, in different relations to different times, and that is why they change their properties over time while remaining the same. However, this is not the only way endurantists account for change and there is not a clear agreement between them. Hawley, 16-24.

[30] Hawley, 33.

[31] Markosian, 'The Dynamic Theory of Time and Time Travel to the Past', 138-43.

the Parmenidean view, connecting them to the ancient disagreement between the two pre-Socratic thinkers.[32]

The Dynamic Theory involves the A-theory, tense realism, presentism, 3-dimensionalism and endurantism. On the other hand, the Static Theory includes the B-theory, tense eliminativism, eternalism, 4-dimensionalism and perdurantism. The following table summarises the various aspects of these two metaphysical theories of time:

Table 2.1: Aspects of the Dynamic and Static theories of time. These two theories are general trends and should not to be taken as solid blocks, as different combinations across the table can be defended.

	Dynamic Theory of Time	*Static Theory of Time*
Temporal series	A-series	B-series
Tense	Tense realism	Tense eliminativism
Ontology	Presentism	Eternalism
Dimensionality	3-dimensionalism	4-dimensionalism
Persistence	Endurantism	Perdurantism

The Dynamic Theory takes the passage of time to be an objective feature of the universe since it adopts the A-series as the right way to order events in time. Events in time have the real properties of pastness, presentness and futurity, and tensed propositions are fundamental when it comes to giving an objective description of the universe. The dynamic Universe is 3-dimensional and only exists in the present, the passage of time represents change in any or every part of it. Therefore, all objects are wholly present at every moment at which they exist.

The Static Theory describes the universe as a static manifold of events in four dimensions. All times exist equally and the passage of time is either eliminated or reduced

[32] Jenann Ismael, 'Time and the Visual Imagination: From Physics to Philosophy', in *Oxford Studies in Philosophy of Mind Volume 2*, ed. Uriah Kriegel (Oxford University Press, 2022), 217–47, https://doi.org/10.1093/oso/9780192856685.003.0007.

to the static manifold or declared a subjective feature of our consciousness. Tense, as well, can be eliminated from a fundamental description of the universe, since past, present and future are not real features of the world and tensed propositions only make sense as relativised to a certain point in the static manifold. Moreover, objects are made of temporal parts and are spread across different dimensions. This bundle of views can be well understood as an eternal Block-Universe. It is this theory the one that has in fact had the most support from contemporary physics, and this is due to the lack of the dynamic aspect of time as it appears in relativity theory, which makes it look like a subjective feature that can only be added ad hoc.

Science fiction provides us with a way to roughly imagine the world as it is depicted by the defenders of the Static Theory, which is the most popular one in the genre. In *Slaughterhouse-Five*, Kurt Vonnegut describes how the aliens from Tralfamadore can see in four dimensions. The protagonist, Billy Pilgrim, is abducted by a flying saucer and learns about their understanding of time:

Billy Pilgrim says that the Universe does not look like a lot of bright little dots to the creatures from Tralfamadore. The creatures can see where each star has been and where it is going, so that the heavens are filled with rarefied, luminous spaghetti. And Tralfamadorians don't see human beings as two-legged creatures, either. They see them as great millepedes — "with babies' legs at one end and old people's legs at the other," says Pilgrim.[33]

For the Tralfamadorians, time is another of the four dimensions of the Universe, and see objects spread in all of them, as the perdurantists claim they are. The aliens also see the past, present and future existing simultaneously, which requires an eternalist ontology. A presentist A-theory does not allow for this, since the future and the past do not exist at the present moment, and the only way to move through time is continuously with the universal Now, at the same rate as its objective passage. Contrarily, the passage of time is a subjective experience for Billy since his whole life is already laid out for the Tralfamadorians to see, also robbing the future of any sense of openness and giving up the idea of free will. This is obviously a fictional representation of a static universe, which

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[33] Kurt Vonnegut, *Slaughterhouse-Five (Modern Library 100 Best Novels): a duty-dance with death* (New York, 1991).

cannot be taken so seriously, but can help to get an idea of the implications of the Block Universe.

Vonnegut's description is actually spatialising time, which Smart advised against, and that would lead to conceiving a hypertime along which Tralfamadorians experienced the true temporality, if taken seriously. The fact that experience and thought are necessarily in time is what makes it impossible for us to imagine or visualise a static universe, and that can be used either as an argument for the subjective nature of time or as proof that time is indeed fundamental and irreducible.

It would be unfair to explain the Dynamic Theory in the framework used by static theorists, or just as its negation. It is inadequate to characterise the Dynamic Theory as taking a tiny slice of the temporal dimension of the Universe to be the present and everything that exists, as it moves forward in time and things come and cease to exist as they jump from the future to the present, and then to the past. This view of the theory would be misleading because for the dynamic theorists there is no straight line that represents the temporal dimension — if there is, it is no more than a theoretical construction to describe change. Instead, the universe is a 3-dimensional space in which change happens, and everything there is now is wholly present and what there is at all. There is no changeless way to express change and therefore propositions about reality are uneliminably tensed.

How would dynamic theorists deal with the science fiction trope of time travel? Well, unfortunately, time travel cannot be possible if the Dynamic Theory is true.[34] Markosian explains how we are able to imagine travelling in time when we are living in a dynamic universe. What we really imagine when we conceive time travel to the past is that at the moment we press the button in the time machine, reality around us is wiped out and a new setting that corresponds to how the world looked 100 years ago appears. You think that you travelled in time but what really happened is that at that moment the world around you has been reshaped into the way it used to be in the past. Since you live in the present, past events are in the past and future events are in the future. Travelling to the past would be to experience as present events that are now past, which is impossible

[34] Markosian, 'The Dynamic Theory of Time and Time Travel to the Past', 146-63.

since time always goes forward and presentness, pastness and futurity are real features of events.

As we can see, neither the Tralfamadorians nor time travel could exist if the Dynamic Theory were true. One could say that science fiction writers prefer the Static Theory just because it allows for more possibilities when it comes to speculating about scientific progress and the nature of the universe, but this is probably also due to the physicists' strong preference for the Static Theory, as it fits well with the spacetime of special relativity. The most straightforward interpretation of a relativistic universe is a static block universe, in which time is another dimension and there is neither an objective passage of time nor a universal Now.

One of the main arguments against the Dynamic Theory is its incompatibility with relativity theory, especially presentism and the A-theory. Simon Saunders claims that the problem is simply that the idea of absolute simultaneity cannot be reconstructed in a Minkowskian spacetime, and this is indeed essential to the theory.[35] An event can happen before, after or simultaneously with another one, viewed from different reference frameworks. This is not just a matter of perspective, since all inertial reference frames have the same validity when it comes to determining which events happen first — i.e. there is no privileged frame. Due to this, the order of the events is relative to the reference frame, and therefore the present can only be defined locally in a spacetime point, it cannot be universalised. From there, past and future can be defined as the past lightcone and future lightcone of such a point, that is, locally as well. This complicates the task for the presentists, since a moving, universal present cannot be physically defined and it would be untenable to assert that a spacetime point is all that exists. For this reason, Saunders claims that presentism "contradicts it [special relativity] in the sense that it implies that special relativity is badly deficient as a fundamental theory of the world". [36]

This contradiction of presentism with relativity also counts as the strongest argument in favour of eternalism and the Static Theory of Time. However, defenders of presentism and the A-theory may claim that it is not as incompatible with relativity as their opponents claim. Zimmerman argues that the relativistic spacetime manifold is a

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[35] Saunders, 'How Relativity Contradicts Presentism', 1-5.

[36] Saunders, 'How Relativity Contradicts Presentism', 3.

theoretical construct which should not dictate our metaphysics.[37] He agrees with Saunders that presentism has demands for relativity to make sense of it — namely a privileged slicing of the spacetime manifold that can account for the present — but he does not see this as inherently problematic. An absolute Now is also unnecessary for Newtonian mechanics and can be added out of metaphysical soundness, without fearing contradiction. Why should we be worried about adding things to scientific theories in order to make them fit our cogent metaphysical principles, like for example that only the present exists?

Another argument against the Dynamic Theory can be traced back to McTaggart's proof for the unreality of time, as some have taken it to be a strong point against the reality of tense and the A-properties. For instance, Mellor follows Dummett in taking from McTaggart the idea that the A-series is inherently contradictory because it cannot explain itself without presupposing another A-series and falling into an infinite regress.[38] However, Mellor disagrees with McTaggart's claim that the B-series needs the A-properties to hold. He makes use of the analogy between space and time: the A-properties are temporal indexicals just like here and there are spatial indexicals, so they are relativisations to a point in the temporal dimension and not properties of time in itself. Time is then taken as the dimension of change, in which events can be placed tenselessly and just in relative positions between them. Hence, the B-series alone accurately captures the nature of time and all tensed propositions are reducible to tenseless ones.[39]

Other authors, like E. J. Lowe, have argued against McTaggart's claim that the A-series is self-contradictory, calling it an indexical fallacy.[40] Lowe's response is simple: there is no contradiction in the A-series because events do not have different A-properties at the same time. The opponents of the A-theory forget the uneliminably indexical nature of the A-series expressions. It is not the same to say that an event that is happening now, in 2023, was future in 2020, as to say that it was true to state in 2020 that such event was future. Neither can we say that an event in 2025 is now in the future, but rather that it will

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[37] Zimmerman, 'The Privileged Present: Defending an 'A-Theory'of Time', 218-21.

[38] Michael Dummett, 'A Defense of McTaggart's Proof of the Unreality of Time', *The Philosophical Review* 69, no. 4 (1960): 497–504.

[39] Mellor, 'The Unreality of Tense'.

[40] Lowe, 'The Indexical Fallacy in Mc Taggart's Proof of the Unreality of Time'.

be true to state in 2025 that such event is present — this of course requires realism about tense. The person who makes a statement cannot abstract from themselves because the A-properties always depend on the point of view of the one who utters such a statement. According to Lowe, "philosophers of time […] cannot escape their own temporal perspective, however much they are tempted to suppose that they can view things sub specie aeternitatis".[41] There is no now in the future, and neither is now the future of the past, since these properties can only be truly attributed from the personal-I perspective at a certain time. This confusion, concludes Lowe, is what leads McTaggart, Dummett, Mellor and others to the infinite regress. Nevertheless, we should not take this as the ultimately correct way of understanding tense and the A-properties. Indeed, Lowe's arguments have been criticised also by other tense realists such as Kevin Falvey.[42]

In addition, the Dynamic Theory faces another challenge that is not there for the Static Theory: it still needs to develop a solid tensed logic that can account for cross-time relations. Prior introduced the tense operators and his famous analogy between time and modality,[43] which gave the foundations for different kinds of tense logic. However, Sullivan shows that current tensed logics like Quantified Tensed Logic K (QTLK) or free tense logic fail to meet the basic metaphysical principles of the Dynamic Theory.[44] That is the Temporary Existence Principle for the former, which asserts that some objects came to exist or will cease to exist; and the Univocal Existence Principle for the latter, there is only one way in which objects exist. Regardless of which option is chosen, it seems that the dynamic theorists would have to abandon some of their assumptions. This is not a problem for the tenseless logicians, since they can express their propositions in standard predicate logic,[45] so this can be taken as another argument in favour of the Static Theory.

On the other hand, the Static Theory has been criticised for being less common-sensical and not taking the human experience of time seriously.[46] Dismissing the passage

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[41] Lowe, 67.

[42] Falvey, 'The View from Nowhen'.

[43] Prior, *Changes in Events and Changes in Things*.

[44] Meghan Sullivan, 'Problems for Temporary Existence in Tense Logic: Problems for Temporary Existence in Tense Logic', *Philosophy Compass* 7, no. 1 (January 2012): 43–57, https://doi.org/10.1111/j.1747-9991.2011.00457.x.

[45] Sullivan, 'Problems for Temporary Existence in Tense Logic', 53.

[46] Zimmerman, 'The Privileged Present: Defending an 'A-Theory' of Time', 221-3.

of time as an illusion without providing an account of how the feeling of temporal dynamicity can arise from the staticity of the universe is something that cannot be justified by pointing at the equations. Furthermore, some will just not take science's claims to be the definite truth, since big paradigm shifts have completely reshaped the scientific disciplines' assumptions in recent history, and nothing can guarantee that it will not happen again.

1.3 A priori time in the idealist tradition

In the previous section, I introduced the two metaphysical theories of time that are prominent in the current discourse of analytic philosophers of time, particularly in the Anglo-Saxon academic circles. Although these two positions may seem to exhaust the possibilities of how to understand time, I am not intending to present them as such. Viewed from their perspective, it makes sense to say that either the passage of time is real or it is not, or that either non-present objects exist or they do not. Nonetheless, there is another way of approaching the issue of time, and that is, as Kant would say, from a critical perspective.

Kant's Transcendental Idealism

Immanuel Kant is one of the most influential philosophers of Western thought. In the *Stanford Encyclopedia of Philosophy*, he is presented as the "central figure of modern philosophy". His work is comprehensive and aspires to encompass all of philosophy, ranging from metaphysics to aesthetics, through epistemology, ethics, political philosophy and others. The main feature of Kant's philosophy is its critical aspect. Critical philosophy is one that centres on the subject of knowledge, making it also the object of its own inquiry. He developed this philosophy in his three main works: *Critique of Pure Reason*, *Critique of Practical Reason* and *Critique of the Power of Judgement*.[47]

In the first critique, Kant presents his thesis of transcendental idealism. This is based on the idea that humans do not experience the world as it is, but only how it appears

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[47] For an overview of Kant's philosophy, I have consulted: Michael Rohlf, 'Immanuel Kant', in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta and Uri Nodelman, Fall 2023 (Metaphysics Research Lab, Stanford University, 2023), https://plato.stanford.edu/archives/fall2023/entries/kant/; Roger Scruton, *Kant: A Very Short Introduction*, vol. 50 (OUP Oxford, 2001).

to be to us. There are objects in themselves, but our knowledge about them is shaped by the structures of our a priori cognitive machinery. This a priori knowledge consists of two stems: the pure categories and pure form of intuition. The categories, or concepts, are internal to thought and are necessary for thinking and understanding. With intuition, Kant refers to the immediate awareness and sensory perception of real objects, and its pure form is external to thought because it is inherent to experience and does not depend on constructs or products of our thinking. Thinking is enabled by pure concepts but it is intuition which provides that thought with content about the world.

Although there is no consensus on a standard interpretation of Kant's thesis, I here endorse the most relevant for my purpose, defended by current supporters of the a priori time. According to this interpretation, the pure categories hold absolutely, quantity, quality, unity and plurality are a few examples. We get to know about objects by placing them under these a priori concepts, but how we experience them is mediated by the form of intuition. The pure forms of intuition are space and time, which are not things in themselves but still empirically real, since they constitute a precondition for experience to occur. The form of intuition is a pre-established spatiotemporal framework necessary for us to perceive reality. Thus, the a priori categories apply to reality only insofar as it reaches human thought through intuition. Human knowledge is therefore limited to appearances.

Kant's philosophy aimed to synthesise the early modern debate between empiricists and rationalists, combining some aspects and rejecting others from both positions. Knowledge neither comes from experience alone nor can be achieved through pure reasoning — as in knowledge of the thing-in-itself. Rather, reason provides knowledge with form, whereas experience provides its content.[48]

In his critical project, Kant also reinterpreted the field of metaphysics and understood it as the study of the transcendental forms that make us experience reality the way we do. He called it critical metaphysics because the subject becomes the object of their own study, it is a reflective metaphysics that inquires into the pure knowledge that one has independently of experience. This metaphysics clearly differs from the typical speculative metaphysics about the thing-in-itself — which Kant called 'dogmatic'. A

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[48] Scruton, *Kant: A Very Short Introduction*: 11-21.

critical metaphysician would search for so-called synthetic a priori knowledge. The predicate of a synthetic proposition is not contained in the subject and its truth depends on how the world is, whereas an analytic proposition is true or false in virtue of its meaning alone — the predicate is contained in the subject. Hence, Kantian metaphysics leads to knowledge that arises from thought alone (a priori), but whose truth conditions depend on experience (synthetic). In other words, Kant's critical metaphysics aims to identify the forms of knowledge that are not derived from experience but that structure our understanding of the external world.

Kant's work has inspired many scholars after him who have made use of and further developed his critical and idealist approach. The philosophical movement of German idealism has constituted one of the most relevant ones in the history of modern philosophy and continues to influence current academics that engage with the metaphysical debates about time. So let us define the initial notion of ideal or a priori time.

Ideal Time

Time plays a fundamental role in Kant's formulation of transcendental idealism. In his metaphysics, space and time are the pure forms of intuition instead of real properties of the thing-in-itself. Space and time are imposed by our minds on any empirical input. We can only represent objects in this preconceived framework and that makes it possible for our thought to have an object and be about reality. However, since our thought about it is mediated, what is available to us is just the appearances rather than the thing-in-itself.

This transcendental idealist conception of space and time was quite different from the two main views that were being discussed at the time, absolutism and relationalism. The former was defended by Newton and then by his followers, who understood space and time as an infinite pseudo-substance that provides physical bodies with temporal and spatial extension. The latter, with Leibniz as its main representative, was the view that space and time exist are only abstractions from spatial separation and temporal succession between objects and events, but are not things in themselves.[49]

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[49] Andrew Janiak, 'Kant's Views on Space and Time', in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Summer 2022 (Metaphysics Research Lab, Stanford University, 2022), https://plato.stanford.edu/archives/sum2022/entries/kant-spacetime/.

Kant shifted from the absolute/relational framework to an ideal/real one. Ideal time is not real in the sense of a thing-in-itself independent of our mind. Spatial and temporal relations do not supervene on objective properties of the things-in-themselves, but depend on our objective representation of reality. Our intuition of time and space, for Kant, is an example of synthetic a priori knowledge, therefore the object of study of critical metaphysics. They are not derived from experience but are necessary for it to occur, so they are fundamental features of human cognition and shape our understanding of the world.

In sum, Kant moved the focus from an external reality that he saw as unavailable to us, to the transcendental structures that shape our experience. Critical metaphysics, thus, portrays time as an priori form of intuition that is necessary for experience. This time differs from the one conceived by the analytic philosophers, who present it as a feature of the external world that we may or may not perceive as how it really is. For Kant, the external world is not the subject matter of metaphysics, since our knowledge of it is always mediated through our form of intuition, so it would be wrong to associate his view on time with either the Dynamic or the Static theories of times. In a Kantian framework, those theories would be part of dogmatic metaphysics instead.

At first glance, it seems like Kant's notion of time could be compatible with either the dynamic or the static theories, since these are speculations about the unmediated external world. If we leave aside Kant's rejection of this speculative metaphysics, it would not be wrong, yet totally unfounded, to claim that the universe really may have something that corresponds to our ideal time and that the nature of such would be dynamic or static. This gap between how the world is and how it is to us allows for speculation that cannot be verified by experience or through reason. However, if we close the gap, i.e., if we do not follow Kant in assuming that the form of intuition is external to the form of thought as such, then the distinction between reality in itself and reality in appearance would vanish and thus ideal time would just be real time. If the form of thought has absolute validity, and the form of intuition partakes in this absolute validity, then by thinking of an object we are directly engaging with the object, not with a mediated appearance of it. Reality is thus directly available to us in its true form, which entails the categories that

apply to it and the spatiotemporal structure that shapes it.[50] In Sebastian Rödl's words, this step consists of identifying the pure idea of an object of thought with the pure idea of something in space and time. This thesis comes from absolute idealism, a philosophical doctrine first developed by Georg Wilhelm Friedrich Hegel.[51]

Idealism holds that ideas, or the realm of mind and consciousness, constitute the ultimate reality. It is opposed to materialism, which claims matter to be fundamental. The 'absolute' stands for what Hegel calls the absolute idea, which is the mind knowing itself and realising that there is no objective knowledge beyond it. Absolute idealism asserts that the unity of reality is the unity of this absolute idea, and that all differences and distinctions, including those between mind and world, reality and self, are ultimately bridged by it. It differs from subjective idealism because it does not consider different minds to have their own particular realities. Neither that reality is mind-dependent, since the mind involves the idea of a world where it finds itself. Rather, it entails that reality does not 'appear' to us in any way different than how it is, because there is no gap between the pure categories, which hold absolutely, and the form of intuition, as Rödl argues. I will not go into detail about this, but it is worth noting that it is this philosophy, especially dropping the distinction between reality-in-itself and reality-to-us, which allows defenders of the a priori notion of time to engage in the current analytic debates I presented earlier. I will elaborate on this view later on when I introduce Rödl's work.

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[50] Sebastian Rödl, 'Eliminating Externality', *Internationales Jahrbuch Des Deutschen Idealismus* 5 (2008): 176–88.

[51] Paul Redding, 'Georg Wilhelm Friedrich Hegel', in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Winter 2020 (Metaphysics Research Lab, Stanford University, 2020), https://plato.stanford.edu/archives/win2020/entries/hegel/.

Chapter 2

Ismael's Metaphysics of the Agent

From the previous chapter, the reader might get the impression that the discussion about metaphysics of time has come to a dead end. The picture so far seems to make us choose between two options: either we believe the scientists and the Static Theory in their claims that the universe is eternal and deny any objectivity of the passage of time, or we completely commit to its passage in spite of scientific theories that have proven empirically successful. Neither position seems comfortable since both imply renouncing strong pillars of philosophical thinking, either common sense or scientific methods. The whole thing becomes more confusing if we consider that one could be an anti-realist about science and still have enough arguments to support the Static Theory, and one could also strongly believe in the scientific enterprise and have no problem with adding metaphysical dynamicity to the static physics of time. Moreover, the notion of a priori time that I introduced in the last part of Chapter 1 could be used as a strong argument in the discussion, but I will leave how it can join the game to the next chapter, as current analytic philosophers tend to overlook the German idealist tradition.

Whether time is dynamic or static is an open question, and both sides have their strengths and weaknesses. So far, I have only presented arguments that either align with one theory or with the other, but there has been a solid attempt to reconcile the two by the philosopher of physics and metaphysician Jenann Ismael. In this chapter, I aim to synthesise her recent work on phenomenology and metaphysics of time and show how she carefully builds a bridge between the two apparently opposite sides. In doing so, she brings in a new way of doing metaphysics that makes it possible for her to hold what seems contradictory at first sight.

2.1 Phenomenology and logic of temporal experience

Some of Jenann Ismael's areas of interest are philosophy of mind and metaphysics, along with philosophy of physics and the overlap between the three. She has published some work on the phenomenology of temporal experience,[52] and has also made important contributions to the discussion on metaphysics of time.[53] Her starting point is the apparent contradiction between how time appears to us — dynamic — and how physics tells us it is — static. Analytic philosophers have defended either notion of time as the true or the real one, dismissing the other one or removing its metaphysical significance, but Ismael does not see the two options as mutually exclusive. In this section, I will briefly introduce Ismael's work on phenomenology of temporal experience and then give an account of her formalisation of temporal passage. Later we will see how she uses these logical tools to reconcile the two theories.

The passage of time is something that everyone can easily grasp, but it is difficult to describe it properly and most of the time we resort to metaphors. Phenomenology provides the tools needed to give an account of what it means for time to flow insofar as it is experienced consciously in the first person. Ismael uses the phenomenological description of temporal passage to reconstruct its characterisation formally and to facilitate its integration into a logico-philosophical framework.

In order to recreate the temporal passage in phenomenological terms, Ismael starts from the simplest level of complexity, a moment or a point in time. She explains in her paper "Temporal Experience" that perceptual consciousness does not consist of small packages of sensorial stimulations that come discretely. Instead, the Doctrine of the Specious Present holds that: "if we consider a particular cross-section of experience at a point t in time (call it t-section), the content carried by the t-section has temporal breadth.

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[52] Jenann Ismael, 'Temporal Experience', in *The Oxford Handbook of Philosophy of Time*, ed. Craig Callender (Oxford University Press, 2011), 460-482, https://doi.org/10.1093/oxfordhb/9780199298204.003.0016; Jenann Ismael, 'Decision and the Open Future', in *The Future of the Philosophy of Time* (Routledge, 2013), 149–68.

[53] Jenann Ismael, 'From Physical Time to Human Time', in *Cosmological and Psychological Time*, ed. Yuval Dolev and Michael Roubach, vol. 285, Boston Studies in the Philosophy and History of Science (Cham: Springer International Publishing, 2016), 107–24, https://doi.org/10.1007/978-3-319-22590-6_6; Jenann Ismael, 'Passage, Flow, and the Logic of Temporal Perspectives', in *Time of Nature and the Nature of Time*, ed. Christophe Bouton and Philippe Huneman, vol. 326, Boston Studies in the Philosophy and History of Science (Cham: Springer International Publishing, 2017), 23–38, https://doi.org/10.1007/978-3-319-53725-2_2.

It spans a finite interval of time centred on t".[54] This idea was developed by William James and Edmund Husserl, and it defines the minimal duration of an episode of perceptual awareness, which has spatial as well as temporal dimensions. Different events with a shorter separation than this temporal breadth blur into a continuous duration, similar to how two distinct points seem to merge when the separation between them is below the angular resolution of our eyes. This idea secures the continuity of experience, and is backed up by the fact that we perceive movement directly rather than successions of discrete snapshots of information coming through our senses.

A key aspect of the Specious Present is that it is centred on the present point but it includes past and future components at a representational level. The momentary perception has a retention of past stimuli, an impression of the present and a protention of future ones. This makes it possible to see movement directly, as the past and future trajectories are not inferred, but represented in any instantaneous perceptual state. Furthermore, this doctrine entails that perception is not like a mirror that represents the same structures of the unprocessed stimuli, some structures are presupposed for experience to arise. A stimulus that happens at a time t will necessarily be perceived to have a minimal temporal breadth and a minimal spatial extension. Experience is then spatiotemporally structured.[55]

Now we zoom out. The smallest unit of perceptual awareness needs to be embedded into a longer psychological history, which creates a sense of self. For this, it is necessary to retain memories of the past and anticipate what will happen in the upcoming future. The difference between them lies in the epistemic and practical asymmetries that we face with respect to past and future events. Whereas the past is known or can be remembered, the future is inferred. On the other hand, we can affect the future by making decisions, but the past is unchangeable. These memories and anticipations obviously point further away in time than the Specious Present, they are recalled or inferred perceptual states that are not part of the immediate perceptual representation.[56]

The self is constructed through a process of iterated nesting, at every moment the memories and expectations are reorganised and reconfigured, creating an

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[54] Ismael, 'Temporal Experience', 462.

[55] Ismael, 461-7.

[56] Ismael, 467- 77.

autobiographical narrative with a definite past and an open future. The agent recognises themselves as the one who went through all those memories and that has the power to decide upon their future.[57] The following poem by Antonio Machado, representative of Spanish Modernist literature, describes quite well this asymmetry between past and future experienced by the agent living in time. He uses the metaphor of a wanderer who creates his own path by walking, he can neither go back nor follow his footprints. As a matter of fact, Ismael uses the same metaphor to depict the past-future asymmetry and the active role of the agent in affecting their future by making their beliefs true.[58]

Caminante, son tus huellas,	*Wanderer, it is your footprints,*
el camino y nada más;	*winding down and nothing more;*
Caminante, no hay camino,	*wanderer, no roads lie waiting,*
se hace camino al andar.	*roads you make as you explore.*
Al andar se hace camino,	*Step by step your road is charted*
y al volver la vista atrás	*and behind your turning head*
se ve la senda que nunca	*lies the path you have trodden,*
se ha de volver a pisar.	*not again for you to tread.*
Caminante, no hay camino,	*Wanderer, there are no roadways,*
sino estelas en la mar...[59]	*only wakes upon the sea...*[60]

I have sketched what phenomenology tells us about temporal experience, how the whoosh of experience arises at every moment and how a psychological history is formed along one's life. Next, I will follow Ismael's argumentation in her 2017 paper and describe how she attempts to formalise temporal passage.[61] Phenomenology has given her the tools to clarify what the passage of time feels like as experienced in the first person, now she turns to logic to give it formal rigour.

Ismael identifies two distinct perspectives on time that are in constant interplay in the agent's consciousness. One is the Temporally Embedded Momentary Perspective

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[57] Ismael 477-9.

[58] Ismael, 'Decision and the Open Future', 160.

[59] Antonio Machado, 'Poema XXIX', *Proverbios y Cantares*, 2010, 5.

[60] Translation from: 'Disfrutando Un Poema En Inglés de Antonio Machado – Cursos de Ingles En Panama', accessed 21 November 2023, http://ingles.com.pa/poema-de-antonio-machado.

[61] Ismael, 'Passage, Flow, and the Logic of Temporal Perspectives', 24-8.

(TEMP), which represents time from a single moment, like a snapshot of time taken here and now. The doctrine of the Specious Present implies that this temporal perspective is not limited to a single moment, it has a minimal temporal breadth. During this time, we gather representational content, which encompasses the present impression, a retention and also an anticipation of the immediate past and future that fall within the breadth of the TEMP. Moreover, every moment is part of a longer psychological history so a TEMP includes all the memories and anticipations. Furthermore, we get memories of anticipation and anticipation of memories. All this is carried by the perspective of one moment embedded into a timeline.

The second perspective is obtained by letting the point of view of TEMP evolve over time. The Temporally Evolving Point of View (TEvPoV) puts together a series of temporal snapshots and assembles them to form a moving frame centred on the agent's point of view. This is the perspective over time of an agent, who has memories of the past and can make decisions about what will happen in the future. Both in TEMP and TEvPoV we can find a representation of the passage of time. In the former, it is in the temporal breadth that spans the perceptual content of experience, whereas in the latter it is the point of view evolving, "the frame is centred on different points of time at different times".[62]

The passage of time can then be accounted for by a phenomenological analysis of our experience without making any allusion to metaphysics. Ismael even says that "there is nothing metaphysical at stake," indeed: "The phenomenology of flow […] is perfectly compatible with Parmenidean metaphysics".[63] So far a Dynamic theorist could accuse her of being a defender of the Static theory of time, theorising a fairly complex way to explain away why time seems to flow while it is static. Besides, she is quite critical of the Dynamic Theory since, according to her, its defenders aim to reify the phenomenological flow in the invariant structures of the universe. In her view, metaphysics does not owe phenomenology to find a correspondent for every element of belief or experience in the external, mind-independent reality. Ultimately, she trusts physics to reveal the laws of nature insofar as they can be empirically justified. Metaphysics should therefore align itself with scientific claims or at least be continuous with physics.

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[62] Ismael, 30.

[63] Ismael, 29.

Nevertheless, Ismael does not see the passage of time as unreal or less objective, like most Static theorists, but as a natural feature of a frame-dependent representation of time, how it looks from within itself. On the other hand, the static representation of time that comes from physics is frame-independent, so how it would look to a god who lives outside of time. She does not believe that these two views are contradictory, since each one is implicit in the other. In the next section, I will show how she uses her logic of temporal perspectives to create a model that describes the transformation between the two metaphysical views of time.

2.2 Generator of a point of view

For Ismael, what (meta)physics owes to phenomenology is a generative procedure that allows for the mental structures that create the sense of flow to arise.[64] So we are looking for some kind of process or mechanism that gives out a frame-dependent representation of time, i.e., something that creates an evolving point of view of an agent facing the epistemic and practical asymmetries that characterise the human temporal experience. Ismael calls these processes the generator of a point of view.[65] For this purpose, she takes from James Hartle the logical schema of an IGUS.

Information Gathering Utilizing System (IGUS)

James Hartle wrote in 2008 the paper "The Physics of Now",[66] where he describes the logic of a simple system that processes and uses information in such a way that time appears to be in constant flow. As a physicist, he starts from the premises of contemporary physics: the universe is 4-dimensional and the passage of time is not one of its objective features. He aims to show why time seems dynamic to us, although being static, as science tells us, by modelling a simple procedure that can account for the passage of time that some beings or robots meeting certain logical requirements necessarily experience. Hartle sticks to scientific rigour and bases his argumentation on physical laws. However, he is

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[64] Ismael, 35-6.

[65] Ismael, 31.

[66] James B. Hartle, 'The Physics of "Now"', *American Journal of Physics* 73, no. 2 (February 2005): 101–9, https://doi.org/10.1119/1.1783900.

not arguing in favour of the B-series and the Block Universe, but showing how the passage of time can be explained in physical terms — static time is assumed.

An Information Gathering Utilizing System (IGUS) is a model of a robot that is able to gather information about its surrounding environment and process it in a way that can make decisions about its behaviour. It is a simple model that does not capture all the nuances of the human experience, but it is complex enough to capture some important elements of the passage of time, common to a family of beings/robots including, but not limited to, humans.[67]

The information-gathering part consists of $n + 1$ memory locations P_0 to P_n, which contain representations of the robot's environment — we can call these representations images, to simplify. At discrete times, separated by a constant interval τ^*, the image in P_n is erased and the one that was previously in P_{n-1} replaces it. All images move from P_{i-1} to P_i, i ranging from 1 to n. A new image of the robot's environment is captured through its sensorial apparatus and stored in P_0. At any time, the robot has a discrete record of images of its recent history over a duration of $(n + 1)\tau^*$.
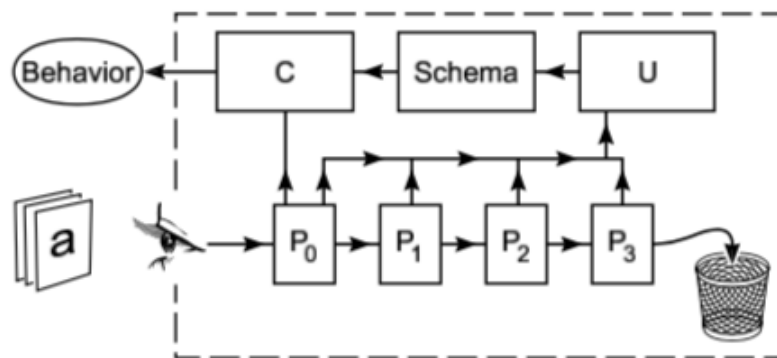
Figure 3.1: IGUS' logical schema with $n = 3$.[68]

As for the information-utilizing part, the robot has two types of processing the information gathered to navigate through its environment. The 'unconscious' processing, represented by U, creates an internal schema of the environment by inferring patterns and abstracting from the stored images, P_0 to P_n. This schema is updated every time new information is captured, every τ^*. The other kind of computing involved is the 'conscious'

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[67] Hartle, 102-3.

[68] FIG. 1 in: Hartle, 102.

processing C, and it is in charge of guiding the behaviour of the robot every time the images are updated. The decision process is directly based on the most recent representation P_0 and the internal schema supplied by U. Given the current situation and the internalised invariances and tendencies of the robot's surroundings, C assesses which is the most appropriate course of action and executes it. Note that U is unconscious in the sense that does not discriminate between the images, it creates and updates the schema based on all the records available; whereas C directly focuses on the immediate representation, accessing the past records only indirectly through the schema. This 'conscious' and 'unconscious' must not be taken as in human-like consciousness terms, since an IGUS is not required to be conscious in this sense. If it was the case that a being or a robot with an IGUS-like structure was conscious, then it would experience time in a very similar way to us. Figure 3.1 shows an example of an IGUS with $n = 3$.

The model of an IGUS can account for some relevant features of the human experience. The conscious computation gets only direct input from the most recent representation of the environment, and indirect input from past representations mediated by unconscious computation. Besides, an IGUS could experience a constant flow of information passing from conscious to unconscious states, which gives rise to the sense of temporal passage. The description of the robot includes P_0 as present during a temporal breadth of τ^*, then the image moves into the unconscious processing and another one replaces it.

Nevertheless, there is something crucial missing for Ismael: the temporal depth of every representational state. She adds another layer of complexity to Hartle's IGUS, consisting of an active compilation of present and past records into an evolving autobiography that also plays a role in conscious decision-making.[69] Every representational state does not only involve an immediate representation of the environment but also a self-constructed storyline of one's experience, with a past that is constantly being reconfigured and a future that is unknown but can be predicted and affected by present decisions.

Regarding the asymmetric nature of an IGUS' experience of time, there are physical reasons why an IGUS cannot represent its future as it does with its past, which

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[69] Ismael, 'Passage, Flow, and the Logic of Temporal Perspectives', 32.

gives an asymmetrical nature to its subjective temporal experience. Even though physical laws have time-reversal symmetry, two time asymmetries impose some restrictions on how the IGUS receives and processes the information. The boundary conditions of the universe impose the direction of both the arrow of radiation and the entropic arrow of time.[70]

As I explained in section 1.1, electromagnetic radiation is bounded by the speed of light, which gives every event a past and a future light cone that determine the regions of spacetime to which that event can be causally connected. Reception of information always comes from an event of emission lying within the past light cone of the reception event. The Maxwell equations of electromagnetism are in fact time-symmetrical, but as a result of having the Big Bang at one edge of the temporal dimension of the universe, there is one preferred direction in which the radiation propagates. This is not a feature of the equations themselves, but something that comes from empirical observation and has to be added to them in the form of retarded potentials rather than advanced ones. This apparent retarded nature of electromagnetic radiation makes the flow of information through radiation only possible from the past to the future, even if these spacetime regions are only defined locally. That is the radiation arrow of time. The IGUS cannot remember the future because it does not receive any information from it.

Moreover, the boundary conditions of the universe also determine a unique direction in which the total entropy of the universe increases, and that is from the Big Bang — a state of minimal entropy — forward. This affects the formation of records, but it is necessary for their erasure, which can only happen along one direction, that of the increasing entropy of the universe as a whole as it tends to thermodynamical equilibrium. This is known as the entropic arrow of time. Both physical arrows of time thus force the psychological arrow of any IGUS to point in the same direction, resulting in what Ismael calls epistemic and practical asymmetries of the IGUS' temporal experience.

All things considered, Hartle shows in his paper that a formal account of the dynamic and asymmetric nature of time as experienced by humans can be given from a static universe that is faithful to the laws of physics. Ismael goes further and makes her 'enhanced' IGUS the generator of a point of view needed to yield the perspective of time

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[70] Hartle, 'The Physics of "Now"', 106-8.

from an evolving frame. The IGUS generates an evolving point of view (TEvPoV) out of a static physical time, it constitutes the function that transforms between a frame-independent representation of time and a frame-dependent one. As Ismael herself puts it, the formal schema of an IGUS "mediates the Heraclitan character of experience and the Parmenidean character of Time itself".[71]

Metaphysical remarks

Again, Ismael can be read as a static theorist in a similar way to Hartle. She describes the complex mechanism that certain robots or beings capable of gathering and processing information need to fulfil to be able to experience temporal flow and temporal asymmetries within a Block Universe determined by the laws of physics. However, there are enough reasons not to see Ismael as a regular static theorist and indeed place her work as a synthesis of the static view and the dynamic view.

Let us recall a key aspect of the two metaphysical theories of time, the temporal series. It can be thought of as whether the temporal passage is real or whether past, present and future are objective features of the universe. The B-series represents time statically according to the laws of contemporary physics, whereas the A-series represents time with the dynamic nature that characterises our temporal experience. Ismael, unlike Static or Dynamic theorists, does not argue for the objectivity of a series and the abstract/derivative nature of the other. Instead, she claims that both series are correct since they correspond to different representations of time that can be transformed into each other through a generative function. The perspective-free representation of time, as a physical dimension along which different events are located, seems static to a being existing outside of time. However, from the point of view of an agent who lives embedded in time, the universe constantly unfolds dynamically. The generator of a point of view mediates between these two representations of time in perfect symmetry.

We take a snapshot of time and take a partial view of the universe relativised to a given reference frame, we let the frame evolve and imagine a system building up an IGUS-like structure centred on it. An evolving point of view of an agent is then created. Similarly, if we take what is left invariant under transformations between embedded

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[71] Ismael, 'Passage, Flow, and the Logic of Temporal Perspectives', 33.

temporal perspectives, a static and frame-independent representation of time is constructed. The A-series and B-series correspond, respectively, to embedded and transcendent perspectives on time, and they can be integrated by an evolving function.

The passage of time does not appear in the frame-independent representation of time because it is a frame-dependent feature that is nonetheless objective. It cannot be reified in the invariant structures of the universe because it is not a feature of time in itself, but that does not mean that it is unreal. It is a feature of the embedded point of view of the agents that experience an evolving temporal perspective that has more practical relevance for them, centred on here and now.

In a more recent paper, Ismael locates the origin of the contemporary tension between the opposite views on time in the traditional way physics has depicted the Block Universe, using a spatial axis to represent time. When philosophers look at the typical representation of the evolution of the universe, they conflate the time the image is embedded in with the time that is depicted. They see in the picture that different events that happened at different times exist at the same time and endure through a higher dimensional time, the one in which they are themselves embedded. This is not the right interpretation because time itself is plotted in the image so the various stages of the universe are not existing 'at the same time'; indeed, they exist at different times in an atemporal representation of the universe's history.[72]

Put simply, neither is the future *already* here nor is the past *still* here. Instead, there is a frame-independent representation of time that is available to us, agents living within time, only as an abstraction constructed by taking what is invariant under transformations between temporal perspectives. This representation would be directly available to a superior being or a god that can see time and the universe from the outside, that is, someone who is not situated within it. Acknowledging the metaphysical validity of this frame-independent representation does not mean that the passage of time is unreal or that we cannot affect our future. The generator of a point of view provides the logical transformations between the frame-dependent and the frame-independent accounts of time. Ismael holds to a metaphysical ambiguity that hinges on the possibility of making such transformations. "From the frame-dependent perspective of TEvPoV, the atemporal

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[72] Ismael, 'Time and the Visual Imagination'.

representation is a static representation of an evolving reality. From an atemporal perspective, TEvPoV is an evolving representation of a static reality. There is perfect symmetry".[73]

With the generator of a point of view to produce a perspectival account of time — and, more generally, Being — Ismael reconciles the two opposite theories on time presented in Chapter 1. The tension between the dynamic and static aspects of time vanishes once the situated view of the agent becomes part of the metaphysical picture and a generative process that can mediate between the embedded and transcendent perspectives is theorised.

2.3 Agent-centred metaphysics

Ismael's generator of a point of view is partly a response to the dynamic vs. static debate, as I have shown, but it is also part of an overarching metaphysical project within analytic metaphysics. Understanding what this project is about is key to situating Ismael's work and fully grasping its philosophical relevance. In the last section of her 2017 paper, she rejects the common assumption in analytic metaphysics that "for every element of belief or experience, there should be a corresponding element of Being," and claims that "we shouldn't expect extensional correspondences".[74] I believe some context is needed to understand what she is referring to. Let me elaborate on this to later see what exactly she is proposing and how the generator of a point of view fits into this 'new' way of doing metaphysics.

In analytic metaphysics, at least as practiced by philosophers of science, naturalism is mostly dominant. Generally, naturalism is the thesis that nature exhausts reality, and science is the most appropriate way to study it. Therefore, philosophy should align itself with science by following it or conceptually supporting it. What is relevant to my project here is methodological naturalism, which privileges the scientific method to arrive at true knowledge and defends that all knowledge ultimately hinges on knowledge of the natural world — even philosophical knowledge. Naturalist metaphysics leaves the study of what the world is like to science and concerns itself with how human beliefs

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[73] Ismael, 'Passage, Flow, and the Logic of Temporal Perspectives', 33.

[74] Ismael, 36.

relate to the scientific description of the world. The supporters of the so-called Canberra Plan (David Lewis, Frank Jackson and David Chalmers) specifically conceive philosophy as the conceptual analysis of the different elements of our common beliefs, and the subsequent search for features of the world, as described by science, that correspond to such beliefs. The subject of study of this naturalist metaphysics is solving the location problem, which consists of, for each element of common discourse, finding the feature of the world that it truly represents, or otherwise categorising it as false.[75] In other words, metaphysicians on the Canberra Plan are concerned with finding truthmakers in the scientific account of the natural world that make our beliefs true or false.

Huw Price uses the analogy of mirrors to describe the metaphysics of the Canberra Plan, it assumes that the human mind acts as a mirror of the world at the representational level, through language and other forms of mental representation.[76] Price himself is critical of conceiving metaphysics just as a matching game between concepts of our mind and features of the scientific worldview and believes the whole picture is much more complex. He argues that the naturalist search for the relation between scientific objects and beliefs needs a prior metaphysics or first philosophy that studies the representational practice of the subject through science, as a feature of the natural world. Before the matching game begins, the naturalist has to validate the language used for that purpose. The scientific study of how the subject-agent creates a system of beliefs precedes the search for truthmakers, and this study actually reveals that there is no need for every belief to have a counterpart in the natural world that directly corresponds to it. Indeed, Price claims that the naturalist should not assume that language and other ways of mental representations are transparent to the natural world, they do not act as mirrors of nature, and therefore they should be studied through a scientific lens as well.[77]

Ismael argues in favour of the project started by Price, also known as the Sydney Plan.[78] Metaphysicians on the Sydney Plan are not concerned with finding truthmakers

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[75] David Papineau, 'Naturalism', in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta and Uri Nodelman, Fall 2023 (Metaphysics Research Lab, Stanford University, 2023), https://plato.stanford.edu/archives/fall2023/entries/naturalism/.

[76] Huw Price, *Naturalism without Mirrors* (Oxford University Press, 2011), 3-33.

[77] Price, 184-99.

[78] Jenann Ismael, 'Naturalism on the Sydney Plan', in *Philosophical Methodology: The Armchair or the Laboratory?*, ed. Matthew Haug (Routledge, 2013), 86–104.

for every element of discourse, but rather with providing an account of how the interaction of the situated agent and their environment prompts them to develop certain notions that do not strictly represent any concrete feature of the natural world. The agent develops a side-on view that is not a totally accurate representation of Being — from the perspective of Being — but that acts as a complex user interface that helps the agent navigate their environment. Some elements of this side-on view will have direct correspondents in Being. However, the ones that do not have them cannot be dismissed as unreal as the agent and their view are also part of Being.[79]

Let me exemplify how this kind of metaphysics would work. The concept of colour can be linked to certain physical phenomena. The different colours correspond to different frequencies of electromagnetic radiation in the visible spectrum. Materials only absorb electromagnetic waves of given frequencies and reflect the rest, our retinas detect that light, which is processed by our brains in different ways depending on the frequency, and that is how we see colours and can distinguish among them. The metaphysical exercise, here, is tracing the concept of colour in the scientific account of the world. This would be all for Canberra Planners, but for Ismael and the Sydney Planners, this is not the whole story. Ismael criticises that the metaphysicians on the Canberra Plan tend to over-articulate this, as there is no need to find a direct correspondence between the concept of colour and a physical phenomenon. That just leads to a conceptual mismatch between a simple concept and an over-articulated description of physical processes that does not capture what such a concept really means for the agent that uses it.[80] This over-articulation becomes more evident as we ask the questions that Canberra Planners are supposedly concerned with, *where is the colour, in the material that absorbs and reflects light, in the light that carries the information or in the brain that processes it?* A Sydney planner, in contrast, knows that the agent assigns the colour to the object because it helps them form a mental image of their environment that is more practical to make decisions.

In other cases, the matching game can also lead to reifying elements in the Absolute structures of Being, that is, as something completely independent from the point of view of an embedded agent. For instance, it happens with moral claims, that either a Canberra Planner should reify them in the Absolute structures, as a kind of moral realism,

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[79] Ismael, 87-9.

[80] Ismael, 94-5.

or just deny that there are any object moral truths since they lack truthmakers in the scientific account of Being. The same happens with causes and chances, they can either be reified in the structures of Being itself or be taken as subjective generalisations that are not an objective feature of nature. On the contrary, a Sydney Planner would describe moral claims, causes and chances as part of the user interface generated through the interactions between the embedded agent and their environment. An account of those in the agent's side-on view has a practical role in helping them navigate their surroundings, by guiding expectations about the future or even developing cooperative relationships with other agents that are mutually beneficial. This metaphysical study of such concepts requires neither reifying them in the Absolute structures nor over-articulating them and reducing them to some physical process or mechanism.[81]

Metaphysics in naturalism merges with physics in the search for a conception of Being qua Being. A complete scientific description of the universe must include an account of the agent that is theorising it, so the whole project becomes one. This should not be seen as a mild version of instrumentalism or anti-realism, but rather as a sort of realism about the perspectival features experienced by the agent, because they and their perspective are part of the world that science is describing. The naturalist should no longer be concerned with the features of the natural world that our beliefs correspond to, but with how those beliefs naturally arise from the physical processes that generate our situated perspectives on Being.[82] According to Ismael: "What physics owes to phenomenology is a non-reductive reconstruction of the contents of the point of view of the agent that tells us how the representational states of an evolved system with a particular combination of epistemic and practical needs would be organized".[83]

The embodiment of the agent-centred metaphysics is presented in this chapter: the IGUS generates a dynamic point of view out of a static universe, as it is described by science. The metaphysical work here has consisted of finding a way to transform an apparently static reality conceived by physics into an evolving one experienced by the embedded agents through the generator of a point of view. The IGUS gives an account of the complex user interface that a situated agent has to navigate their environment. From

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[81] Ismael, 95-7.

[82] Ismael, 97-101.

[83] Ismael, 'Passage, Flow, and the Logic of Temporal Perspectives', 36.

the perspective of Being, the IGUS describes the experience of an embedded agent living with certain practical and epistemic needs. It neither dismisses what depends on the agent's perspective as unreal nor reifies it in the Absolute structures as something independent of the agent.

The Canberra Planner would assess the sense of temporal passage true or false based on whether it has a direct correspondence to some feature of the scientific description of the world, i.e. whether the Absolute structures include temporal dynamicity. Here, Ismael takes the metaphysical path of the Sydney Plan and describes the passage of time as a product of the interaction of an agent with the environment, which is real and objective since the side-on view of the agent is the product of physical processes and part of the natural world. A full account of Being includes such side-on view that the agent has, even if it is something dependent on perspective, and therefore such situated perspective has to be studied as something real and objective. Ultimately, she accomplishes reconciling the rival theories of time without the need to reify passage in the Absolute structures nor reduce the dynamic aspect of time to physical staticity.

Ismael's resolution, as it is common in philosophy, cannot satisfy everyone. Some would still consider her view on time somehow reductive, as it is built upon assumptions that do not fully acknowledge the fundamental dynamic nature of time. In the following chapter, I will explore an alternative theory that also moves beyond the dynamic-static dichotomy, while still retaining the essential dynamicity of time. This theory rejects the grounds on which Ismael articulates her work.

Chapter 3

Rödl's Critical Metaphysics: Time as the Form of Thought

Ismael seems to understand well both sides of the debate and works her way out of a contradiction by theorising a generating function that connects the invariant structures of the universe with the evolving point of view of a situated agent. Her proposal can either satisfy philosophers on both sides or not fully convince any, but however that may be, it clearly solves some of the problems that the two theories independently faced. However, this success does not imply that Ismael's theory can remain unchallenged. In this chapter, I introduce a radically different metaphysics, based on the a priori conception of time presented in chapter two, and discuss the role it can play in the analytic debate.

To introduce this view, I will focus on Sebastian Rödl's *Categories of the temporal: an inquiry into the forms of the finite intellect*.[84] In this book, the German philosopher describes time as the form of thought and deduces the a priori temporal concepts that structure the human intellect. An account of Rödl's theory will occupy the first section of the chapter. Despite a marked gap between him and most analytic philosophers engaged in the debate on time, Rödl's philosophy somehow comes closer to the Dynamic theory, as it can be considered A-theoretic and tense realist. As we will see, his ideas can be used to reformulate some key points of this theory. I will dedicate the second section to explaining how this can be done.

3.1 The Categories of the Temporal

Sebastian Rödl is a professor of practical philosophy at Leipzig University. His areas of research are varied, including philosophy of mind and language, epistemology, moral philosophy and theory of action. His work is mainly influenced by Aristotle, Aquinas,

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[84] Sebastian Rödl, *Categories of the temporal : an inquiry into the forms of the finite intellect* (Cambridge, Mass: Harvard University Press, 2012).

Kant, Hegel, Frege and Wittgenstein. Rödl published *Categories of the Temporal* in 2005.[85] This book develops an absolute idealist approach to metaphysics of time, placing it at the core of human thought and exploring the a priori structures that shape our understanding, our experience and, ultimately, being. Furthermore, Rödl defends a strong rejection of empiricism, thereby aiming to protect his philosophy, derived from pure thinking, from any metaphysical scepticism.

Metaphysical logic or critical metaphysics

Rödl explicitly situates his book in the analytic tradition of philosophy.[86] He is very critical of how this school of philosophy has come to understand logic, as a study of deductive calculi rather than the study of the forms of thought. With his contribution, he aims to provide analytic philosophy with a more solid conception of logic that studies the general form of thought insofar as it is thought. This understanding of logic is based on its own history and is mostly relying on Aristotle, Kant and Hegel. He argues that it should be called metaphysical logic, following Aristotle in his claim that the form of thought is the form of what is — and therefore logic and metaphysics overlap in their subject of study.[87] For Rödl, thinking is being, and this is going to set the grounds for most of his metaphysical claims about the nature of time, which ultimately is the form of thought, and thus, of being.

Most analytic philosophers have assumed that the general form of thought follows a certain deductive order. This assumption comes from Frege's deductive logic, developed in his famous *Begriffsschrift*.[88] Logic, for Frege, is the science of the order of thought, which follows the laws of inference, but also the science of what is true. Rödl rejects that the general form of thought is a certain deductive order, that is, he denies Frege's claim that metaphysical logic is just deductive logic. Instead, Rödl makes the

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[85] German version was published in 2005, the English translation in 2012.

[86] Rödl, *Categories of the temporal : an inquiry into the forms of the finite intellect*, 1-7.

[87] Rödl, 22-25.

[88] Gottlob Frege, 'Begriffsschrift', in *From Frege to Gödel*, ed. Jean Van Heijenoort (Harvard University Press, 1967), 1–83.

Kantian claim that the general form of thought is its relation to intuition.[89] Therefore, he identifies Kantian transcendental logic with metaphysical logic.

The laws of transcendental logic are pure, because they abstract from specific experiences, but they are also synthetic, since they describe the form experience takes. In Kant's words, they are synthetic a priori knowledge. As we saw in Chapter 1, this kind of knowledge is also the subject of study of critical metaphysics, which Rödl claims to be another name for metaphysical logic. Critical metaphysics studies the order of being as the order of thought, judgement and experience of the subject. Rödl thus commits to this Kantian conception of critical metaphysics and rejects the speculation of dogmatic metaphysics into which, according to him, most analytic philosophers tend to fall.[90]

The kind of metaphysics Rödl introduces can be challenged by metaphysical scepticism, which doubts that pure synthetic knowledge is possible. These doubts can be traced back to Hume, and they rest on the empiricist assumption that sensory perception precedes thought in apprehending what is. Kant's response to this was to argue that sensory perception has a pure form as well, namely space and time, but that just shifts the scepticism from the form of thought to the form of intuition.[91] As a solution to this, Rödl criticises Kant's idea that the form of experience is external to the form of thought. Instead of considering two sources of knowledge, intuition and thought, Rödl identifies the two by eliminating the externality of intuition to thought. The form of thought and the form of intuition are the same, therefore, the order of thought is the order of what is.[92]

Temporal thought as situational thought

In order to understand the role that time plays in Rödl's metaphysics, it was first necessary to clarify that thought is dependent on intuition, so its form coincides with the form of

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[89] Intuition, for Kant, is a cognitive faculty that provides a direct mental representation of sensory data. Kant saw intuition as a separate source of knowledge that provides thought with an object, and described knowledge as the unity of intuition with thought. In Kantian terms, experience is constituted by a collection of apperceptions, which are the union of given intuitions (perceived through the senses) and the pure categories that apply to them (provided by pure thought). Rödl criticises that this separation allows for metaphysical scepticism, and identifies both the form of thought and the form of intuition are the same.

[90] Rödl, *Categories of the temporal : an inquiry into the forms of the finite intellect*, 37-40.

[91] Rödl, 33-41.

[92] Rödl, 41-3.

what is. According to Rödl, thought relating to intuition is essentially in time, and accordingly is situational.[93]

A thought is situational when it is thought by means of the time it is thought at. Intuition-dependent thought is situational because intuition provides it with different situations at different times, so an intuition-dependent thought is, in the primary instance, always about what is given in intuition at a certain time. These thoughts directly relate to the truth, since they make statements or judgements about certain situations that can be assessed as true or false absolutely. This assessment is not relative to the circumstances in which a thought is thought, but rather to the thought itself, since the thought already is an awareness of the time at which it is thought. The way we express thoughts is key to understanding this.

Situational thought can be expressed only by situational sentences, which are those that use the time at which they are uttered. For instance, "it is raining" and "it was raining yesterday" are situational sentences. They are, nonetheless, not bound to a specific time or place, and they can be uttered by anyone. They differ from eternal sentences, which express something atemporal that is not bound to a moment in time. Two examples of the latter would be "$2 + 2 = 4$", or "water boils at 100°C," which always express the very same thought irrespective of the time at which they are uttered. Conversely, a situational thought can be thought at different times only by using different situational sentences. The thought "it is raining", can be grasped again the next day by the sentence "It was raining yesterday", and so on. There is a coordinated series of situational sentences that make it possible for that thought to be expressed at any time and still relate to the truth absolutely. All these sentences are related to each other across time, so they are not to be taken independently. They are all possible expressions of the *same* thought at *different* times and that is what ensures that thought to be timelessly true. In short: a thought that essentially requires *different* sentences for its expression at *different* times is a situational thought.[94]

Situational thought differs from the situation-responsive behaviour of other animals and from the hypothetical situationless thought of an infinite intellect. Animals

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[93] Rödl, 58-64.

[94] Rödl, 65-6.

are able to perceive certain situations and respond to them according to instinct, training or past experiences, but they are unable to think temporally. Animals do not have a language that enables them to express the same thought at different times, and therefore are incapable of expressing temporal thoughts that relate to the truth.[95] On the other hand, an infinite (divine) intellect does not think temporally either. The difference with the human finite intellect is that the latter depends on what is given through intuition at different times. The divine intellect is not limited in such a way, because everything it intuits comes from within itself, and therefore it does not relate to specific situations and its thought is atemporal and absolute.[96]

Thus, what characterises the finite intellect is that it is time-conscious. Situational thought is implicitly conscious of the time at which it is expressed, but it is also explicitly conscious of the time of its object, since it is represented as temporal. It is in the interplay of these two 'times', the implicit time of expression and the explicit temporal element, that we can make temporal statements by thinking situational thoughts expressed by situational sentences. Then, Rödl's result is that situational thought *is* temporal thought.

Rödl argues that temporal thought is temporal not in virtue of including certain elements — e.g. by referring to times in some ways — but in virtue of the way it is structured. The former suggests that time is part of the sensory content, and was prominently defended by Quine. Rödl rejects Quine's claim that thought is temporal by virtue of its content and states that thought that relates to intuition is temporal by virtue of its logical form.[97]

Up until this point, the issue has been to clarify the idea that time is the general form of thought relating to intuition; now that this has been done, Rödl moves on to ask what this form of thought amounts to. We shall now discuss how the elements of thought are structured according to the forms of predication.

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[95] Rödl, 66-70.

[96] Rödl, 70-4.

[97] Rödl, 84-95. Rödl refers to various of Quine's works: Willard Van Orman Quine, 'Empirical Content', in *Theories and Things* (Harvard University Press, 1981), 24–30; Willard Van Orman Quine, 'On Carnap's Views on Ontology', *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 2, no. 5 (1951): 65–72, http://www.jstor.org/stable/4318118; Willard Van Orman Quine, *Pursuit of Truth* (Harvard University Press, 1990); Willard Van Orman Quine, *Word and Object* (MIT press, 2013).

The forms of predication and the pure concepts

In the second part of the book, Rödl develops the forms of predication that structure thought and the corresponding pure categories. To clarify, the form of thought is the unity of its elements, these elements can be of various categories and how they unify is predication. As Rödl proceeds, there is not just one form of predication but rather a system of interrelated forms of predication along with categories of the temporal. He preliminarily identifies three of these forms: tense, aspect and generic thought, each of them characterised by a logical copula and the pure concepts under which the elements they unite necessarily fall. The system of forms of predication and pure concepts is the a priori knowledge we have about the object of thought that is given through intuition, that we can access not by thinking any particular object, but just by thinking any object. They are synthetic a priori. We say that thought is temporal in virtue of its structure because these forms of predication necessarily are temporal in nature. Let us see what that means.

Thought can be temporal in two senses. It can be externally temporal, when it represents its object as having a temporal position, and thereby relates to other temporal positions; it can also be internally temporal, when its object appears as temporally extended, as 'taking time'. These two senses of temporality rest upon the first two forms of predication: tense and aspect. Furthermore, Rödl argues that both of these in turn rely on time-general thoughts displaying the third form: generic thoughts. These three forms are not independent since they all need each other to provide thought — and being — with the different aspects of its unified temporal structure.

The form of tense gives thought the capacity to distinguish times from what is true at those times, not by using time names as contents of thought, but through the way the different elements of thought unite. Kant already identified the categories of *substance* and *state* in the First Analogy of Experience, which allow us to distinguish what stays the same and what changes. These categories are necessary to articulate the thought in its relation to the intuition of temporal succession, which is perceived both subjectively — as a succession of perceptions — and objectively — as a perception of succession.[98]

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[98] Rödl, *Categories of the temporal : an inquiry into the forms of the finite intellect*, 113-27.

The logical copula that unites tensed thought presents the bipolar form "is/was". *S is/was A* is a temporal thought that unites a substance *S* with a state *A*. There are two poles that this thought can take that make it externally temporal in virtue of how it is articulated, present — *is* — and past — *was*. This temporal copula differs from the Fregean copulas that unite the object and the concept of an empirical thought, atemporally. Whether the thought is about a present or a past situation is neither a difference in content, nor in form, but a difference *of form*, which means that past and present are the two poles of the same form of predication. Tense as a predication already carries with it the contrast of past and present, it is in fact what characterises it.[99] Furthermore, it is this bipolar unity that defines two a priori concepts, that of a thing that remains the same and that of a determination that can change, respectively. "The predicative unity of tense defines the categories of substance and state: what falls under determinations in the present or in the past is a substance, and what determines substances in the present or in the past is a state".[100]

Put simply, tense is the bipolar unity of thought relating to intuition. However, tense cannot stand on its own as the only temporal form of predication, it needs a criterion of substance that secures identity over time. With the form of tense, we are able to intuit that substance *S was A* and that substance *S is B*. The state has changed, but the substance has remained the same. The problem arises once we realize that this presupposes the identity over time of *S*, which cannot itself be intuited in the form of tensed thought. If the states are the determinations that we perceive as relating to an unchanging substance, there has to be a way of identifying the same substance under different determinations.

Comparing perceptions at different times, which is the only option that fits into the form of tense, is not enough a criterion of substance. This would only work as a good criterion if a substance was in the same state at the different times it is perceived, in case the state changed it would be perceived as different things – the sensorial content would be different. Therefore, we need an a priori understanding of something that spans contrary states of the same substance. This is what Rödl calls 'movement'. It is not movement in its literal sense, but the idea of a substance changing states, a concept that spans the temporal extension that it takes for the substance to be in different states, and

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[99] Rödl, 130-2.

[100] Rödl, 128.

thus a form of temporal that is not only externally temporal but also internally temporal.[101] This movement would be a "sufficient criterion of substance because it spans contrary states".[102]

Rödl takes from Kant the idea of 'action' as a criterion of substance, but he renames this pure concept as *movement form*. The temporal extension that it gives to thought cannot be part of its content, but it has to appear as another guise of the form of thought that relates to intuition. Tense itself rests on this criterion of substance, it needs thought to be internally temporal to make possible the a priori contrast between a substance and its changing states. Thoughts of this form present the contrast of aspect.

The form of aspect is the predicative unity of the categories of substance and movement form. This form of predication represents thought as being temporally extended, or in other words, it makes thought internally temporal. Aspect indicates whether movements are perfected or in progress, and as such constitutes a tripolar unity: *present-progressive/past-progressive/past-perfective*. The logical copula that characterises this form of predication is "is doing/was doing/did." So *S is doing/was doing/did A* are the three poles that a thought of aspect can take by uniting substance *S* with the movement form *A*, which can either be in progress in the present, in progress in the past, or completed – which has necessarily occurred in the past.

That a movement is either in progress or completed is something we know a priori, it is pure synthetic knowledge.[103] They mean fundamentally different things and are necessary to provide thought with consciousness of temporal extension. The sentences *Joost went to Amersfoort yesterday* and *Joost was going to Amersfoort yesterday* are different. In the former, we are stating that Joost made it to Amersfoort, whereas in the latter we are stating that he was on his way to completing the journey to Amersfoort without specifying if he indeed arrived. He could have had an accident, a snowstorm could have made him go back or he might have as well arrived, but that is not what the sentence conveys. The progressive thought of a movement is necessary for the perfective one, but the opposite is not true. A completed movement has been in progress at some

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[101] Rödl, 144-51.

[102] Rödl, 152.

[103] Rödl, 158.

point, but a movement in progress is not always going to be completed, since it could be interrupted.[104]

This raises another problem that indicates that we are not done with the forms of predication of thought relating to intuition. We need a form of predication that allows us to think of what things do, in general, so we know when a movement is completed or rather has been interrupted. The bipolar unity of tense rests upon the tripolar unity of aspect, but this one, in turn, relies on the a priori knowledge of what things do generally — not in the present tense, but time-generally. This points to another level of predication that is necessary to articulate both tensed thought and thought of aspect.[105]

There are two ways a substance's movement can cease: either it is completed or it is interrupted.[106] A progressive thought contains in its form the end of the movement, though it does not entail the consequent perfective thought. Rödl argues that this cannot be because of a subjective projection on our part as thinkers, and so it has to be because of an underlying understanding of *what things do* generally when their movement does not break off. Movements are sometimes not completed, but that does not negate the fact that they were taking place. *A stone is falling* presupposes implicitly that, generally, *stones fall*, and that's what the stone is doing; but it could be the case that something interrupted the movement and the stone didn't reach the ground, therefore avoiding the completion of the movement. Imagine that someone catches it, or that the stone evaporates due to friction with the air — as happens when the stone in question comes down as a meteorite. In those cases, the progressive thought would be true, but the perfective one would not.

There must be a general statement or a law that underlies the thoughts of aspect and that ensures that we know what a substance is doing. It is necessary to know what *things do* to articulate whether a substance is doing or has done a movement, which is, in turn, necessary as a criterion of substance to identify substance and state and articulate tensed thought. This law-like knowledge of *what things do* is then necessary for the whole

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[104] Rödl, 159-64.

[105] Rödl, 171-2.

[106] Rödl, 173.

system of temporal thought to hold, and the form of predication that provides us with such statements is called generic thought. [107]

Generic thoughts underlie tensed thoughts and thoughts of aspect, they span progressive and perfective statements as well as present and past ones. They generalise over tense and aspect, which makes them time-general, but they also generalise over substances, they are substance-general as well. The generic thought *trees blossom* is instantiated in a tree that is blossoming now or another one that blossomed last spring; in one that is in the process of blossoming and one that has completely blossomed. It does not matter whether it is past or present tense, whether the movement is progressive or perfective, and whether it is this or that substance of the relevant form, as long as they can be predicated to *do* the same movement form.[108]

The generality of these statements does not rely on universal quantification over temporal statements. Generic statements are contained in every specific temporal statement, they act as laws of movement that determine what movements certain substances do, and thus also which states they can be in. A certain generic thought is instantiated in every particular thought that predicates movement forms of specific substances. A movement can be completed or interrupted, so even if a substance does not complete a certain movement form, that is what it would have done if it had not been interrupted. Furthermore, it is the generic thought that allows us to know when a movement has broken off. Knowledge of these laws does not follow from experience because they are not quantitative statements. The time- and substance-generality of these statements depend only on how they unite the corresponding categories.

Another pure concept springs from this predication, *substance form*, of which a movement form is predicated to yield a generic thought. A substance form is not a set of particular substances, but a general substance that is determined by a movement form. The logical copula associated with this form of predication is a tenseless *do,* so generic thoughts take the logical form *Ns do A*. *N* represents the substances that fall under a general form *N* that can be determined time-generally by the movement form *A*. [109]

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[107] Rödl, 171-5.

[108] Rödl, 187-91.

[109] Rödl, 191-5.

The generality of generic thought can be explained in terms of the asymmetric contrast between rule and exception. That a certain kind of substance does a kind of movement generally according to a rule does not mean that it cannot happen otherwise. The rule is for what the substance does when nothing interferes; in case that happens, then what happens is an exception to the rule. A rule allows for exceptions because it is not an empirical quantification of specific substances doing specific movements, it is rather an explanatory statement about what the relevant kind of substance does when nothing interferes. The difference between these is that the explanatory arrow goes in opposite directions. In the case of quantitative generality, it is the particular empirical cases that explain the general statement of what things do; whereas, for explanatory generality, it is the generic statement that explains the particular case of what happens when no further factors interfere.[110]

For instance, *wood burns* is a general statement that explains why a chair is burning, and also that a table burnt yesterday. It is not that various cases in which we saw wood burning explain that wood burns. In fact, a substance form can be thought of as the unity of a range of movement forms. Wood is defined, among many other things, because it burns when put next to a fire. A particular substance form takes shape when we start understanding the laws that apply to it: "recognizing something as wood is knowing (something of) the laws according to which it changes".[111]

That movements follow laws is synthetic a priori knowledge, what is not a priori is specific laws, since for that we need experience to provide particular situations. We need to intuit a piece of wood or a frog in order to make general statements about them, but the knowledge *that* substances behave generally in accordance with the laws belonging to their substance forms is a priori. This goes against the empiricist claim that everything we do is collecting particular happenings and then finding regularities. We need not see many frogs to make general statements about frogs, seeing one is *in principle* enough, because we already understand a particular substance through its form, however minimal our grasp of that form may be at first encounter.

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[110] Rödl, 196-201.

[111] Rödl, 201-4.

Empiricists deny that there is an objective generality and claim that we can just generalise over quantity, but Rödl argues that only by understanding this explanatory generality are we able to apprehend the particular and make claims about it in the first place — which is what the empiricist must presuppose to be possible *without* such generic knowledge. In other words, to make temporal statements about particular substances and movement forms, we need to first understand *that* substances generally *do* certain movements that follow certain laws, and this knowledge is by no means coming from experience, it is pure. "Knowledge of substances is always already knowledge of forms".[112]

Rödl even delves in one more step and identifies *form thoughts*. This form of predication identifies a substance with its substance form with the timeless logical copula *is*. For a substance, *S is an N* is the form thought that recognises *S* as being a particular case of the general substance *N* that behaves in accordance with the movement forms that define it. The predication that this kind of thought exhibits is not time-general, like generic thought, but timeless, because it does not span temporal differences. *This is a frog* is an example of a form thought, it brings a particular substance under the substance form of *frog*, defined by *what frogs do*. Form thoughts underlie every statement about particular substances.[113]

It is then the general that explains the temporal, but it is through the temporal that we apprehend the general. We need both the general and the particular to apprehend what is. Starting from the principle that the form of thought is its relation to intuition, Rödl has developed three a priori forms of predication that structure thought as temporal – tense, aspect and generic thought, and a fourth form that cannot be separated from each the others – form thought. To sum it all up, Table 4.1 shows in a schematic way the forms of predication that articulate temporal thought, the logical copula associated with each of them and the pure categories that they unite.

[112] Rödl, 204.

[113] Rödl, 204-8.

Table 4.1: Forms of predication, their corresponding logical copula and pure categories. They all spring from the one principle that the form of thought is its relation to intuition.

Forms of predication	Logical copula	Pure Categories
Tense	*Is/was*	*Substance* and *state*
Aspect	*Is doing/was doing/did*	*Substance* and *movement form*
Generic thought	Time-general *do*	*Substance form* and *movement form*
Form thought	Timeless *is*	*Substance* and *substance form*

In this way, Rödl fulfils his goal of describing the system of thought of the finite intellect, which is defined by the unity of thought and intuition. "That we apprehend substances and their movements through the senses, and forms and their laws through the intellect, are two sides of the same coin. In this way the unity of intellect and sensibility, which defines the finite intellect, appears in the system of the forms of *what is thought* by the finite intellect." With this, Rödl claims to have "*completely* described the system of these forms on the most abstract level". [114]

Rödl's metaphysics of time has a high level of complexity and rests heavily on the work of past philosophers, especially Kant, Hegel and Aristotle, so it is not easily accessible. The takeaway message from *The Categories of the Temporal* is that time is neither something external to us nor something internal or mind-dependent, but the form of thought and thus, the form of what is. Time awareness is what defines the finite intellect, which is articulated into the forms of predication that make us intuit things temporally the way we do. With this, Rödl does not claim that time is subjective, but rather that it is the fundamental and irreducible structure of thought and being.

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[114] Rödl, 207-8.

3.2 Reformulation of the Dynamic Theory of Time

After reading *The Categories of the Temporal*, one might be tempted to separate Rödl's metaphysics from the analytic philosophy of time I have previously dealt with. On the one hand, the Anglo-American philosophers are doing what Kant called dogmatic metaphysics, which has led them to ill-founded debates without a clear way out. On the other hand, there is Rödl's critical metaphysics, which describes the temporal forms of thought that shape the human intellect at its most abstract level. It may seem that most debates I presented in Chapter Two are not something Rödl aims to engage with since he works in a totally different framework that does not allow for any speculative metaphysics. In my view, however, reading Rödl like this would be a mistake for two reasons.

First, Rödl himself directly engages with many analytic philosophers throughout the book, including Frege, Prior, Nagel and Quine, and even comments on the endurance-perdurance debate, although just to dismiss it as nonsense. He is aware of what is going on in the analytic philosophy of time and he is directly trying to provide it with what he thinks it lacks, a solid temporal logic. Second, Rödl's philosophy drifts away from Kant's transcendental idealism and comes closer to Hegel's absolute idealism, therefore does not entail that there is an externality of the form of being to the form of thought. As I already explained, he conceives metaphysics as the study of the form of thought and the form of being, so his a priori analysis of the human intellect is supposed to also reveal the form of what is. In a way, Rödl is not just interested in what we can know about the world, but also in the world in itself; though we cannot really say this since there is no such separation between what we (can) know and how the world is. In any case, Rödl is not avoiding analytic metaphysics nor creating a barrier between his work and analytic philosophy. Instead, he aims to directly have an impact on the field by redirecting its attention towards what he considers important.

With his temporal logic, Rödl enters directly into the dynamic-static debate on time, as one of the main problems of the Dynamic Theory was its lack of a solid logic that could stand against the Static Theory's atemporal predicate logic. It also comes with a necessary and systematic reframing of the whole debate and its many different aspects. Rödl is definitely ambitious with his project, as it is aimed at completely solving the issue of time on one hand, and the complex mechanisms of human understanding, on the other — both turn out to be the same. Nonetheless, it is not clear from his book how his theory

can be applied to the big debate on time or even how it can be received and instrumentalised by analytic philosophers, especially the defenders of the Dynamic Theory. In this section, I will explain how Rödl's metaphysics can reformulate the Dynamic Theory of Time, building on Mulder's work. Furthermore, I aim to include an attempt to reconcile this theory with contemporary physics, also taking into account Rödl's rejection of empiricism to make it more consistent. Generally, I aim to give a stronger version of the theory that can withstand the static theorists' main arguments.

The anti-reductive view

If we recall Chapter 1, the Dynamic Theory of Time is characterised as the amalgamation of the A-series, tense realism, presentism, 3-dimensionalism and endurantism in one theory. As I explained, each of these views is contested by its philosophical opponent, and they do not necessarily go together. I showed why it is reasonable to combine all these pieces to form a cohesive theory. Rödl's temporal logic can enhance this theory by providing a distinctive conceptual framework that distinguishes it from Static Theory, though this cannot be done without reframing the dynamic-static debate. Jesse Mulder shows how to integrate Rödl's temporal logic into the analytic debates on temporal series, persistence and ontology.[115] He argues that what really is at stake in the philosophy of time is whether the temporal form of predication and its formal concepts can be reduced to a Fregean atemporal account. In this way, he redefines the two sides of the main debate as the reductive view and the anti-reductive view.

Mulder's starting point is the *original temporal nexus*, which is "a family of formal concepts centred around the form of predication that constitutes the unity of temporal thoughts".[116] This is basically what Rödl called *the categories of the temporal*, and it is distinguished from the Fregean atemporal nexus. Following Rödl's theory, Mulder presents tense and aspect as two temporal forms of predication that unite the pure categories of *substance* and *state*, and *substance* and *activity* — movement form, respectively. He acknowledges the further forms of predication and concepts developed by Rödl himself. The anti-reductive or original view is the one that holds that the original

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[115] Jesse M. Mulder, 'Two Fundamentally Different Perspectives on Time', *Axiomathes* 27, no. 3 (June 2017): 295–320, https://doi.org/10.1007/s10516-016-9307-1.

[116] Mulder, 300.

nexus is fundamental to ground temporal truths and, thus, irreducible to an atemporal account. On the other hand, the reductive view sees the original nexus as reducible to the Fregean atemporal nexus, which is considered to be fundamental. To put it differently, reductionists believe that temporality, temporal facts and temporal truths need to be understood from an atemporal set of formal concepts and predications, whereas anti-reductionists state that these can only be understood through the original temporal nexus.

Mulder shows that endurantism, the A-theory, and presentism, as separate theories, are prone to conform to the reductive framework imposed by perdurantism, the B-theory and eternalism, despite the strong inclination toward the anti-reductive view that many of their supporters may have.

Regarding the debate on persistence, both perdurantism and endurantism seem to endorse the B-theory, since their opposition is framed upon an atemporal understanding of persisting objects. This is so at least in the way in which these two theories are typically enunciated. The opposition between them is usually presented on atemporal grounds: perdurantists take objects to be composed by temporal parts with their own properties and truths that stand atemporally, whereas endurantists conceive objects somehow outside time, bearing atemporally different relations to different times. The problem here is that the sole enunciation of the theories requires this atemporal talk based on Fregean predication. In contrast with Hawley's rejection that the debate can be articulated outside such tenseless talk, Mulder claims that there is a way to defend endurance and reject the B-theory, but this is only possible insofar as endurantism can be formulated in a non-reductive way.[117]

Similarly, the A-theory risks being articulated in the same eternalist background as the B-theory. Both standard and non-standard A-theories tend to ground the tensed facts and truths in a temporal location in a timeline, this is the present moment and it is metaphysically privileged.[118] According to Mulder, this comes from Prior's understanding of tense. His temporal logic was a failed attempt to add genuine

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[117] Mulder, 304-6.

[118] Kit Fine develops two non-standard versions of the A-theory: external relativism and fragmentalism. The former considers many realities that represent the world at every instant whereas the latter conceives an over-arching reality formed by many incoherent fragments. Mulder shows in his paper that both of these versions also end up relying on the reductive account of time. Kit Fine, 'The Reality of Tense', *Synthese* 150, no. 3 (June 2006): 399–414, https://doi.org/10.1007/s11229-005-5515-8.

temporality to a Fregean base line. By grounding tensed truths in a temporal location, A-theorists are assuming a reductive view of time. This shows in particular when A-theorists seek to account for the passage of time: they need to rely on the eternalist timeline. The A-theory can only reject the reductionist framework by redefining itself in anti-reductionist terms. This requires formulating it along with a version of presentism on non-reductive grounds to avoid the eternalist ontology.[119]

Mulder finally turns to presentism. It is usually presented as a negative ontology, first by defining an eternalist timeline and then by selecting the present moment and completely removing the past and the future from it. The passage of time becomes very difficult to explain if we stick to this definition, since it needs to be added *ad hoc*. Temporal facts then take the shape of (Fregean) atemporal predication because a moment in time only makes sense in relation to the others in the *inexistent* timeline, this implies again the reductive stance. If we take present tense facts as fundamental to represent the present instant – which constitutes the whole of reality, it becomes impossible to unite the different totalities of facts across time. Mulder here draws on Rödl's criticism of Prior's tense logic, according to which it creates a problem of cross-temporal unity that ultimately puts the reality of a presentist into a thin slice of an eternalist universe.[120]

Tensed truths cannot then be tied to a temporal location, as this ultimately rests on an atemporal predication of a static reality. Temporal truths need to be formulated in the temporal form of predication of the original nexus. The present tense implies the past and the future tense, as temporal facts are dynamic and constantly change their presentation. The truth in the original view is absolute, but it is also temporal insofar as it is in its nature that as it recedes into the past, the way it is thought or presented changes (which is why situational sentences are necessary, as explained earlier). The contrast of tense is already part of how the facts are predicated in the original nexus.[121]

Only by taking this anti-reductive stance on the original nexus is it possible to understand the A-theory in a presentist reality constituted by temporal facts, where things endure in time. It is the temporal predication that makes tense fundamental and thus the A-properties real, and the dynamic unity of tense entails a positive presentism – the whole

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[119] Mulder, 'Two Fundamentally Different Perspectives on Time', 306-12.

[120] Mulder, 312-6.

[121] Mulder, 315.

of reality is constituted by dynamic tensed facts. Endurantism comes from the aspectual differentiation in processes, the progressive/perfective contrast implies that what is undergoing change needs to maintain its identity throughout, and thus cannot be conceived as reducible to a collection of 'temporal parts'.

In sum, the only way to escape the common ground provided by the reductive view is by combining the three — A-theory, endurantism and presentism — and rejecting the conceptual framework by which they are forced to justify the dynamic aspect of time through an atemporal nexus. It is the conformation to the reductive view that makes the three separate theories unfeasible. Anti-reductionists should know that temporal predication must be understood only through the original nexus, which does not need to be accounted for because it is fundamental.

Mulder gives us the key to understanding Rödl's work from the analytic point of view and using it to defend the Dynamic Theory's central theses. I suggest that what he calls the anti-reductive view should be understood as a reformulated version of the Dynamic Theory, enhanced with its own conceptual framework and temporal logic — I will call it the anti-reductive Dynamic Theory. Rödl's metaphysical logic is A-theoretic, presentist, and in a certain way, endurantist — despite his wholesale rejection of involving himself with the persistence debate. We need Mulder's exercise of translation to see that Rödl's framework is the language in which the Dynamic Theory can be best enunciated. The original temporal nexus is the solid foundation upon which the Dynamic Theory can rely to stand as a serious competitor against the Static Theory. As Mulder shows, the Dynamic Theory, as it has been traditionally presented, already conforms to the static conceptualisation of time. In a way, the static view has already won insofar as the debate is articulated upon reductionist grounds.

By incorporating Rödl's temporal logic into the Dynamic Theory, not adding it as an extra thesis, but using it to reformulate all of them, we get a whole more cohesive and cogent version of the theory that moves beyond the reductionist framework and asserts itself as a totally different way of understanding time. First of all, by doing this we solve the problem of having a solid temporal logic. The original nexus is taken as fundamental and thus change does not need to be accounted for in changeless terms. Furthermore, the anti-reductive view of time boosts the common sense argument that philosophers like Zimmerman insist so much on. The dynamic view is so common-sensical because our

thought is ultimately grounded upon the original temporal nexus, so that it obviously feels natural for us to think of time accordingly.

This, however, is not all: because it is not just a matter of how we think, but is also about being, about what there is. A static theorist could use the common sense argument to their advantage by saying that our spatiotemporal understanding of the universe is something that depends on how our brains are structured, and claim that it does not follow that the universe in itself is the way we perceive it. A traditional dynamic theorist could try to argue that brain structures are contingent on real features of the universe, and dynamicity cannot arise from staticity. Someone who has read Rödl and knows about the anti-reductionist view could resort to absolute idealism, and claim that there is no gap that separates an 'external' world from our immediate grasp of it. The form of thought is the form of being, and that is temporal. Absolute idealism comes as a fundamental premise to build up Rödl's metaphysics, so it follows that the anti-reductive Dynamic Theory cannot be fully defended without accepting this thesis. The common sense argument in an absolute idealist framework becomes central, since for Rödl the fact that we intuit everything temporally indicates that the form of being is fundamentally temporal as well. In the analytic framework, this argument has a vaguer form because the typically assumed empiricism denies that our intellect can be a source of objective knowledge about the world.

Understandably, many analytic philosophers would oppose committing to such a strong metaphysical thesis, especially because their tradition is typically attached to empiricism and materialism, and also not quite knowledgable e of German idealism. However, the solidity that Rödl's temporal logic gives to the whole theory places the anti-reductive Dynamic Theory in a secure position, which makes this option worth considering.

The issue that is left unresolved is how to reconcile this anti-reductive version of the Dynamic Theory with contemporary physics. Rödl directly rejects empiricism and the idea of quantitative generality, therefore dismissing any kind of metaphysical scepticism that can arise from it. Nevertheless, it is not clear from his book what his attitude towards science in general, and relativity in particular, is. Is he completely denying the objectivity of science, or redefining it? Perhaps, Rödl is leaving to the analytic philosophers how to deal with physics and relativity.

Contemporary physics: conciliation or deflation?

The main problem of the Dynamic Theory of Time, the traditional version but also the anti-reductive one, is the direct conflict that it appears to generate with the theory of relativity. Nothing in Einstein's theory of spacetime indicates any sense of flow or passage, and the thesis of presentism cannot be properly reconstructed in a relativistic universe. In the following paragraphs, I present the various attitudes that the anti-reductive Dynamic Theory can have towards contemporary physics.

I already introduced the response that Zimmerman gives towards this argument. There is no contradiction for him in adding a privileged slicing to the spacetime manifold to be able to formulate presentism without fully rejecting relativity. By doing so, we would be recognising the authority of metaphysics, also privileging common sense over scientific claims. We would pick Bergson's side and see physics as a theoretical construct that yields the right predictions, but that does not tell us everything about the true nature of reality. It seems that accepting this argument would imply adopting a deflationary attitude towards science. That is, removing its function as a source of objective knowledge and taking a quite radical anti-realist stand on it.

This attitude is still compatible with empiricism, as it can appear as a sort of scepticism towards the empirical methods, but then it becomes difficult to justify why our rationality can say something true of the world, independently of experience, if all our knowledge is created by interiorising patterns of perceived stimuli. One could argue that common sense is a more direct source of objectivity than empirically tested scientific theories because it is unconsciously apprehended and less mediated by our intellect. However, it seems like this sort of scepticism results in a total epistemological deadlock that prevents us from saying anything meaningful about the world, therefore it is counter-effective for the Dynamic theorists to hold this thesis as an argument against the Static Theory.

Indeed, this is the kind of scepticism that Rödl makes sure to avoid by rejecting empiricism so radically. Zimmerman's argument of adding *ad hoc* elements to physical theories out of metaphysical soundness holds firmer if we deny any possibility to doubt our raw thinking capacity, or in other words, if we accept that we have synthetic a priori knowledge. Again, we see that this deflationary account, just like the common sense argument, makes more 'sense' within the absolute idealist framework. However, it is not

clear whether Rödl would take this stand on science. As he explained in his chapter on generic thought, laws of movements have an a priori form, yet they take a specific shape through particular situations at different times — empirically, that is. The general laws about a substance form are apprehended through particular, empirical observations of individual substances. Even though we cannot say that any generic thought is a scientific claim in the empiricist's sense, we can definitely see how, in this framework, science works in a similar way.

Within Rödl's framework, scientific laws are a priori insofar as we are concerned with their form and structure, but laws of this form only enter the scene in particular empirical observations, and there they have empirical content. Science is, therefore, the theoretical construction of law-like statements that describe how nature works, and the process of specification of such laws depends on individual observations. *How nature works*, as *what things do*, should be here understood as the set of generic statements that define substance forms. An elevated number of observations to formulate a scientific law is advantageous and desirable not because the laws are generalisations over many individual situations, but rather because it provides more conditions to consider and thus makes the law more specific, also allowing the scientists to know more of exactly how things behave under exactly which circumstances. As Rödl puts it, movements can break off, similarly: scientific laws describe what things do generally but not without exception. Scientists search to cover those exceptions as well, making their understanding of the laws, and their interaction with other laws, more comprehensive. This is, consequently, a never-ending process because the generality of these laws necessarily involves that there are exceptions when something interrupts, i.e. new variables, conditions, or situations that were not taken into account to formulate a law.

Science is a rigorous systematisation of this process, a careful definition of substance forms through the observation of the particular substances' behaviour under many different conditions. A scientific law thus takes the form of a generic statement about substance forms and their attributes. Scientists aim to account for more and more possible interruptions or exceptions to those laws to make them part of more comprehensive sets of laws that can explain more cases. Subsuming these exceptions under laws necessarily brings up more exceptions with the potential to be studied further.

Frogs croak because the substance form of a frog is defined, among other things, by the sound it makes. An average person can say that frogs croak, but a zoologist knows

that a frog of this species croaks differently from a frog of that other species, and that a high-pitch croak means something different from a low-pitch croak. Similarly, the planets orbit the Sun because mass is defined, among other things, by how it is affected by the gravitational force. There is an added complexity when laws involve mathematical relations between different measurable attributes, but the same applies. The equation that defines the scientific law is the a priori form of such law, but it is the magnitudes of particular substances that give the equation the necessary content to make it lawlike. Whereas the equation represents the a priori formal relations between the different elements involved, the content comes from the situations to which each law can apply.

To give an example, let us take the planets of the Solar System orbiting the Sun. Newton's law of gravitation explains the fact that the orbits have an elliptic shape because that is how mass behaves — clusters of mass interact through the force of gravitation that they exert upon each other. The substance form of *mass* is defined by its capacity to exert gravitational force according to Newton's equation.

In Rödl's view, laws play an explanatory role that resembles Hempel's model of deductive-nomological explanation, in which a given phenomenon is explained by being subsumed under a scientific law. In Hempel's DN model, it is also the scientific laws — the explanans — that explain the particular facts — the explanandum — by directly connecting the event to the conditions specified in the law.[122] For both Hempel and Rödl, the explanatory arrow goes from the general to the particular, even if we need the particular to formulate the general statements. The difference is that Hempel, as an empiricist, takes the general law to have the form of a quantitative generalisation. Rödl's criticism of the DN model would be that such an 'explanation' is circular: if the general law is taken as a quantitative generalisation over the particular events and those are in turn explained by the law, then the particular events are explained ultimately by themselves.

We see that Rödl's rejection of empiricism does not entail throwing away all scientific laws, but it does challenge the way science is understood by most analytic philosophers. A scientific law is objective insofar as it describes what things do, even if later on a new law is formulated which can explain the exceptions that escaped the

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[122] Carl G Hempel, 'Two Basic Types of Scientific Explanation', *Philosophy of Science: The Central Issues*, 1962, 685–8.

previous one. Calling this view of science deflationary would be dishonest, as it conceives science as a key enterprise to describe, up to a certain degree of accuracy, the substance forms that constitute reality.

Moreover, Rödl's view sets a clear distinction between metaphysics and science. Whereas metaphysics — which for him is synonymous with logic, understood as the science of thought — is concerned with finding the pure concepts and forms of predication that structure thought and being, science is the process of specification of particular substance forms through the formulation of scientific laws in the form of generic statements. The disciplines are complementary like two sides of the same coin.

There is no room for speculative metaphysics because metaphysical logic already exhausts the study of the form of being. Science can seem to come close to metaphysics when its laws become very general, but we cannot overlook that the way such laws are reached is totally different from how critical metaphysicians arrive at their truths. Science can never take over because it is just not about the general form of being, but rather about the definition of substance forms, and it works its way through the particular, empirical observations, rather than reflecting on thought alone — what Kant, Hegel and Rödl did to develop their critical metaphysics. Even if the very form of thought is its relation to intuition, and every thought does imply some individual given case, there is no need to think of any particular thing to apprehend the form of thought, but it is enough to just think of anything. Metaphysics does not require any *particular* intuition, whereas science is directly concerned with particular intuitions.

In sum, in Rödl's framework, metaphysics is the study of the form of thought and being through thinking alone, whereas science is the study of empirical reality through the empirical study of substance forms. I would not call this a deflationary account of science, but this view does privilege (critical) metaphysics over science to grasp the true form of being. Science, however, does not fall short as it is aimed at explaining physical reality by formulating scientific laws, which is actually not that different from what an analytic philosopher of science would say. So far, this separation between metaphysics and science seems clear and unproblematic, but there is a problem as soon as we turn to scientific laws that deal with what for Rödl is the general form of being.

Time, as the form of being, has an empirical manifestation that is directly measurable by change in enduring things. Therefore, time appears in scientific laws as part of the empirical content, another variable in the equations. Time is, indeed,

fundamental for the laws of mechanics, either classical, relativistic or quantum, and also in most other fields of physics and other sciences in which there is always a concern for the temporal evolution of any kind of system. After reading Rödl, it is obvious that time is always present because thought and being are fundamentally temporal, and it is in the nature of temporal truths to recede into the past. Nonetheless, the temporal variable that appears in the equations does not refer to time as a fundamental form — which is not measurable — but to its empirical manifestation of the constant change in things (substances) that exist temporally. Time itself is not what is measured, because it is not something empirical, it is movement or change that makes the equations work.

This may again sound like Bergson's separation between physical time and real Time. Here, Time itself is the form of what is, and physical time is an attribute of particular substances that endure and undergo observable changes. Is this separation of physical time from "formal" time enough to explain the incompatibility of the anti-reductive Dynamic Theory with relativity? Probably most scientists and philosophers of science would answer this question with "no". The theory of relativity tells us about the form of the universe itself, not just the substances existing in it, or at least if it is seen from a scientific realist standpoint. Relativity is a theory about spacetime. Yet, in the Rödlian framework we are working on, I do not see the possibility that science can state anything meaningful about the form of being, since it is not concerned with synthetic a priori knowledge.

Therefore, the most logical response from a defender of the anti-reductive Dynamic Theory is to reject that relativity's claims are metaphysical and accept them just insofar as they describe the many substances that populate the physical reality. The form of being is beyond the reach of science simply because of how it works, it is not possible to arrive at metaphysical truths through scientific methods. Even though Einstein — and most contemporary physicists — believed that relativity is actually describing what spacetime is like, the theory is only empirically 'confirmed' by observing particular substances behave that way. According to this view of science, relativity is only describing attributes of substances and substance forms, not the form of being.

We should not, however, completely reject the idea that a relativistic spacetime could be compatible with dynamic metaphysics. Oliver Pooley, for instance, has explored

the option of combining relativity with Kit Fine's non-standard A-theories,[123] but this has been done on reductionist grounds, which, from the anti-reductive point of view, is eventually going to give problems as it is not the A-theory's natural framework.

A possible strategy could be reconsidering the role and necessity of a Global Now for the Dynamic Theory. A Global Now is something attributed to the A-theory and presentism but constructed in an eternalist, B-theoretic universe, and the problem arises when trying to justify it on the former theses' natural grounds – anti-reductionism about the temporal nexus. Perhaps, an anti-reductive Dynamic Theory does not require a Global Now because it does not accept the framework in which presentism and the A-theory are presented in the way that they do require a 3-dimensional hyperplane of simultaneity. Positive presentism, in an anti-reductive framework, may not require a privileged slicing of the spacetime manifold, as long as for any possible perspective on a worldline, things objectively occur dynamically. The objective reality would be what is immediately grasped from a local, situated point of view, and the God's eye view of the universe that relativity presents should be understood just as a symbolic representation that does not dictate the form of being.

The main problem with this would be reconciling relativistic locality with the absoluteness of metaphysical logic. Without losing sight of absolute idealism, we could say that Rödl's metaphysics is a formal requirement of how things are along single worldlines. Our grasp of the world is bound to a local perspective, and relativity describes the behaviour of substances that constitute the empirical reality around it. There are metaphysical constraints on how this reality is, namely its temporal-dynamic form, and this is respected in any local, situated view of the world. If we accept this, then all the theses of the anti-reductive Dynamic Theory apply independently of the choice of reference frame. They may not apply to the God's eye view, but this is just a representation relating change rates in enduring objects that exist temporally, and does not have metaphysical validity whatsoever.[124] I will not be examining the feasibility of this option further as it is outside the scope of my thesis.

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[123] Oliver Pooley, 'XVI-Relativity, the Open Future, and the Passage of Time', *Proceedings of the Aristotelian Society (Hardback)* 113, no. 3pt3 (October 2013): 321–63, https://doi.org/10.1111/j.1467-9264.2013.00357.x.

[124] This is very much analogous to the way that, in a different neo-Kantian framework, Grete Hermann reconciles relativity with the Kantian a priori. To see a brief explanation of Hermann's work on relativity

To conclude this last part, we have seen that an anti-reductive Dynamic Theory that follows Rödl's philosophy does not need to dismiss science, but just reposition it and separate it from metaphysics. Relativity does not need to be seen as a deficient scientific theory as long as it is not taken as metaphysics. The only deflation that is needed to make the anti-reductive Dynamic Theory compatible with science is that of empirical time, which should not be taken as time itself, but as the change that physical objects undergo as a result of being temporal in form. Whether it is possible to completely reconcile Rödl's view and relativity is something that needs further discussion and engagement with technical details. However, I wish to keep open the possibility that relativity can still be valid from a scientific realist standpoint in an anti-reductive framework.

In this chapter, I have presented Rödl's metaphysics as developed in his *Categories of the temporal*. His work is directed at building a temporal logic that reveals the form of thought and an absolute idealist metaphysics that defines the general form of being: both turn out to be the same project. Following Mulder's proposal, we have seen how Rödl's metaphysical logic can be implemented in the Dynamic Theory of Time, providing it with its own anti-reductive framework. This leads to a different version of the theory, the anti-reductive Dynamic Theory, which defends the same central theses as the previous one, but on Rödl's logico-metaphysical grounds. This reshaping of the Dynamic Theory should not be seen just as a simple addition of an extra independent thesis or premise to the traditional ones. It is, actually, a whole new step beyond the reductive view, the one that gives rise to the dynamic-static dichotomy. I decided to keep the term 'dynamic' in it because it retains a version of the Dynamic Theory's theses, but it is truly another theory built up on a totally different framework that does not allow for such dichotomy to arise. The anti-reductive Dynamic Theory is not fully yet developed, but it aims at becoming a comprehensive view that fully accounts for the metaphysics of time in all its aspects. That being said, a thorough examination of the feasibility of fully integrating relativity into the new theory is still needed.

This redefinition of the whole picture of metaphysics of time is certainly not something that Jenann Ismael has in mind when she is reconciling the dynamic and static

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(and the references to the original sources therein) see: Guido Bacciagaluppi, 'Translation of three short papers by Grete Hermann (with introduction)', *Journal for General Philosophy of Science* 51, no. 4 (2020): 595–610, http://hdl.handle.net/1874/411599.

views of time in her work. In the next chapter, I will explore more deeply the connections, similarities and incompatibilities between the two authors. Most importantly, we will see how both of them move on, in their own way, from the dynamic-static dichotomy that has troubled the philosophers of time for so long.

Chapter 4

Unveiling the Contrasts between Ismael's and Rödl's Views

So far, my thesis has focused on providing an overview of the traditional picture in metaphysics of time and then describing two recent attempts to challenge what I refer to as the dynamic-static dichotomy. While this has taken up the majority of my thesis, I intend to move beyond simply summarising what has already been stated. I specifically chose the views of Ismael and Rödl because their perspectives offer novel insights that allow them to take a step further and leave behind the longstanding debate in analytic philosophy. By either reconciling opposing viewpoints or redefining them, Ismael and Rödl introduce innovative approaches to the concept of time — for the analytic philosophers, at least — that can shift the focus to new issues in metaphysics. My interest lies in comparing how they do this, looking past the superficial differences in style usually associated with the authors' academic backgrounds (Anglo-American and German) and going to the fundamental level to describe the more or less tacit assumptions that each of them needs to build their theory consistently. By doing so, I will reveal why their views, though sharing some features, are mostly incompatible.

In this chapter, I put these authors next to each other and make a comparative study that can reveal the differences and incompatibilities between their works, but also their similarities. After a bit of digging, it becomes obvious that they work from completely different frameworks and that their solutions to the metaphysical debate cannot be applied together. They ultimately have a different view of what metaphysics should be like. I will delve into the fundamental assumptions that underlie their works and set them apart, then I will try to look for commonalities in the methods they use to 'solve' the debate. Additionally, I aim to give an account of each of the authors' philosophy from the other one's perspective and see if we can take away anything meaningful from this exercise.

4.1 Superficial analysis

At first glance, and for those who have not read much of Rödl's work (or just superficially), it may seem that Ismael is an analytic philosopher working out the concept of time as it is understood in the Anglo-American framework — in which the dynamic-static debate takes place — whereas Rödl is some continental philosopher dealing with the Kantian concept of ideal time. It might look like Rödl is not concerned with the analytic debate as he does not explicitly engage with the central theses involved in it. I have already explained in Chapter 4 why he should not be read in this way, as he indeed aims at the foundations of that debate in order to redefine it completely. However, I find it relevant to focus on why Rödl's work could be overlooked by the analytic philosophers because of his historicised manner of doing philosophy, more typical of the continental philosophers. I will dedicate this short section to arguing why it is wrong to attribute the differences between Ismael and Rödl to the incommensurability between the two schools of philosophy, showing that the differences due to their background are nothing but superficial and then hinting at a deeper level where the most important contrasts are found.

The analytic-continental split in philosophy is a *de facto* self-description that mostly English-speaking philosophers have been using since the mid-20th century to differentiate their work from other kinds of philosophy traditionally associated with continental Europe. There are stereotypes associated with each tradition, for instance, that analytic philosophy deals with problems whereas continental philosophy deals just with proper names. Simon Critchley problematises these stereotypes, as well as the geographic component of this division, but acknowledges that some general features easily distinguish the works of philosophers from each school.[125] Analytic philosophers treat problems more abstractly and construct very logical arguments, inspired by scientific methods. Scientism is indeed, quite common in analytic philosophy, almost a requirement. Continental philosophy, on the other hand, addresses problems in a historicised way, through the lens of culture, understanding philosophy and the philosopher as situated at a certain time and place. Moreover, it encompasses a wide range of different attitudes towards science. In fact, this distinctive methodology is due to the

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[125] Simon Critchley, 'What Is Continental Philosophy?', *International Journal of Philosophical Studies* 5, no. 3 (October 1997): 347–63, https://doi.org/10.1080/09672559708570862.

different works of reference upon which each of the traditions has been built. Kant, Hegel and Nietzsche are central to most continentals, whereas analytic philosophy has had a great influence from authors like Frege, Wittgenstein and Russell. Furthermore, there is a matter of reluctance to engage with each other's work, which has resulted in developing their own recognisable style with little to no influence from their overseas counterparts.

Rödl does not fit into continental philosophy and he even situates his work in the analytic tradition, so he should be read as such even if he does not fully conform to the label in the most traditional sense. Method-wise, both Rödl and Ismael are very analytic. They both treat the problem of time with very abstract and logical arguments, but the former stands out for his strict rigour in building his train of argumentation and his systematicity in addressing all issues he deems relevant one by one. Ismael, by comparison, seems to be doing more inventive work and putting on the table new original ideas.

Regarding their works of reference, there is a clear distinction between these authors, especially regarding how explicit they are about the framework they are working on. For Rödl, it is important to clarify which claims come directly from Kant, Hegel and Aristotle, and where his disagreements with these authors lie. He also directly refers to analytic philosophers, mostly Frege, to voice the points which he actively opposes and therefore characterise his theory. Figuratively, Rödl's procedure can be seen as a philosophical patchwork. Ismael is never that explicit about the philosophical grounds she is working on, like her tacit assumption of Fregean atemporal logic and her conformation to the empiricist leaning of analytic philosophy. She does refer to Hartle's philosophy of physics and the phenomenological work she directly engages with, but not with the logical foundations these are based on. This is, obviously, not reproachable as she is not doing that kind of foundational work, so it is not expected of her to justify the whole tradition that supports her philosophy.

In this way, it seems that Rödl's philosophy is historicised as it is aware of its own history and even critical of it, which is more characteristic of continental philosophy. On the other hand, Ismael seems to follow most analytic philosophers, who usually are not that explicit about the history of their tradition and tend to take their philosophical framework for granted. However, like Critchley, I deem this analysis problematic as it overlooks the deeper implications of the theories and relies on the superficial distinctions between the authors. Rödl goes to Aristotle, Kant and Hegel to overcome an issue that

analytic philosophers, especially those who defend the Dynamic Theory of Time, are currently facing. He rejects Frege's predicate logic, which is a reference work for most analytic philosophers. Because of this, it could be said that he is departing from the analytical tradition, despite his work being directly aimed at such tradition. Methodologically, however, he cannot be accused of not being rigorous enough.

The analytic-continental division does not apply to this case as a valid analytical framework, so, preliminarily, I believe a fruitful dialogue can be held between the two positions I am presenting. I suggest that letting these views interact directly with each other can reveal where their main differences lie, which, as I already stated, is going to be the fundamental level that Rödl is tackling and intends to change. We will see that Rödl, besides redefining the Dynamic Theory, is also bringing in a different way of doing metaphysics — critical metaphysics — that is mostly incompatible with Ismael's naturalism.

4.2 (Dis)solving the dynamic-static dichotomy

Let us see what happens when we let Ismael's and Rödl's theories interact. On the one hand, there is a resolution of a philosophical debate in which two sides, the Dynamic Theory and the Static Theory, get reconciled — a synthesis of binary opposites. On the other hand, there is the formulation of a new temporal logic that completely redefines and boosts the Dynamic Theory. The first and most obvious question that arises is: Does Ismael's resolution or reconciliation of the opposite sides cover Rödl's version of the Dynamic Theory? Well, the short answer is no, and this follows from having read Ismael and Rödl and having understood them properly. Let me elaborate.

As I argued in Chapter 3, Rödl is not *just* adding an extra thesis to the Dynamic Theory of Time, he is providing a logical framework that reconfigures all and each of the central points of the theory. Because of that, the anti-reductive Dynamic Theory is not the same thing as the Dynamic Theory that Ismael takes into account when she formulates the generator of a point of view that mediates between the dynamic and the static representations of time. Ismael is still considering the Dynamic Theory as it is presented through Fregean logic, that is, on reductive grounds. The IGUS, as it was initially theorised by Hartle, is a logical construct dependent on atemporal logic.

One could think that the generator of a POV, even if not defined for that purpose, could mediate between the reductive and anti-reductive views. This, however, would be

conflating the Static and Dynamic theories with the reductive and anti-reductive views, respectively, which are not the same. Ismael's theory unifies the static and dynamic representations of time as both metaphysically valid, within the framework that Mulder describes as reductionist of the original temporal nexus. She works within the reductive view without putting it into question, as she accepts it to be the logico-metaphysical basis of the debate she is aiming to solve. Her theory does not work across the two views regarding the reducibility of temporal logic. As Mulder described, the dichotomy between staticity and dynamicity can only arise on reductive grounds. Therefore, its resolution must happen within those grounds as well.

We see that Rödl escapes Ismael's unification by providing a different logico-metaphysical framework, which allows us to develop a theory that relates to the Dynamic Theory of time by retaining a version of its main theses. The anti-reductive view does not leave room for the dichotomy, as it takes time to be the form of being and does not have the conceptual machinery to formulate any anti-reductive static theory — which would be plain nonsense. If the irreducibility of Rödl's temporal logic is taken as a premise, there are simply no opposite views to reconcile.

In a way, Ismael's theory confirms Mulder's general picture. She shows that there is no real dichotomy within the reductive view either, as both representations of time — frame-dependent and frame-independent — are the two sides of the same coin, with identical metaphysical validity. The dynamic vs. static debate can be solved on the same grounds that give rise to it. Ismael is committing to atemporal logic and thus to the reducibility of the original temporal nexus, which, I insist, should not be confused with defending a Static Theory of Time. Ismael herself acknowledges that the apparent dichotomy is a product of what she takes as the fundamental form of human thought, which is closer to a Fregean form than to Rödl's temporal form: "I now think that there is a sense in which the problem arises because the solution exists. […] It is a reminder of the constant tension in the human between the transcendent and embedded viewpoints, which is in its turn the product of the peculiarly human form of mindedness".[126]

In sum, a first look into Ismael's and Rödl's works reveals that the reconciliation of the former does not include the position of the latter. This is because Rödl is able to

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[126] Ismael, 'Passage, Flow, and the Logic of Temporal Perspectives', 35.

avoid the logical tools used by Ismael by creating an alternative temporal logic. Put differently, Ismael's resolution of the temporal dichotomy does not apply to Rödl because he can escape said dichotomy himself by changing the foundations of the framework that allows for it to be formulated in the first place. As we will see in the next section, this choice of logical framework is a reflection of the wider (meta-)metaphysical preferences that shape the way they engage with metaphysics in the first place.

4.3 Two metaphysics: Naturalism and Absolute Idealism

This first incompatibility when trying to compare Ismael and Rödl already reveals the irreconcilability of two theories that are built on different logical frameworks. The subject of my inquiry therefore now turns to understanding what prompts them to commit to either logic when discussing the metaphysics of time. This comparative study thus requires a broader understanding of the kind of metaphysics they do, beyond just the content of their theories, that can justify the philosophical tools they use to move on from the dynamic-static dichotomy. I dedicate this section to exploring the main disagreements between Ismael's naturalism and Rödl's absolute idealism.

This conflict between ways of doing metaphysics is something that Rödl anticipates and takes into account in *The Categories of the Temporal*, so it is quite a straightforward exercise to situate his philosophy — he explicitly does it himself.[127] In fact, his positionality reveals that of the group of analytic metaphysicians to whom he addresses his work as well. Conveniently, we can place Ismael in this heterogeneous group insofar as her work reflects the same assumptions.

Rödl faces an entire philosophical tradition, namely the Anglo-American institution of analytic philosophy, so he rightfully sees the need to position himself clearly by expressing the points he disagrees with and drawing on past philosophers who are not central to that tradition. Apart from rejecting Frege's predicate logic in favour of Kant's transcendental logic,[128] he also criticises Nagel's conception of the view from nowhere/nowhen,[129] Quine's naturalist understanding of time as part of the content of

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[127] Rödl, *Categories of the temporal : an inquiry into the forms of the finite intellect*, 1-18.

[128] Rödl, 25-52.

[129] Also know as the God's eye view. Rödl, 70-4.

thought,[130] and Prior's attempt to make up a temporal logic by adding temporal operators to Frege's atemporal logic.[131] The underlying problem of all these philosophers, according to Rödl, is that they consider the form of thought to be a certain deductive order rather than the relation to intuition (we think by relating concepts to intuitions) and thus miss the point that the form of thought is fundamentally temporal.

Rödl combines Kant's critical metaphysics with Hegel's absolute idealism. He draws from Kant that the form of thought is its relation to intuition and he avoids scepticism about the form of being by rejecting Kant's transcendental idealism and adopting Hegel's absolute idealism instead. Hegel's idealism, as well as Kant's, should not be understood as a subjective idealism that opposes materialism, but as the doctrine that objective knowledge is only achieved through thinking. In Kant's case, there is a thing-in-itself that we cannot know about, whereas for Hegel and Rödl, being is directly available to us in its true form. In absolute idealism, everything hinges on the absolute idea, and thus all binary opposites, including that of the mind and the world, are ultimately comprehended in it.

By taking this stand, Rödl completely rejects empiricism and naturalism, as they are based on the idea that all knowledge is created out of what is given through experience and that science is the best way to describe the world, respectively. The true metaphysics, for Rödl, is the search for synthetic a priori knowledge that is revealed by just thinking of anything. Science is still relevant of course, but not in a metaphysical sense, as it is directed at describing the various substance forms that are found in particular situations. By doing metaphysics in this way, Rödl realises that thought is temporally structured through the various forms of predications and pure categories, and therefore concludes that time is the form of being. This does not leave room for speculative (dogmatic) metaphysics about how our concepts relate to elements in the scientific account of the world — as the Canberra Planners intend to do — because our immediate knowledge of things given in intuition already provides us with metaphysical knowledge of their form, which is temporal, and therefore there is no difference between the things in themselves and our knowing of them.

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[130] Rödl, 84-95.

[131] Rödl, 99-108.

Now, let us turn to Ismael's metaphysics. She falls into most aspects of the analytic philosophers that we have seen Rödl criticise. Fregean predicate logic is used by default in her work — which is the basis of analytic philosophy — and some sort of naturalism is assumed. She is a physicalist and believes that science can provide us with an approximate God's eye view of the universe. However, Ismael challenges the Canberra Plan by being critical of some of its philosophical assumptions. She acknowledges that our cognitive machinery imposes some form on our perceptions so we can understand the reality around us. This a priori knowledge, if we can call it like that — the spatiotemporal form of our perceptions — is not subjective because it is a product of nature and thus part of the world that makes things knowable for the situated agent. Although this may seem like some sort of scientific neo-Kantianism, it is no more than a convergence between modern neurosciences and Kant's transcendental idealism. Ismael drifts away from the Canberra Planners when she gives metaphysical importance to the 'a priori' form of sensory perception. However, she is not a Kantian because she still believes knowledge of the thing in itself is achievable through the empirical methods of science, even if our perception of the world is mediated by the physical processes in our brains.

Fregean vs. Kantian form of thought

In the previous section, I assumed that Ismael's generator of a point of view is based on Fregean logic because that is the norm in analytic philosophy; it is counter-intuitive that she would be questioning the grounds of her philosophical tradition without being explicit about it. Whether Ismael sees the form of thought as the relation to intuition or as a deductive order is unclear from her work, but I see it more plausible that she understands temporal thought in a similar way to Quine.[132] That is, in Rödl's words, that thought is temporal in virtue of the elements it is structured.[133] For Ismael and Quine, the form of thought is ultimately Fregean — a certain deductive order — but thought is temporal because its elements are temporal. There may be some differences between these two, but I believe Rödl would criticise Ismael along the lines of his criticisms of Quine.

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[132] Willard Van Orman Quine, 'Things and Their Place in Theories', in *Theories and Things* (Harvard University Press, 1981), 1–23; Quine, 'Empirical Content', 24–30.

[133] Rödl, *Categories of the temporal : an inquiry into the forms of the finite intellect*, 84-95.

In Ismael's theory, time as form is already present in sensory perception — unlike for Quine — but the evolving perspective is constructed in the 'unconscious' computing of the IGUS. Quine's observation categoricals — eternalised sentences of the form *whenever P then Q* — are also constructed in the abstract layer of thought that opposes the sensory data. By contrasting the categoricals with actual observation sentences — immediate responses to stimuli — we can theorise about the world.[134] The inferential relations are made according to an internal system of laws that constitute the form of thought (Fregean logic). The IGUS' evolving perspective on time also comes from a higher level of abstraction. It is constructed out of an ordered manifold of the memory of consecutive perceptual episodes, and it serves as a guide for expectations of the future and decision-making.

Even if Ismael acknowledges the temporal form of an immediate representation of the IGUS' surroundings, the evolving perspective of time does not precede perception but is constructed out of a series of perceptual episodes by the system of laws that represent the form of thought. This would be wrong for Rödl because, for him, creating the evolving perspective of time already requires temporal awareness, so it cannot arise from it. Rödl claims that Quine's categoricals express a form of cross-temporal awareness which presupposes an understanding of time that cannot be drawn from any empirically given situation, so that his connection from situation-bound 'observation sentences' to these categoricals is unwarranted. He mistakenly describes temporal thought as what for Rödl is just situation-responsive behaviour. In the case of Ismael's IGUS, Rödl would similarly argue that the evolving perspective brings in a cross-temporal awareness which in fact can only be legitimized by assuming that there is an underlying understanding of the (evolving perspective of the) temporal from the beginning, that is, already in basic, situation-bound sense perception. In this case, though, the form of thought would not be Fregean, it would be Kantian, so the IGUS would not accurately capture the form of human thought.

Both Quine and Ismael assume that a form of time consciousness can arise on empirical grounds, from the empirical sensory input given in particular situations. This is what Rödl is ultimately criticising, as for him thinking is no more than relating to intuition and therefore thought must be structured accordingly, and should not be taken as

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[134] Quine, 'Empirical Content', 27-30.

independent from it. I do not claim that this is the only right Rödlian reading of Ismael, this is just a possibility of how I think he would reject Ismael's IGUS as a rightful representation of the temporal form of thought. The comparison with Quine seems appropriate because, with his theorisation of temporal thought, he is trying to justify naturalism,[135] which is also Ismael's concern. She commits to naturalism anyway, so she must accept a Fregean form of thought one way or another.[136] Even if she assumed a Kantian form of thought, her metaphysics would still not fit Rödl's standards and her work would not contribute to his.

Ontological and epistemological differences

If we move on to other metaphysical aspects in which Ismael and Rödl disagree, it is important to focus on the different ways they have to conceive what is and the process to getting or producing knowledge of it. Their projects may seem similar in some sense — they both aim at the *meta*physical — but that is arrived at from completely different ontological and epistemological assumptions. Rödl's goal is to describe the structures of the finite intellect that provide our thought — and being — with form, and this can only be done through pure thought. On the other hand, the subject of Ismael's metaphysics is to describe how natural processes generate the partial view of an embedded agent, and this has to be done continuously with scientific enquiry.

When it comes to what is, Ismael and Rödl have different conceptions of things and being in general. The former refers to what is as (capital) Being, which encompasses everything that is, including time itself. For Ismael, there is a way of approximately describing Being like a God's eye view of it, provided by the empirical methods of science. On the other hand, Rödl believes that being — he does not capitalise it — is temporal in form. In comparison, he does not see time as something that is part of being, but as the form in which being manifests itself, the way things are. For Rödl, the God's eye view of the universe is no more than an abstraction of reality with no ontological weight. All there *is* is what is directly available for us to know.

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[135] Quine, 'Things and Their Place in Theories', 21.

[136] Does she? Is accepting a Kantian form of thought (relation to intuition) incompatible with naturalism? It seems it is like that for Rödl's understanding of Kantianism. Other neo-Kantian schools, like the neo-Friesian school, are indeed compatible with naturalism.

The ontological discrepancies are also connected to the fundamental epistemological differences between the two authors. Whereas Rödl believes that the essences of things and being are available to the subject — we just need to think of them — Ismael does assume a gap between Being itself and our view or representation of it, which can be justified by science just up to some point. Her naturalist metaphysics, at the end of the day, is part of the scientific enterprise to describe Being itself, but focused on how the partial view of the embedded agent arises. By contrast, metaphysics for Rödl is an enquiry into the general form of being, whereas he conceives science as a more concrete enterprise to describe particular substance forms that are found in experience.

One might be tempted frame the differences between the two authors' ontological views as a modern version of Parmenides and Heraclitus, but this idea would be too reductive and would not capture the nuances that make Ismael's and Rödl's works so different. Ismael's account of Being might look Parmenidean, though a bit more complex. She conceives a totality that encompasses everything, but includes in it the dynamicity — and other aspects — of experience, something that Parmenides completely dismissed as unreal. On the other hand, Rödl's conception of being is not like Heraclitus' either. There is also an implicit Parmenidean account of the Absolute in his work, there is an absolute idea upon which everything hinges. The Heraclitan-looking claim is that the form of things is temporal, and therefore being is dynamic. What I am trying to say is that making these connections with the ancients does not seem a very precise way of doing philosophy, and we should understand that philosophy also evolves and, whereas certain existing positions can become more nuanced, new ones can arise either from scratch or from the combination of past views. In section 4.5, I will elaborate on why I do not want to frame these two 'innovative' views as dichotomic or perpetuating one way or the other the apparently never-ending debate in philosophy of time.

4.4 Revealing past mistakes

So far in this chapter, I have just shown how different and deeply incompatible Ismael's and Rödl's views seem to be, but I believe to have found one commonality between the two which could in fact be the key to moving beyond the dichotomic debate. For the analytic philosophers defending either the Dynamic Theory or the Static Theory, as well as for the ancient Parmenides and Heraclitus, what has been under discussion is how the world is, and they have been concerned with finding arguments that can support that the

universe is one way or the other. They usually draw on rational arguments, like the common sense argument or the superiority of the A-series or the B-series to account for change, and empirical or scientific arguments, like the static universe considered by the theory of relativity. What unites all these is that they all aim for the transcendent, taking the subject for granted or even being oblivious to the situated nature of the self.

What Rödl and Ismael have in common is that they reflect on the role of the theoriser who is making claims about the world, and build up their theories around this consideration. That is something that critical metaphysicians and Sydney Planners share and that differentiates them both from the typical dynamic and static theorists. They are both critical of the subject — in Rödl's terms — or the agent — in Ismael's — and give some level of objectivity to our perspective of what is. The way they deal with this is quite distinct, so this is why I prefer to see this as a mistake made by the previous philosophers rather than a similarity between two deeply incompatible logico-metaphysical theories.

Ismael's naturalism is centred around how the agent develops a side-on view of Being that fulfils their practical and epistemic needs and allows them to navigate their environment, without dismissing the nature of this partial view as subjective. The situated view of the agent, resulting from the natural interactions between themselves and their surroundings, is itself part of Being and therefore can be studied through the scientific lens of naturalism. Indeed, a full scientific account of Being, in the Sydney Plan, must include the side-on view that an agent has of Being itself. Therefore, our dynamic representation of time is part of this complete account and it is complementary to the static representation insofar as it is possible to make logical transformations between them. On naturalist grounds, Ismael shows that the tension between the dynamic and static views of time is just apparent, as a close examination of the situated view of the agent reveals that these two are 'two sides of the same coin'. The difference between the Sydney Plan and the Canberra Plan amounts to a reconsideration of the role of the agent and giving up the matching game between elements of belief and features of the scientific description of the world. This redefinition of metaphysics occurs within the naturalist framework, the important premise of privileging science to arrive at true knowledge is retained, and so is the Fregean logical framework.

For Sebastian Rödl, however, this would still be dogmatic metaphysics because even if it researches the mechanisms that make the experience of the subject arise, it does

it through the empirical methods of science, and then renounces pure thinking as the way to discern synthetic a priori knowledge. If Ismael is placing the side-on view of the agent at the core of her naturalist metaphysics, Rödl goes further and sees the subject as the only source of metaphysical knowledge, that is, knowledge of the form of being. As a critical metaphysician and an absolute idealist, he claims that true knowledge is only achieved through pure thinking. There is no Being in itself that can be described by empirical methods, there is, instead, the absolute idea, that encompasses everything that is necessary and upon which all knowledge ultimately hinges. Being is dynamic just because its form is temporal, and this is directly available to the subject who thinks by relating to intuition. There is no tension between this immediate grasp of being and a theoretically constructed transcended account of things that abstracts from time — which has no metaphysical significance.

We see, therefore, that by either focusing on the natural processes that produce the agent's perspective or considering the subject as the ultimate source of knowledge, the tension between the dynamic and static aspects of time vanishes. In the first case, the dynamic and static representations of time are both part of the totality of Being, whereas in the second one, time is the form of being and there is no way to construct the idea of metaphysical staticity. These two approaches are totally apart from each other and only share the starting point of problematising the way the dichotomic debate is formulated. This is why, in my view, their commonality is just a hint of a past mistake, which is the lack of critical awareness of the self when discussing an abstract idea of Being that is definitely shaped according to one's own perspective.

More generally, this comparison of Ismael and Rödl shows that the objectivity that analytic philosophers usually aim for by abstracting from the self is not as convenient as we may think. Taking into account the partiality of our own view, or even considering it as fully objective, brings us closer to the concepts that we as philosophers deal with and can reveal the origin of many misconceptions that lead to ill-founded debates like the dynamic-static one treated in this thesis. The two options presented here to overcome this classic shortcoming of analytic philosophy are: 1) acknowledging the partial perspective of the agent as a product of natural processes and studying it through the naturalist lens (Sydney Plan), or 2) committing to the subject as the source of true knowledge and considering metaphysics as a pure thinking project to discern the a priori structures that shape thought and being (critical metaphysics).

4.5 Looking across metaphysical frameworks

A preliminary question I had about the works of Ismael and Rödl before starting my thesis was: "If their theories are not compatible, are they, at least, commensurable?" Also: "Can they contribute anything to each other?" I was considering that, when closely comparing their work, I may find some ways in which they could learn from each other or, at least, draw some general lessons from the other's ways of dealing with the same problem. After a close look, I see their theories as not only incompatible but totally incommensurable, which I now actually consider a good thing — perhaps a sign of progress in philosophy of time! In this section, I will explain why these theories are incommensurable and also why I have a positive judgement of this after some consideration.

The incompatibility between the logic they use already is indicative of a rather profound mismatch between their ways of reasoning. However, in order to test how deep the incommensurability goes, I suggest the exercise of looking at each of the theories from the other author's framework, by assimilating all their assumptions without putting them into question. This will also show us if there is any way in which each theory can contribute to the other. If Ismael's and Rödl's works are incommensurable, as is the case, we should not be able to make much sense of this exercise.

When we are positioned within the naturalist metaphysical framework and try to understand Rödl's work, many problems would quickly hinder our progress into making any sense of it in our naturalistic terms. First of all, Rödl's claim that thinking is being, on which his whole project hinges, should be abandoned, thinking would be just the product of complex natural mechanisms. *The Categories of the Temporal* would become an interesting phenomenological treatise about how the set of pre-established predications and concepts seems to structure our temporal experience. Whatever relevance this could be given, all of his work would lose any metaphysical validity and would be under the scrutiny of science, especially neurosciences. In naturalism, it is up to scientists to describe what is, not the philosopher. All speculation, even if it is about one's own mind or experience, is valid insofar as it can be corroborated by science's empirical methods. We can see, then, that Rödl's work loses all its metaphysical relevance when it is brought to naturalist grounds. Although he aims his work at analytic philosophers to convince them to change the logical basis of their philosophy, his goal proves quite difficult to achieve since they rely on naturalist assumptions that fit too well with their whole logico-philosophical framework. I do not want to say that this cannot happen, as Rödl's

argumentation is very logical and precise, but it seems fairly unlikely that a naturalist is going to be willing to give up the Fregean-naturalist framework that probably grounds most of their and their colleagues' work.

On the other hand, something similar would happen if Rödl were to read Ismael's work and try to assimilate any of her claims from his own philosophical framework. As I have shown earlier in this chapter, Rödl is directly attacking the logic Ismael uses to build her project, so in this sense, nothing that she states can have any metaphysical significance for him. No matter how concerned she is with the agent's view, Ismael still does what Rödl would describe as dogmatic metaphysics because she is leaning on science, and thus renouncing pure thinking, to vindicate her metaphysical claims. Let us, instead, try to discern whether the generator of a point of view would be of any use to Rödl, even if it had to be reformulated in his temporal logic. The anti-reductive IGUS could be useful to the theoretical construction of an abstract timeline in the finite intellect. The raw experience of succession would be the starting point, and through abstract thought mediated by the pure concepts and forms of predication, the subject would be able to order them in their mind as separated events in a theoretical temporal dimension, which in itself would not have any metaphysical significance. Though the IGUS could be, in principle, constructed on anti-reductive grounds, it would not retain its main purpose to mediate between two equally valid representations of time. Rödl's metaphysics is knowledge about the form of thought and being, so Ismael's work loses any sense under his gaze. What makes her theory so important — the reconciliation of static and dynamic representations of time — is not something that Rödl can find useful, as he rejects that kind of metaphysics and gets rid of the dichotomy in his own way.

It seems that Ismael and Rödl work on two different incompatible and incommensurable philosophical frameworks. There is no possible understanding between them that does not involve getting rid of a set of assumptions that are in fact key to building up their theories. However, I want to point out that in principle, they are both engaging with 'analytic' philosophy, with highly rational and precise arguments. With this I want to problematise the typical analytic-continental division that seems to make analytic philosophers oblivious of other philosophers outside their tradition and even their history. This self-imposed division is partly responsible for a quite irritating lack of dialogue between philosophers from different schools discussing similar topics. There are, obviously, deep differences between authors like Ismael and Rödl, but those should

be assessed based on actual philosophical discrepancies between their theories and not just their country of origin and their main reference works.

To sum up, this comparative study suggests that the tradition you come from definitely plays an important role in the way you do philosophy, but that should not be an excuse for not being aware of the implications and assumptions that committing to such tradition involves. We have seen that Ismael and Rödl, though dealing with the same problem, approach it from incompatible and incommensurable logico-philosophical frameworks and give it different solutions that cannot presented as dichotomic. I believe this is a positive outcome of my analysis because I have not gone from one dichotomy to another, just changing some details in the content of the theories, but shown that the dichotomic debate that analytic philosophy seems to be stuck with has, at least, two completely independent ways of being 'solved'. Ismael's and Rödl's theories cannot be presented as a dichotomy because there is not a common ground that can lead to both, or in other words, there is no common framework to ask the question which these two theories are the only two possible answers. They also do not necessarily exhaust the possibilities, the fact that they are not binary opposites leaves room for different metaphysical frameworks that could give other alternative solutions to the dynamic-static debate. Perhaps, the matter of logic, as presented by Mulder, can be seen as a dichotomic scenario — either the original temporal nexus is fundamental or not. This is not, however, everything that Rödl's and Ismael's theories entail, nor do they derive logically from choosing either option, so I do not believe this necessarily makes the views dichotomic.

Conclusions

An end or a new beginning?

As the thesis has been building up towards the comparative analysis in the last chapter, in which I already drew quite explicit conclusions, I believe there is no need for me to repeat myself too much. I intend to use this final chapter as an ending summary of my work and a sort of self-assessment.

In this thesis, I have properly answered my initial research question — expressed in the Introduction — and addressed the various issues that it prompted. After providing the relevant historical and philosophical context, I have presented Ismael's and Rödl's theories in detail and situated them into the larger metaphysical landscape. We have seen that Ismael, like my beloved Shevek, has managed to reconcile the dynamic and static aspects of time through the generator of a point of view. Her philosophy is situated within the current of naturalism typical in analytic philosophy, but with an innovative approach. Ismael moves from a more traditional naturalist metaphysics, concerned with finding extensive correspondences between elements of ordinary belief and features of the scientific worldview, towards a more agent-conscious naturalism that seeks to understand how a partial perspective on Being arises from the interaction between the agent and their environment. It is this reflection on the role of the agent that allows her to resolve the apparent implicit tension in the nature of time.

On the other hand, Rödl' critique of the logical base of analytic philosophy leads him to construct a different logical system that is inherently temporal, unlike the Fregean atemporal logic, accepted by default in the field. We have seen that this can be used to reformulate the dynamic theory of time in a framework in which the debate cannot arise simply because there is no way to articulate the static theory on his temporal logic. I have emphasised that what we end up with is not the dynamic theory of the analytic philosophers but rather another theory, the anti-reductive theory, formulated in a different framework that retains the idea of dynamicity — he is not just 'another' dynamic theorist. By resorting to a neo-Kantian approach with a Hegelian absolute idealist twist, he

prioritises the thinking mind's self-understanding over any empirical method used by scientists to arrive at true knowledge about time.

In my comparative analysis, I have shown that Ismael's and Rödl's metaphysical theories of time are irreconcilable since they differ in the body of fundamental assumptions that ground their work: they do not even agree on what metaphysics does. Whereas Ismael is a naturalist who sees metaphysics as part of the overarching scientific project, Rödl advocates for a critical metaphysics about the general form of thought and being. The latter goes against the Fregean form of thought — and the atemporal logic tied to it — assumed by the former, and defends the Kantian form of thought and temporal logic instead. Furthermore, I have argued why the only apparent commonality between them, which is the reflection on the role of the self in doing metaphysics, is no more than pointing out the key mistake that was hindering the analytic philosophers of time to overcome the dichotomic debate. I finished my analysis stating that, due to the deep incompatibilities and the lack of a common ground between the theories, they should also be seen as incommensurable.

There are still some questions that have been left unanswered, either because they were beyond the scope of my work or because I simply did not know how to. The first one arose in Chapter 3, a more in-depth investigation of how to properly integrate the theory of relativity into Rödl's metaphysics is needed to completely reconcile his critical metaphysics with the current physical theories — in such a way that these fit into his account of science. I have barely hinted at the direction in which I think this could go, that is reconsidering relativity as a theory of empirical objects, not of spacetime itself, but a more technical approach would be needed to adequately assess the feasibility of this path.

On another note, I believe it has been left unclear what is the right logical form of thought that suits Ismael's IGUS. As I pointed out, there are some differences between hers and Quine's way of accounting for temporal thought. A revision of the generator of a point of view that could clarify this issue would enhance the whole theory from the perspective of metaphysical logic, and thus become even more convincing to the more logic-leaning metaphysicians in the analytic tradition.

As to the relationship between Ismael and Rödl, I must say there is little more to do. In my view, the only thing their theories have in common is the problem they overcome, but even this similarity can be taken with a pinch of salt as it is too general.

After all the digging I have found nothing but contrasts between them, both at the logical and the metaphysical levels. I believe they both have the potential to make changes in the general picture of metaphysics of time if their theories resonate with enough people. Honestly, I see Ismael's theory as much more prone to be widely accepted among the analytic philosophers, as it is not as radical as Rödl's and does not require naturalists to 'convert' to absolute idealism. Most analytic metaphysicians are probably not about to revise the body of fundamental assumptions they have been working with their whole career unless they are very committed to the dynamic nature of time. Some dynamic theorists have not had any problem in prioritising common sense over contemporary physics (Zimmerman, for instance), and could see in Ismael a sort of deflationary approach to dynamicity. I do not find myself entitled to predict whether an entire reconfiguration of the field is forthcoming, or whether, if that ever happens, it will end up looking just like another dichotomic dispute about the reducibility of temporal logic — as Mulder presented it.

What is clear is that the dynamic-static debate, as it is currently formulated, is worn out and there are at least two ways of showing it, one that involves rethinking the foundations of analytic philosophy, and another one that builds upon those very same foundations. The philosopher — me, you or whoever spends time reflecting on these things — is left with a pragmatic choice. Use this work wisely as a documented description of two different non-dichotomic approaches to metaphysics of time, choose your fighter, or do not, but it is up to you now.

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