An Analysis of Persistence

Stefano Catelan

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Department of Philosophy

Durham University

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Abstract

'Something *persists* iff it exists at more than one time' asserts Lewis. How things persist takes two forms: 'something *perdures* iff it persists by having different temporal parts, or stages, at different times' whereas 'it *endures* iff it persists by being wholly present at more than one time. Lewis' words show insight although some of their import has been overlooked. The debate has been articulated mainly around the interplay between theories of time and persistence, oblivious of the evidence that Lewis' definitions embed philosophically ubiquitous and crucial notions like *existence* (and *identity*) which deserves to be investigated. In addition, the inquiry has often moved from time to persistence: e.g. teasing out the features that a specific view of time had which yielded a specific theory of persistence, whereas as it has recently been urged the relationship between views of time and persistence might be more relaxed: any theory of time could fit with any theory of persistence.

This thesis is an exploration of persistence, time, and existence (and to a lesser extent identity) to make sense of whether and how the first could affect the others. The investigation is restricted to *material objects* (though little depends upon this), and to how and why the intuitions and common sense considerations in the background of perdurance, the theory of persistence I sympathise with, motivate a specific theory of time, i.e. eternalism; and finally how both afford a specific notion of existence, to wit a view of existence *a là* Quine, according to which existence is delimited by true uses of the existential quantifier. Thus, the direction of investigation will be from persistence, via time, to existence. The reason for this is that change is an undeniable datum of experience for which we have robust intuitions and common sense considerations, whilst time, although pervasive, is so in an elusive way which is hard to pin down.

The thesis is divided into three parts which mirror the three main topics spelt out above. In the first part, a case of a persisting object will be used to show that our common sense thinking and intuitions harbour a predicament: it appears plausible to believe that there is a fact of the matter whether an object is or is not one and the same although we may not be able pin down the reason why. This will be clarified without supposing these intuitions and common sense considerations to be inviolable. The focus will be on two main contenders, perdurance and endurance, and what discriminates between them: the notion of temporal parts. Their centrality makes it decisive to understand what temporal parts are and what they do. It will be argued that whilst the debate has reached a stalemate in attempting to define temporal parts, the notion rests upon a robust basis of intuitions and common sense considerations which draw upon our ordinary understanding of parts in space, and this is sufficient to give a working grasp of them as well as the potential for a definition which stands scrutiny. It has also been argued that temporal parts are decisive in solving some puzzling situations; therefore I will examine one of

these, the long-standing problem of change, and show that there is a sense in which it might not be a genuine metaphysical problem. Leibniz's Law is a law of logic and it is best formulated accordingly; whereas the way it is used to generate the problem of change is metaphysically loaded. The problem of change as a metaphysical problem is thus deflated but, it will be argued, there are better, more intuitive, ways of motivating perdurance.

The intelligibility and possibility of temporal parts, and hence perdurantism, has been shown to rely on the thought that reality is four-dimensional, so that in addition to the three spatial dimensions in which reality uncontentiously extends, there is a fourth, time, along which similarly reality extends. In the second part I shall consider if what philosophers have said about this stands scrutiny. Philosophers have argued that space and time share some decisive features (the similarity thesis); it might be hoped that investigating what they have said will clarify whether and how time could be so considered. I will argue that such an investigation will leave the space/time analogy wanting, and therefore I shall endeavour to venture a tentative picture of time which could accommodate the similarity thesis as well as a view of time as extended. I will then take a brief look into the current debate in the philosophy of time and tease out what the different theories of time are really about, their basic assumptions which are supposed to make manifest how each view sees time and what they try to defend as basic features of it. I will make clear why perdurance's four-dimensional view of reality is most appealing if combined with an eternalist view of time according to which every time co-exists; both four-dimensionalism and eternalism sharing the assumption that time is a dimension through which things extend.

In the third part, I unveil the nexus between perdurance, eternalism, and the notion of existence. I argue that perdurance's basic assumption that reality is four-dimensional which is shared by eternalism, motivates a view of existence *a là* Quine, since it guarantees an *existentially closed* domain of existents, which is what perdurance and eternalism imply. The overall conclusion is that once unpacked, perdurance, eternalism, and a view of existence *a là* Quine fit together in a way in which each one motivates the others. Each has intuitions and assumptions that it tries to preserve and defend; intuitions and assumptions which might not be preserved if the theories are combined differently.

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Acknowledgements

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Introduction

An Analysis of Persistence should be, by and large, as the title suggests, an attempt at a *metaphysical* analysis of persistence. In detail, for convenience's sake, the investigation shall be limited to *material objects*, also known in the literature as 'moderate-sized specimens of dry goods'.[1] It should also be, desirably, an exercise in systematic metaphysics. Within the breadth of the philosophical enquiry, *metaphysics* is to be understood as an autonomous discipline concerned with the fundamental structure of reality,[2] and *systematic* insofar as it begins with an *ontology*, an account of what *kinds* of things there are and what their nature is. Ontology is to be considered as a taxonomy of what *categories* of being there are and how they relate each other, one which more often than not is conducive to an account of what the ultimate structure of reality is.[3] Metaphysics also deemed as the most fundamental form of enquiry: something that is extremely difficult to pursue, and which does not come on the cheap; to wit it does not allow for piecemeal solutions or short-cuts. It is a *holistic* discipline which takes common sense as a starting point but which acknowledges that aspects of common sense will need to be revised or abandoned. It is a discipline which generally

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[1] Austin, J.L. (1962). *Sense and Sensibilia*. Oxford: Oxford University Press, 9. See also Lowe, E.J. (2003). "In Defense of Moderate-Sized Specimens of Dry Goods". *Philosophy and Phenomenological Research* 67: 704-10.

[2] Lowe, E.J. (1998). *The Possibility of Metaphysics*. Oxford: Oxford University Press, Ch. 1; (2002) *A Survey of Metaphysics.* Oxford: Oxford University Press, Ch. 1.

[3] Lowe, E.J. (2002). *A Survey of Metaphysics*. Oxford: Oxford University Press, 13-6; Shaffer, J. (2009). "On What Grounds What". In D. Chalmers, B. Manley & R. Wasserman (eds.) *Metametaphysics*. Oxford 347-380. Reprinted in K. Korman, & E. Sosa (eds.) *Metaphysics: An Anthology, 2nd edition* (2011). Blackwell, 73-96.

pursues its investigations *a priori* but, while resisting scientism, retains respect for science since the role of metaphysics is to enlighten features of reality that the empirical/scientific enquiry inevitably presupposes.[4]

Inevitably, this work shall form part of E.J. Lowe's legacy and scholarship. His lesson and vision is of a metaphysics of the understanding rather than puzzle-solving: an approach guided by a constant sense of puzzlement, fascination and bewilderment at the existence and nature of reality; a relentless questioning of our assumptions devoid of the need to manipulate them.

As Wilfrid Sellars once put it:

> "The aim of philosophy, abstractly formulated, is to *understand* [my italic] how things in the broadest possible sense of the term *hang together* [my italic] in the broadest possible sense of the term."[5]

In this work, I shall endeavour to apply this elusive catchline to Lewis' paramount characterisation of persistence as '[s]omething persists iff, somehow or other, it exists at various times'[6]. Thus, on a first general and abstract level of enquiry, one of the issues I shall ideally be looking at is indeed what *some* of the notions nominally embedded in Lewis' phrase - something, *time*, and *persistence* - stand for, and how one motivates the others.[7] A great deal of effort has been put into the question of *how* things (in a very

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[4] Lowe, E.J. (1998). *The Possibility of Metaphysics*. Oxford: Oxford University Press, 3-8; (2002) *A Survey of Metaphysics*. Oxford: Oxford University Press, 5-7.

[5] Sellars, W. (1962). "Philosophy and the Scientific Image of Man". In R. Colodny (ed.) *Frontiers of Science and Philosophy*. Pittsburgh, PA: University of Pittsburgh Press: 35-78. Reprinted in (1963). *Science, Perception and Reality*. London: Routledge & Kegan Paul Ltd.

[6] Lewis, D. K. (1986). *On The Plurality of Worlds*. Oxford: Basil Blackwell, 202.

[7] For the record, and because I am aware that there might be a slight sense in which I raise the reader's expectations without fully meeting them, the enquiry into *something* will not be pursued in this thesis. The reason is mere convenience: *something* (or what I shall call a 'subject of persistence') is traditionally linked to theories of substance, in all the various ways in which substance is metaphysically understood. To include them into the project would certainly be rewarding but at the same time it would add to the project even a wider scope which might render it too ambitious, and consequently difficult to handle. The topic of theories of substance is worth by itself a doctorate project or two.

general sense of the term) do persist but less into understanding if and how those notions affect one another.[8]

Curiously though, in addition to the notions highlighted above, Lewis' characterisation of persistence contains three further philosophically significant concepts which I believe are as crucial as the previous ones in achieving an adequate understanding of persistence. These are notions which have been regrettably overlooked in the literature: namely, those of *existence*, *identity*, and *change*. It seems to be quite obvious that existence should be included in the investigation - recall Lewis' phrase 'something persists iff, somehow or other, it *exists* at various times': clearly, an entity must primarily exist at all if it exists at one time, and then, allegedly, at others. It might be less obvious that the notions of identity and change should be important in this investigation. But first, it must be recalled that an alternative, perhaps roundabout way, to talk of persistence is in terms of *identity over (or across) time*: after all, for something to genuinely persist is for *it* to exist at different times, as the *one and the same* thing. Had it been a different thing (in the sense of numerically different) at different times it would make very little sense to say it persisted.[9] How then the phrase 'one and the same' is cashed out in the literature is quite contentious, however this difficulty should not rule out identity as a legitimate component of the definition. Lastly, despite the fact that change is an ubiquitous and familiar feature, it may take some effort to spot it lurking underneath Lewis' characterisation, therefore a small amount of philosophically harmless thinking-hard-enough-in-the-right-sort-of-way is required.

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[8] See for example: Chisholm, R. (1976). *Person and Object: A Metaphysical Study*. La Salle: Open Court Publishing Co.; Armstrong, D.M. (1980). "Identity Through Time", in Peter van Inwagen, (ed.) *Time and Cause: Essays Presented to Richard Taylor*. Dordrecht: D. Reidel. pp. 67-78; Lewis, D. K. (1986). *On The Plurality of Worlds*. Oxford: Basil Blackwell, 202; Heller, M. (1990). *The Ontology of Physical Objects: Four Dimensional Hunks of Matter*. Cambridge: Cambridge University Press; van Inwagen, P. (1990). *Material Beings*. Ithaca: Cornel University Press; Oderberg, D. (1993). *The Metaphysics of Identity over Time.* New York: St Martin's Press; Rea, M. (1997). *Material Constitution.* Lanham: Rowman and Littlefield Publishers. Mellor, D.H. (1998). *Real Time II*. London: Routledge; Gallois, A. (1998). *Occasions of Identity.* Oxford: Clarendon Press; Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press; Sider, T. (2001). *Four Dimensionalism. An Ontology of Persistence and Time*. NewYork: Oxford University Press.

[9] Although, as recently claimed by few people, this might turn out not to be the case. See Sider (2001), *Four Dimensionalism. An Ontology of Persistence and Time*. NewYork: Oxford University Press; (2000). "Recent Work on Identity Over Time". *Philosophical Books* 41: 81-89; (1997). "Four Dimensionalism". *Philosophical Review* 106: 197–231; (1996). "All the World's a Stage". *Australasian Journal of Philosophy* 74: 433-53. Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press. Varzi, A. (2003). 'Naming the Stages', *Dialectica* 57: 387-412. Though even these writers seemingly try to capture something of the notion of identity over time through, for example, making temporal parts the parts of a specific continuant.

Something persists if and only if it exists at various times: there is a remarkable turnover in the features that things exhibit over time, a piece of wax is soft and fluid at one time (when heated) but solidifies at a later time (upon cooling).[10] For some reason, we talk as if the piece of wax were one and the same, therefore the piece of soft wax becoming solid changed from exhibiting a 'soft' feature (being soft) to exhibiting a 'hard' one (being hard). Broadly speaking, this is what we experience on a daily basis. Therefore, I believe a reader who is metaphysically unsympathetic to change shall not charge me of inaccuracy or partiality, not at this stage anyway, and if possible not at later stages either. To conclude, for a thorough and hopefully sound understanding of the persistence of material objects, in addition to *something*, *time*, and *persistence* in Lewis' definition, also *existence*, *identity*, and *change* are notions which seemingly deserve investigation.[11]

In pursuing the investigation exposed above, as a guideline, I shall draw upon an article by Lowe which regrettably has somehow been overlooked.[12] His thesis is quite clear:

> "as far as metaphysics is concerned, questions concerning the nature of time are *more fundamental* [my italic] than, or at least *prior* [my italic] to, questions concerning the nature of persistence."[13]

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[10] See Descartes' wax example in the Second Meditation in Descartes, R. (1911). *Meditations on First Philosophy*. In E.S. Haldane (Trans.) *The Philosophical Works of Descartes*. Cambridge: Cambridge University Press, 16.

[11] For convenience's sake, what shall be pursued in the course of the thesis is mainly the relationships, if any, between theories of persistence and time and their branching into the notion of existence (remarks about identity will be made but to a lesser extent. There is also a sense in which change seems to be already investigated insofar as existence, identity, and time are).

[12] Lowe, E.J. & McCall, S. (2006). "The 3D/4D controversy: a storm in a teacup". *Noûs* 40: 570-8; (2006). "3D/4D equivalence, the twins paradox, and absolute time". *Analysis* 63: 114-23; Lowe, E.J. (1987). "Lewis on Perdurance Versus Endurance". *Analysis* 47:152-4; (2006). "Endurantism versus perdurantism and the nature of time". *Rivista di Filosofia Neoscolastica* 4: 713-27.

[13] Lowe, E.J. (2006). "Endurantism versus perdurantism and the nature of time". *Rivista di Filosofia Neoscolastica* 4: 715-6.

In conversation we agreed that in addition to this, perhaps questions about the nature of persistence and time could be further clarified through a careful understanding of very basic and ubiquitous notions like those of existence (and identity).[14]

To claim that an adequate understanding of questions about the nature of existence (and identity) precedes the understanding of questions about persistence does not correspond to a reduction of the latter to the former; in other words I shall not claim that the whole of the debate about persistence comes down to an analysis of the notions of existence, identity, and their relations, although to some extent I agree with Wasserman's claim that 'One's perspective on change is often determined by one's position in the broader philosophical landscape.'[15] Rather, I will contend that once we succeed in exposing the intuitions, implications, and commitments bolstering and entailed by a particular view on persistence and time, it might be possible to see that they motivate (top-down approach) a particular view of existence; so that it could then be possible from a particular view of existence to predict, and to some extent anticipate its bearings upon a view of time and persistence (bottom-up approach).[16] Consequently, a commitment to a particular view on existence (and identity) could have theoretical constraints when it comes to deciding upon an account of time and persistence.

Having said that, the general attitude by many metaphysicians towards ubiquitous notions such as existence, identity, and change has been traditionally quite

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[14] Surely, the understanding of persistence could be clarified further including into the investigation the 'subject of persistence' or what Lewis calls 'something' (limited to material objects for the purposes of the thesis but that if required could be easily extended to embrace other kinds of things). It seems to make quite good sense, at least to me, to know at first what kind of thing a thing is, and then speculate about whether or how it persists retaining some sort of identity over time. Different kinds of things may well persist in different ways - what in jargon is known as persistence conditions - if they persist at all. This however does not establish a preferential pattern in all similar cases; it may well be that sometimes knowing what the persistence conditions of a thing are could help to know what kind of thing that thing is. But as stated in footnote 6 and 11 I shall not pursue this topic further.

[15] Wasserman, R. (2006). "The Problem of Change". *Philosophy Compass* 1: 48.

[16] As I shall maintain in the following, I am not particularly sympathetic with a bottom-up approach in metaphysics, although I understand the desire and somehow the necessity for synthesis of human subjects of experience/knowledge.

dismissive. To this extent, I shall briefly recall how thinkers of the likes of Peter Unger[17], David Lewis[18], and others[19] belittle their status[20].

Speaking of the Sorites arguments (which conclude that there are no ordinary things) Unger urges that:

> "[t]he sorites argument just presented did not involve the notion of identity in any interesting way; we never said, or cared, *which* heap *was* [my italic] present. Indeed, if that idea is involved at all, which I doubt, it is only in the manner in which *any terribly general idea may be presupposed by, and involved in,* [my italic] any argument at all, or virtually any."[21]

Along similar lines, Lewis maintains that:

> "[...] we should not suppose that we have here any problem about *identity*. We never have. Identity is utterly simple and unproblematic. Everything is identical to itself; nothing is ever identical to anything else except itself. There is never any problem about what makes something identical to itself; nothing can ever fail to be. And there is never any problem about what makes two things identical; two things never can be identical."[22]

And famously Quine on the topic of existence states that:

> "Existence is what existential quantification expresses.There are things of kind *F* if and only if (∃*x*) *Fx*. This is unhelpful as it is undebatable, since it is how one

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[17] Unger, P. (1979). "There Are No Ordinary Things". *Synthese*, 41, 2, 117-154.

[18] Lewis, D. K. (1986). *On The Plurality of Worlds*. Oxford: Basil Blackwell, p. 192-3.

[19] Quine, W.V.O. (1950), "Identity, Ostension, and Hyposthasis". *The Journal of Philosophy* 47: 621. Quine, W.V.O. (1987). Quiddities: An Intermittently Philosophical Dictionary. Cambridge, MA: Harvard University Press. Armstrong, D.M. (1978). *Universals and Scientific Realism*, 2 vols. Cambridge: Cambridge University Press. Armstrong, D.M. (1989). *Universals: An Opinionated Introduction*. Westview Press. Armstrong, D.M. (1997). *A World of States of Affairs*. Cambridge: Cambridge University Press. Amstrong, D.M. (2004). *Truth and Truthmakers*. Cambridge: Cambridge University Press. Baxter, D.L.M. (1988*a*). "Identity in the Loose and Popular Sense". *Mind* 97: 575-82. Baxter, D.L.M. (1988*b*). "Many-One Identity". *Philosophical Papers* 17: 193-216. Baxter, D.L.M. (1989). "Identity through time and the discernibility of the identicals". *Analysis* 49: 125-131. Baxter, D.L.M. (1999). "The Discernibility of the Identicals". *Journal of Philosophical Research* 24: 37-55. Baxter, D.L.M. (2001*a*). "Loose Identity and Becoming Something Else". *Noûs* 35: 592-601. Baxter, D.L.M. (2001*b*). "Instantiation as Partial Identity". *Australasian Journal of Philosophy* 79: 449-464.

[20] As for existence see Quine, W.V.O. (1948). "On What There Is," *Review of Metaphysics*, 2: 21–38. Reprinted in his *From a Logical Point of View*, Cambridge, MA: Harvard University Press, 1953; van Inwagen, P. (2003). "Existence, Ontological Commitment, and Fictional Entities". In Michael J. Loux & Dean W. Zimmerman (eds.), *The Oxford Handbook of Metaphysics*. 131-57; (1998). "Meta-Ontology". *Erkenntnis*, 48, 233-50. Hirsh, E. (2011). *Quantifier Variance and Realism: Essays in Metaontology*. New York: Oxford University Press, xii; Sider, T. (2011). *Writing the book of the world*. Oxford University Press, 175.

[21] Unger, P. (1979). "There Are No Ordinary Things". *Synthese*, 41: 118.

[22] Lewis, D.K. (1986). *On the Plurality of Worlds.* Oxford: Basil Blackwell, 192-3.

> explains the symbolic notation of quantification to begin with. The fact is that it is unreasonable to ask for an explanation of existence in simpler terms. We found an explication of singular existence, '*a* exists,' as '($\exists x$) x=a'; but explication in turn of the existential quantifier itself, 'there is,' 'there are,' explication of general existence, is a forlorn cause."[23]

It is philosophically interesting to contrast it with Lowe's claim (in keeping with Bertrand Russell)[24] that:

> "[Philosophical Logic is] the philosophical elucidation of those *notions that are indispensable* [my italic] for the proper characterisation of rational thought and its contents. The notions in question are ones like those of reference, predication, *identity* [my italic], truth, negation, *quantification*, *existence* [my italic], necessity, definition and entailment. These and related notions are needed in order to give adequate accounts of the structure of thoughts—particularly as expressed in language—and of the relationships in which thoughts stand both to one another and to objects and states of affairs in the world."[25]

It is interesting how one philosopher's dismissive attitude towards 'terribly general ideas' becomes 'notions that are indispensable' for another. Perhaps just an instance of the idea that one philosopher's *modus ponens* is another's *modus tollens*. In any case, I shall leave it to the reader to decide which party to join. I hold that, in keeping with Lowe and Russell, we should care for them. And this is one thing among others I shall attempt to argue for in this thesis.

Persistence and time are paramount topics, as well as extraordinarily large, in metaphysics. This is evinced by the extensive literature on the topics, and their inclusion in many surveys or introductory books about metaphysics.[26] Therefore, in order to form a project appropriate for a thesis, I shall limit the scope of my research narrowing the

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[23] Quine, W.V.O. (1969). *Ontological Relativity and Other Essays.* New York: Columbia University Press, 97.

[24] "Some kind of knowledge of logical forms, though with most people it is not explicit, is involved in all understanding of discourse. It is the business of philosophical logic to extract this knowledge from its concrete integuments, and to render it explicit and pure." Russell, B. (1914). *Our Knowledge of the External World*. London: George Allen and Unwin, 53.

[25] Lowe, E.J. (2000). *Philosophical Logic*. Durham : Durham University Philosophy Department, 1.

[26] See Lowe, E.J. (1998). *The Possibility of Metaphysics*. Oxford: Oxford University Press, Ch. 4, 5; (2002) *A Survey of Metaphysics*. Oxford: Oxford University Press, Ch. 2, 3, 4. Loux, M.J. (2013). *Metaphysics: A Contemporary Introduction. Third edition.* New York: Routledge, Ch. 6. van Inwagen, P. (2014). *Metaphysics. Fourth edition*. Westview Press; van Inwagen, P. & Zimmerman, D.W. (eds.) *Metaphysics: The Big Questions*. Malden, Mass.: Blackwell Publishers Ltd. 1998, 67-220.

enquiry down to addressing three main questions, each related to the other: one general, and two more specific. The general one, stemming from what has been said so far, is whether and how some of the notions embedded in Lewis' definition of persistence - persistence, time, and existence - motivate one another. It is worthwhile noting that embedded within the general question is also the important issue regarding the interplay, if any, between theories of persistence and time. It has been argued that nothing hampers any theory of persistence to combine with any theory of time.[27] The thesis I shall argue for is instead that, after careful analysis it appears that there are some constraints which favour some combinations whilst hindering others; in particular, if the ontological implications of specific theories of persistence, time, and existence are teased out - that is, how they see reality - there is a sense in which one motivates the others. For example, there are aspects of perdurance that entail eternalism, an entailment not present between perdurance and presentism:[28] more specifically, the intuitive grasp that we have on temporal parts as posited by perdurantism, relying on analogies between space and time, as it will be claimed later on; clearly motivates an eternalist outlook. A combination which in turn motivates a Quinean view of existence, once the ontological inplications of the three views are adequately unpacked.

The first specific (or less general) question shall investigate in what ways, if any, theories of persistence motivate theories of time, and most importantly whether and how both motivate theories of existence.[29] For the second specific question, I shall introduce

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[27] Brogaard, B. (2000). "Presentist Four-Dimensionalism". *The Monist* 83: 341-56. Sider, T. (2001). *Four Dimensionalism. An Ontology of Persistence and Time*. NewYork: Oxford University Press, Ch. 4. See also Miller, K. (2005). "The Metaphysical Equivalence of Three and Four Dimensionalism". Erkenntnis 62: 91-117. For a different approach more in keeping with mine see Lowe, E.J. (2006). "Endurantism versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 713-27.

[28] See Brogaard, B. (2000). "Presentist Four-Dimensionalism". *The Monist* 83: 341-56. Brogaard argues that "contrary to what is usually believed, four-dimensionalism does not entail a changeless world." Brogaard's paper, together with its cogent conclusion, brings up important as well as contentious issues regarding the status of theories of persistence, time and their interplay. I believe that there is some confusion with metaphysical, epistemic, and linguistic issues, specifically between presentism and 'taking tense seriously'. In the part of this thesis which concerns Time (Part II), I will argue that there is a sense in which a presentist four-dimensionalism betrays what presentism and four-dimensionalism convey and imply.

[29] I suddenly dropped 'identity' since the main focus will be on existence; although I shall hint at 'identity' very frequently throughout the thesis. The reason why I decided to leave it behind is merely practical and to contain the breadth of the enquiry.

Lowe and McCall's thesis [30] of the equivalence between a 3D or endurantist view of reality, and a 4D or perdurantist:

> "The thesis of 3D/4D equivalence states that objects of the physical world can be described using either 3-dimensional or 4-dimensional language, and that the descriptions are equivalent in the sense of intertranslatable. Furthermore, there is no 'fact of the matter' in the world which makes one of the descriptions true and the other false."[31]

And:

> "For some purposes the 4D picture is more illuminating [...] and for others purposes the 3D picture is preferable. But ultimately it makes no difference which ontological position we adopt. The intertranslatability of 3D and 4D descriptions of the world enables us to move from one ontological stance to the other with ease and confidence. The 3D/4D controversy is indeed a "storm in a teacup"."[32]

It might well be the case that the 3D/4D controversy is not genuine.[33] Disregarding for a moment Lowe & McCall's argument, and going back to Lowe's 2006 article quoted early on[34], the idea is that the equivalence holds insofar as time is seen as *extended*, or a *dimension* in which reality somehow *extends*.[35] Therefore, the second specific question shall investigate, from a philosophical point of view, the idea that time is somehow extended; and examine how we could make sense of it. More specifically, perdurance as

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[30] Lowe, E.J. & McCall, S. (2006). "The 3D/4D controversy: a storm in a teacup". *Noûs* 40: 570-8. Lowe, E.J. & McCall, S. (2003). "3D/4D equivalence, the twins paradox, and absolute time". *Analysis* 63: 114-23.

[31] Lowe, E.J. & McCall, S. "3D/4D equivalence, the twins paradox, and absolute time". *Analysis* 63: 118.

[32] Lowe, E.J. & McCall, S. (2006). "The 3D/4D controversy: a storm in a teacup". *Noûs* 40: 577. For completeness' sake, I shall take 4D as a shortcut for the view according to which ordinary material things are extended in four dimensions, they take up time as they do with time. Conversely, I shall take 3D to mean the thesis according to which ordinary material things extends in the three dimensions of space only, that is they do not extend in time.

[33]See also Miller, K. (2005). "The Metaphysical Equivalence of Three and Four Dimensionalism". *Erkenntnis* 62: 91-117. For a criticism to the equivalence thesis see Haslanger, S. (1994). "Humean Supervenience and Enduring Things". *Australasian Journal of Philosophy* 72: 339-59. For the record, I see McCalls & Lowe's point (although I might disagree) but I struggle to understand Miller's.

[34] Lowe, E.J. (2006). "Endurantism versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 713-27.

[35] *Ibid.* 716. "[...] if one thinks of time as being a dimension, then the same underlying temporal reality supports, equally well, a description of persistence in terms of either '4D space-time worms', 'momentary 3D stages', or 'enduring 3D objects'. [...] Fourth and most importantly, I believe that time should *not* in fact be thought of as being any kind of dimension and as a consequence of this believe that only certain variety of endurantism can be the correct account of persistence." I shall not commit myself to Lowe's fourth claim. I shall take advantages of Lowe's framework but not of his conclusions since the purposes of this thesis are to understand rather than to establish.

a theory of persistence, with its commitment to a four-dimensional view of reality, seemingly entails such an *extended* view of reality; a view which in turn seems to motivate a picture of reality similar to the one which eternalism as a theory of time suggests. But what exactly do perdurantists and eternalists mean? How does one motivate the others? If they do, in virtue of what? Finally, how does the interplay between perdurance and eternalism motivates a specific view of existence?

The three questions exposed above, which are distinct but intimately related as I have tried to make clear, shall correspond to three equally distinct but intimately related strands in the thesis. Although distinct, the three questions will not be addressed independently one by one; this I believe would defeat the claim of their being intimately related. What I shall suggest instead is that one should see them as three different layers which interplay and overlap to a higher degree; so the endeavour will be to unpack them showing how intertwined they are and how they motivate one another. Admittedly, the strategy deployed in this thesis to achieve the pointers outlined above might look a little unconventional: investigating *theories* of persistence, time, and existence may sound too broad. What I shall offer is instead more substantial: how a specific theory of persistence, perdurance, motivates a specific theory of time, eternalism, and finally how the combination of perdurance and eternalism motivates a view of existence *a là* Quine.

My own sympathy goes for perdurance despite finding it somehow wanting. I am a keen perdurantist since I think that such a doctrine is a paradigmatic example of a theory which acknowledges two of what I take to be the most forceful styles of philosophising: empiricism and rationalism. Against traditional scholarship, I believe that the two are two indispensable ways to look at the same thing, to wit reality.
For instance, Lennon has it that:

> "Empiricists seek to know the way the world *is* [...] in order to produce a description [of it]. By contrast, rationalists already know the way the world is. [They] instead seek to know *why* the world *must* be the way it is. Their theories are thus prescriptive instead of descriptive."[36]

> "If the underlying impulse of rationalists, prior to all argument, is the visceral conviction that the world could not have been otherwise, the empiricists' conviction is that the world inexplicably just is the way it is. Thus the defining

[36] Lennon, T.M. (2005). "The Rationalist Conception of Substance". In A. Nelson (ed.) *A Companion to Rationalism*. Blackwell Publishing Ltd. 12-30.

> commitment of empiricism to experience as the ultimate source of all knowledge is in fact posterior to its initial impulse. Experience of the world is needed because reason does not tell, or is not told, why it must be as it is."[37]

The different impulses seem to mirror how the two look at the world:

> "[The] empiricist conviction is that the world is multiple, diverse, and complex. There are many things in the world, they differ in many ways, and it is not clear how they relate to one another. [...] The rationalist impulse is in response to a perceived unity, uniformity, and simplicity in the world; to rationalists, the world seems to hang together and form a coherent whole."[38]

At first blush, reality looks heterogeneous, uneasy to be grasped, scattered, if not haphazard; but from an alternative perspective it looks as if that sheer heterogeneity could be easily tamed; there seem to be connections between distinct things, multiplicity and complexity seem to be able to be understood in terms of unity and simplicity. It just appears to me as a reasonable way to look at things, and the subtlety lies precisely in the precarious balance between the two. Of course, the dialectic between empiricists' descriptions and rationalists' prescriptions ought to be taken with a grain of salt, particularly if carried over to the contemporary debate. But this is something I shall put to one side now and keep for later on in the thesis.

On the other hand, perdurance does seem to somehow resist my attempts to tame it, to present it as a well-grounded philosophical world view in general, and as a theory of persistence in particular. It is said to settle brilliantly all sorts of puzzles, and philosophically difficult situations but ultimately there remains a sense in which when it comes to regimentating the intuitive grasp we have on temporal parts and the analogy between space and time which lies in the background of the notion of temporal parts, perdurance does not seem to be able to fully withstand scrutiny. This though, as pointed out above, does not immediately rule out perdurance from being a legitimate contender in the field of theories of persistence.

A further interesting question which has been looked into only *en passant* in the literature is how some of those concepts lined up above, to wit 'persistence', 'time', and 'existence', square with common sense and intuitions - our assumptions as it were.

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[37] *Ibid*.

[38] *Ibid.* 12-3.

(This question is particularly important given the conception of metaphysics outlined at the outset). Intuitions and common sense considerations are seemingly the raw materials we have before we begin any philosophical investigation. However, they should never have the last word when it comes to assessing the goodness of a piece of philosophy. An alleged agreement or disagreement between those philosophical concepts and our common sense and intuitions would rather be a promise or an indication whether the direction the enquiry is heading *could* be profitable. In fact, what I shall endeavour to show is that contrary to what detractors of temporal parts believe, there is in the background of the notion a solid core which draws upon intuitions and common sense considerations. Curiously, as I shall argue, such a core of intuitions and common sense considerations will end up motivating a specific view of time, and the combination of both a specific view of existence. Therefore, the reference to intuitions and common sense considerations (as a starting point) will be a recurring feature throughout the thesis.

In relation to this, what will perhaps transpire from the thesis is, apart from the idea that I might be an unconventional perdurantist, a profound sense of scepticism, specifically towards some of the themes and topics relevant to this enquiry. I employ the term 'scepticism' and the adjective 'sceptical' in the sense of a personal disposition towards doubt or incredulity of the facts put forth, rather than as the doctrine that claims the impossibility of true knowledge of things or that all knowledge is uncertain. I am myself quite certain and confident that knowledge is possible, but I am unimpressed by the methodological attitude which, at present, seems to suggest that how we know (epistemology) branches directly into the way things are (metaphysics). If I am correct, the mainstream of contemporary analytic philosophy which I am alluding to makes a very good case in favour of my sceptical impulse.

I shall now consider why this research project should be deemed interesting and therefore deserve credit. A strong case for it has been made so far outlining the three questions it purports to address; therefore the relevance, novelty and original contribution of this work should be clearer by now. However, it may be instructive to summarise it as follows: at first, in how 'persistence', 'time', and 'existence' motivate one another. Secondly, in how a specific theory of persistence, perdurance, motivates a specific view of time, eternalism; and how both motivate a Quinean view of 'existence'.

Two issues which have been overlooked in the contemporary debate.[39] My suspicion is that some of the nowadays' fashionable theories of how material objects persist through time may not wear all their cost on their sleeve; e.g. entailing, as an unbecoming burden, a specific view of time, and of existence. This ought to be exposed so that we are aware beforehand what we would have to commit to if we decide to endorse one or another.

Secondly, the trend that philosophical enquiry has followed in recent years is quite clear: setting aside the more or less contingent reasons why it happened, at least in philosophy, when it comes to the topics of investigation, the tendency has gone toward a very specific and restricted field of enquiry. Most if not all the big questions in philosophy are then put on hold (if not neglected) or allegedly broken down into smaller ones, easier to attain, so that they result more interesting and attractive. Surely, this approach sounds appealing as well as scientific. To mark off a narrow domain of enquiry and pursue it in detail. But philosophy, I maintain, is not science nor it should be (although in the recent past quite a few attempts have been made in that direction). Such a piecemeal approach to philosophical matters, which I already took issue with at the outset of this Introduction, although extremely successful for publishing purposes, may turn out less favourable when the goal is actually to tackle philosophical questions *tout court*, in particular composite and complex ones like persistence, time, substance, and the likes. What the allegedly scientific piecemeal approach inevitably loses is a proper grasp of the topic which only the wider outlook of traditional philosophy could guarantee. A broader stance which is crucial when the task to be accomplished is to individuate and clarify the ontolgical implications and connections between distinct objects of enquiry. Specifically, the connections between a view of persistence (perdurance), and time (eternalism) on the one hand; of our ordinary grasp of notions like change, the analogies between space and time (or the lack of it) on the other; and lastly the connections between the resulting combined theory of persistence and time and a view of existence as Quine's.

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[39] One of the few instances in which existence is brought in is Tallant, J.C. (2014). "Defining Existence Presentism". *Erkenntnis* 79: 479-501. See also Merricks, T. (2007). *Truth and ontology*. Oxford: Oxford University Press, 123-5; and Zimmerman, D. (1996). "Persistence and Presentism". *Philosophical Papers*: 25, 115-26. The sense in which I think existence is part and parcel is different from those as I shall try to explain in the following. In addition, what I would like to stress is the novelty in the approach to these issues, that is instead of the traditional bottom-up, say from theories of time to theories of persistence, I shall pursue a top-down investigation, namely from theories of persistence, to theories of time, and in turn to theories of existence.

If this is the case, then the attempt to solve single puzzles like the Ship of Theseus or McTaggart's paradox is, of course of great interest, but not conducive to what the thesis should like to achieve, in the sense advertised above. Single puzzling situations are small pieces of the overall jigsaw puzzle which is reality. Reality which begins to emerge only when the question about the ontological implications and connections of and between apparently distinct 'existences' is suitably pursued and addressed. A puzzle could be solved through a fair amount of fine hair-splitting but in the end we would still be wondering about its place in the whole picture. Perhaps, the objection goes, the next step towards that sort of overarching understanding of reality could be to solve another puzzle, perhaps one after another, constructing reality as a results from these narrow domains of enquiry. I must confess I am not a keen extensionalist[40] in general and I struggle to grasp what 'Composition As Identity'[41] (CAI) is about, even in its weaker variety; thus I do not think that this strategy ultimately succeeds. In particular, (i) it is still to be demonstrated that a collection of perspectival approaches jointly taken is able to attain a general, wider, stance on a topic; and (ii) it is not clear how that piecemeal approach could address the crucial question concerning the implications and connections among distinct 'existences' when the object of its enquiry is by definition a single 'existence'. To clarify, pursuing these subtopics only, one overlooks whether the solution offered to a puzzle is compatible with or affects the one offered to another. But this is crucial: if it is not clear which the relationships between one and the other are (to wit the implications and connections emphasised so far), then plausibly the way the world is cannot be accurately captured since what reality is fundamentally about is what is invariant under different frames of reference. This is why investigating the implications and connections is decisive, and the narrow scope of contemporary philosophical investigation does not seem conducive to that. Moreover, this focus prevents one from using insights gained in considering one case, from aiding the consideration of another. For example, it has been traditionally argued that eternalism entails perdurance. Although this might not be my preferred way

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[40] Extensionalism is the thesis that sameness of composition is sufficient for identity. See for example Varzi, A. (2009). "Universalism entails Extentionalism". *Analysis* 69: 599-604.

[41] "The intuitive notion that the whole is 'nothing over and above' its parts - that the whole is the same as its parts - may be clarified by claiming the whole is identical, in some sense or other, to its parts. This is the thesis of composition as identity (CAI)." See Cotnoir, A.J. (2014). "Composition As Identity: Framing the Debate". In D.L.M. Baxter & A.J. Cotnoir (eds.) *Composition as Identity*. Oxford: Oxford University Press, Ch. 1. See also D.L.M. Baxter (1999). "The Discernibility of Identicals". *Journal of Philosophical Research* 24: 37–55. Lewis, D. (1991). *Parts of Classes*. Oxford: Basil Blackwel. Baxter, D.L.M. (1988*a*). "Identity in the Loose and Popular Sense". *Mind* 97: 576-82; (1988*b*). "Many - One Identity". *Philosophical Papers*17: 193–216.

of framing the relationships between the two theories (distinct existences) it nevertheless remains the case that if the former entails the latter, the entailment would illuminate another reason (invariant) in which perdurance motivates eternalism.

Therefore, I shall advocate in favour of an old-fashioned way of doing philosophy, an *holistic* approach (in keeping with what I claimed at the outset about metaphysics as a discipline) in which the understanding of how things motivate one another on a very general level is prior. Only at that level of abstractness one could have an appreciation of whether the lesser parts require investigation, and also how deep the investigation has to be. The history of philosophy is one in which systematic metaphysics has had a great impact and, to this extent, my attempt at such methodology at least has precedent. Further, the tasks I have set myself are specific and may have answers that determine the course of future research (e.g. showing certain combinations of ideas to motivate others or not) even if they do not settle the matter once and for all. Lastly, this approach explains and addresses the potential question of why only a restricted number of arguments for perdurance and eternalism will be considered in detail in the thesis.

So much for what this work is about. I shall now briefly outline what it shall not be. Paraphrasing Peter Unger, it shall not be my concern here to argue whether there are any people, or conscious beings. I shall only be after mere *things*, and among these mere things, I shall only consider those which are not living or alive: namely *ordinary inanimate objects*. To clarify, nothing fundamental depends upon any such division; it serves merely to restrict my topic conveniently.[42] No persons, no living things or organisms, just ordinary inanimate objects: 'chairs, tables, pictures, books, flowers, pens, cigarettes.'[43], 'pieces of furniture, rocks and stones, planets and ordinary stars, and even lakes and mountains.[44] As soon as people are included, further complexity is added but again nothing fundamental depends upon it for the overall purposes of the thesis; there is a chance of benefit by adopting this restriction, and little chance for loss in the current project.

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[42] Unger, P. (1979). "There Are No Ordinary Things". *Synthese* 41: 117-54.

[43] Austin, J.L. (1962). *Sense and Sensibilia*. OUP. p. 7-8. Although flowers could be a tricky examples since they may qualify as living things.

[44] Unger, P. (1979). "There Are No Ordinary Things". *Synthese* 41: 119. See also Quine, W.V.O. (1960). *Word and Object*, Cambridge, Mass.: M.I.T. Press, 1. Although the usage of the expression 'ordinary things' is similar in Quine and Unger, at rock bottom, the former believes that there are such objects, the latter thinks that there are not.

It shall also be at no point an attempt to adjudicate one view over another. Casting doubt or raising questions concerning a particular view's assumptions, commitments, and how things in general motivate one another within a specific theoretical framework does not amount, straight away, to endorsing the opponent view. It is unfortunate but some of the current debate is framed in these terms. For example, take the philosophy of time. If one somehow argues against presentism then it seems she must endorse eternalism for *tertium non datur* (and the same *mutatis mutandis* holds for the A- and the B-theory).[45] Interestingly, there could be a *tertium*, as I shall argue, so that the focus is steered away from the 'opposition approach', towards the understanding of what is going on at a more general level. Such 'opposition approach' is surely convenient when it comes to frame an ongoing discussion which has grown disproportionally, (see philosophy of time and/or persistence) but invariably it ends up overlooking some important features and commitments which those theories actually share; or what can be thought of as a red thread (or the small print) that theories bear to other theories; e.g. if and how one motivates or suggests the other. Therefore, in keeping with Lowe's vision, I shall pursue an approach which favours the understanding of the positions over the drawing of the oppositions.

Although I said that I shall take common sense and intuition seriously, at no point will the thesis prioritise these, either pre-theoretical or informed as it were, over a scientific or rational methodology and conclusions (in a very general sense of the terms).[46] Common sense looks to me far from being simply non-scientific or non-rational, and so too are our intuitions. However, both appear to have had changing fortunes in the contemporary debate. Common sense and most of our intuitions are often considered a veil laid down over reality. As soon as the veil is removed, reality stops playing tricks on us, or so they claim. I am quite open about whether common sense and intuitions are generally misleading, surely they are to a certain extent but I do not buy into the conclusion that since they sporadically happen to be so then they

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[45] See chapter 2.2 below.

[46] The statement is as contentious as it gets. Of course, there is a question about what makes a methodology scientific, and what makes it rational. It might not be that what makes one the case makes the other, and *vice versa*. In addition, there is also a question whether there is a contrast between common sense and intuitions on one hand, and science and rationality on the other. Lastly, there is a question whether we can legitimately couple common sense and intuitions on one side, and science and rationality on the other. For all these considerations, I recommend the reader to take the statement with a grain of salt. I readily admit that the distinction referred to here may not be perfectly clear, though I intend on making use of a ready-made sense in which we understand the alleged opposition between the two impulses.

hopelessly are. A relentless and constant comparison with what we take to be the case is unavoidable for a healthy investigation into the fundamental structure of reality.

At this stage, perhaps, given that I have been mentioning common sense and intuitions for a little while, it might be convenient to briefly give a few pointers about my take on them. First of all, regarding intuitions, two different readings/interpretations seem to be at play here: i) a broad reading, according to which intuitions are uncritical, pre-theoretical beliefs; and ii) a narrower interpretation such that intuitions amount to intellectual seemings.[47] I believe both i) and ii) could be needed although perhaps only the latter may be crucial for the purposes of a metaphysical investigation. Registering what we pre-theoretically, unreflectively, and uncritically believe of *p*, the objection goes, yields a view of intuitions as some sort of supernatural power or voice that from inside tells something about *p* which may be interesting but also somehow bizarre. Indeed, the term is doubtlessly misleading, particularly upon a modern reading since it may convey the idea that 'some non-rational or non-cognitive faculty - a kind of hunch - is involved.'[48] But 'intuition', from the Latin term *intueri* means literally to 'look at' or 'look upon', that is 'if an intellectual object (such as a triangle, or the number two) is sufficiently simple, then we can, with our mind's eye, just 'see' certain truths about that object [...].' I must say that I omitted on purpose the rest of the statement from the quote, namely when Cottingham affirms that 'just seeing certain truths about an object happens in a way that leaves no possible room for error' because I am not quite sure how far we can go with this. Also, it must be noted that the conception highlighted above is preliminary to Descartes' 'clear and distinct ideas', an aspect of his system which is not pertinent to my current purposes. Thus, what I would like to keep is the 'just see' sense that attaches to intuitions with the caveat that what we happen to see *could* be somehow revisable in the light of the fact that what Descartes said about triangles and numbers, abstract entities, may apply slightly differently to different contexts, for example persistence's issues which are no doubt less abstract and simple than those above.

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[47] Bealer, G. & Strawson, P.F. (1992). "The Incoherence of Empiricism". *Proceedings of the Aristotelian Society, Supplementary Volumes*. 66: 99-143.

[48] Cottingham, J. (1998). *A History of Western Philosophy: 4 The Rationalists*. Oxford: Oxford University Press, 35. Descartes' Fifth Meditation in Descartes, R. (1911). *Meditations on First Philosophy*. In *The Philosophical Works of Descartes*. Trans. by E.S. Haldane. Cambridge: Cambridge University Press.

Also, the thesis shall not be the umpteenth praise of what is well-known as *bottom-up* metaphysics. I tend to disagree with the compositional or extensional view of reality which has come to the fore in recent years. Peter van Inwagen[49], trying to discipline a long-standing dispute that was thriving dramatically set the agenda of the debate on composition so that nowadays whoever wishes to look at that topic ought to come to terms with his terminology and framework. I believe van Inwagen's remarks and insight are eminently cogent, altogether with the need to regimenting a topic which deserved profound understanding and ordering. However, at the end of the day I cannot help to feel that there remains a sense in which van Inwagen, conceptually, followed the wrong way round. Van Inwagen famously set up two composition questions, a special and a general one. Although two different questions - one wonders under what circumstances the *xs* compose *y*[50] whereas the other asks what composition is[51] - in a sense they both presuppose an extensional approach as a way to metaphysical understanding: one which starts from the parts and goes all the way up to the wholes. Surely, this way about seems to be quite common sense and promising, after all it seems to be very well supported by our intuitions about thinking and talking in terms of part and wholes: four legs and a top compose a table, a number of red bricks a wall, and so on and so forth; but also it seems to be bestowed by the conceptual apparatus and language of contemporary sciences, say Physics just to name one, in which the smallest bricks composing reality appear to be - at least at this moment in time - electrons and quarks, and everything that exists is made up by them.[52]

However, even though this picture may look compelling, there still remains a sense which my sceptical impulse wants to point to: the idea concealed at the heart of this way of looking at things is that there is a privileged way forward when it comes to accounting for whether and how *some things are made up by other things*. The issue here is rather the following: invariably, we start our scientific investigation from things which happen to be composite, tables, chairs, walls, houses, etc. and attempt to

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[49] van Inwagen, P. (1990). *Material Beings*. Ithaca: Cornell University Press, Ch. 2, 4.

[50] *Ibid*. 21.

[51] *Ibid*. 38.

[52] It is undeniably a contentious and perhaps incomplete statement. Whether it all comes down to those constituents or there is more than what meets the eye is debateable, see for example Ladyman, J. (2002). "Science, metaphysics and structural realism". *Philosophica*, 67: 57-76; (1998). "What is structural realism?" *Studies in History and Philosophy of Science*, 29: 409-24.

understand *how* they are the way they are.[53] Thus, when it comes to these issues, I think that the privileged way forward, if any, should be *decomposition* rather than composition. We pull apart a table, and realise that four legs and a top are its resulting parts after dismantling it; we pull apart a table leg and we realised that its resulting parts after decomposition are such-and-such, and so on and so forth. Suppose we end up with some sort of simple things so that the attempt to iterate the decomposition process fails - say the much sought after *rock bottom of reality*. At this point, it would be fair to say that via successive decomposition procedures from a table we reached some ultimative parts in which a table could be decomposed. The temptation to then run the whole process backwards is tempting, I can see the situation first-hand myself. But the question is: would we be allowed to claim that those ultimative parts compose - in van Inwagen's terminology - a table? In all fairness, I think we would need a fairly good story to go with the idea of just running the series of decomposition backwards: for example, for all we know, reiterate decompositions could bring about some sort of disturbance so that from one decomposition to another something may get lost, something that may not be gained back just running the decomposition back. If not actual, at least this scenario looks possible to me. We may not know for we may lack the required sensitivity to detect and register that sort of effect.

If this is conceivable, running the decomposition back up hoping to obtain the thing we started with is a bit of wishful thinking, or it presupposes some sort of heavy-duty metaphysical assumptions - something along the lines of that 'nothing gets missed during the decomposition', or that 'decomposition is just another name for top-down composition', etc. which require an awful lot of philosophical work to be cashed out rather than magical positing. Also the alleged appeal to the best sciences available sounds to me a bit pretentious, for all I know most of what we know, whether true, false, or ok for ordinary speeds and distances, began from an apple falling on somebody's head: an apple, an ordinary inanimate object; a person, an ordinary animate one. The way sciences approaching reality is similar to the way of decomposition[54], whether decomposition must then be dismissed further down the line is a substantive

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[53] I think it is fair enough to remark that sciences are after *how* something is the case whereas philosophy is about *why* something is the case.

[54] All I am trying to call the attention upon is decomposition as a metaphysical way about when it comes to investigate reality, such metaphysical way about I claim to be *top-down*. When it comes to the way of explanation, clearly the sciences' way is *bottom-up*, and this is perfectly fine with me since it is an epistemic issue rather than a metaphysical one.

metaphysical conclusion which requires a very good story, a robust metaphysical work, to be attained.

A curious feature of contemporary analytic metaphysics which arouses part of my scepticism is that it ultimately seems to be up to the single individual which view, among many, to buy into. Such an acknowledgement is strengthened by the fact that there seems to be a privileged way to go about when it comes to the metaphysical argumentation, namely the inference to the best explanation, or abduction. It is said that abduction is ubiquitous[55] although most notably the exact form as well as the normative status of abduction are still controversial. It is ubiquitous but we ignore the details. It is curious to observe that some of those philosophers cited above who maintained a dismissive attitude towards 'ubiquitous' and 'general' notions are now those who praise abduction as ubiquitous. Briefly, abduction is an inference in which the truth of the premises does not guarantee the truth of the conclusion. But then if metaphysics is after truth, then how the inference to the best explanation could be so privileged as a way about in metaphysics? The pursual (logical and methodological) of this issue, although interesting, is well beyond the remit of this work, and a suitable account would take up a lengthy digression. Therefore, the reader shall excuse my brevity if I decide not to follow up but just to throw it in the mix as evidence for my skeptical attitude. To conclude, as David Lewis puts it with exemplary clarity 'any competent philosopher who does not understand something will take care not to understand anything else whereby it might be explained.'[56]

So much for what turned out as a methodological sort of introduction. I shall now highlight the hard details of the project: I shall consider Lewis' characterisation of persistence as a general statement about what persistence consists in, the 'neutral word' as he put it.[57] I shall then propose that the bi-conditional 'something persists *if and only if* it exists at more than one time' could be seen as a sort of formula in which *persistence, time*, and *existence* are placeholders for philosophical theories of persistence, time, and the nature of existence respectively. Lastly, I shall venture that

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[55] On abduction see Peirce, C.S. (1931-58). *Collected Papers of Charles Sanders Peirce*. C. Hartshorne, P. Weiss & A. Burks (eds.) Cambridge, MA: Harvard University Press. Fann, K.T. (1970). *Peirce's Theory of Abduction*. The Hague: Martinus Nijhoff. Putnam, H., 1981. *Reason, Truth and History*. Cambridge: Cambridge University Press. See also Douven, I (2011). "Abduction". In *The Stanford Encyclopedia of Philosophy*, E.N. Zalta (ed.). URL = <http://plato.stanford.edu/archives/spr2011/entries/abduction/>.

[56] Lewis, D. K. (1986). *On The Plurality of Worlds*. Oxford: Basil Blackwell, 203.

[57] *Ibid*. 202.

within that formula there seems to be a red thread tying together views of persistence with views of time and existence. On my view, there seems to be a privileged way in which *perdurance* motivates *eternalism* and the combination entails a Quinean view of existence.

The general consensus, in particular after Sider's 2001 work on persistence[58] has it that there appears to be a high degree of freedom in combining different theories of time with different theories of persistence (although he claims that when all is said and done there is only one combination which best solves and addresses all the problems and questions, namely four dimensionalism plus eternalism). *Contra* Sider, I shall argue against such a familiar point for as soon as the ontological commitments of the theories involved as well as the connections among those theories are made clear then that great degree of freedom seems to diminish visibly. It is not at all haphazard how theories of persistence motivate theories of time, and in turn how both motivate theories of existence. I shall add that the interplay and connections between a specific theory persistence and time, perdurance and eternalism, could likewise motivate a specific view on existence, to wit Quine's.

I shall now highlight the structure of the thesis: at first, I shall present (i) a everyday scenario in which we claim of an ordinary material object that it is an instance of a persisting object; secondly, (ii) I shall show that there is a sense in which our common sense thinking and intuitions about such case harbour a predicament (to wit the fact that although we might not be able to pin down in virtue of what $a=b$, yet we believe that there must be a fact of the matter whether a and b are one or two; for instance God would doubtlessly know the right number). Thirdly, at this point (iii) I shall call upon philosophy and see whether it could be of any help. As expected, philosophy turns out to be quite helpful in shedding light on that puzzling situation, in particular I shall let the three mainstream views on persistence make their pronouncements: perdurance, endurance, and stage theory.

The next step in the development of the argument will be to briefly (iv) assess the good and bad of each contender, trying to unveil the commitments and implications, the small print as it were, that inevitably come with each theory. Following from (iv), I

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[58] Sider, T. (2001). *Four Dimensionalism. An Ontology of Persistence and Time*. NewYork: Oxford University Press, 68-73.

shall assess (v) what discriminates between perdurance and endurance[59]; namely, the notion of temporal parts. Temporal parts seem to be crucial to perdurance, so much that all the alleged benefits of perdurance, if any, hinges upon the notion. Therefore, I think it is of paramount importance to understand (vi) what temporal parts are, and (vii) what they are for. Arguably, there is a sense in which I will find both (vi) and (vii) wanting: assuming Olson's objection, it appears contentious whether Sider's definition of temporal parts could be understood at all by the detractors of temporal parts; and what kind of philosophical work temporal parts carry out. However, although there might not be a definition good enough to stand serious philosophical scrutiny, still the notion seemingly draws upon our intuitions about parts and wholes as well as some common sense considerations about our understanding of spatial parts. Interestingly though, the appeal to intuitions and common sense considerations may not be allowed in this respect unless some amendments are put in place beforehand. As for what temporal parts are, advocates claim that they are an essential posit since the job they carry out in solving metaphysical puzzles is unique. Whether true or not, what I shall note is that the most challenging of the puzzles which temporal parts happen to solve might well rest on a misunderstanding: namely the long-standing problem of change. After an introductory exposition of the problem which has been eating out philosophy for so long, I shall show that there is a robust sense in which the problem of change could be seen as not genuine: it all seems to come down to how Leibniz's Law is interpreted. My contention will be that Leibniz's Law is a law of logic and it is best interpreted accordingly, whereas the way it is used to ground the problem of change and the consequent need for temporal parts is a metaphysical reading of it, a reading which restricts the principle to concrete objects and their properties (or what they both stand for). If I am right then there is a sense in which the need and justification for temporal parts is weakened. Although some Australians would say that near enough is good enough, I believe that to stand a chance as a metaphysical theory, near enough is not good at all.

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[59] In the following of the thesis I shall talk in terms of perdurance rather than four dimensionalism. I shall take perdurance to mean the worm theory, namely one of the two semantic accounts altogether with the stage theory of how proper names and other referring expressions secure their reference. Whether the stage theory is just a semantic account is contentious: as I pointed out in my MPhil thesis, there is a strong sense in which the stage theory has a full-blown metaphysics of its own. Also, it is interesting to note that other contemporary stage theorists or symphatisers the likes of Katherine Hawley and Achille Varzi seem to go in this direction. See for example Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press, Ch. 3; (1999). "Persistence and Non-Supervenient Relations". *Mind*, 108: 53-67. Varzi, A. (2003). "Naming the Stages". *Dialectica* 57: 387-412.

Although perdurance might have failed to provide a compelling argument to show what temporal parts really are and why they are needed beyond any reasonable doubt, still I think it has one last resource, namely (viii) it conveys the idea that reality is four-dimensional: the belief that in addition to the three spatial dimensions in which reality extends, there is a fourth - time - in which reality extends. This point looks to be crucial so I shall look into it carefully and from a *philosophical* point of view, to see if what philosophers said makes a good case for time to be an additional dimension in which reality is extended. The investigation will be pursued as follows: it is all but clear in what sense time could be a dimension but at the same time it is quite clear that space is the best and the only one paradigm of dimension that we've got;[60] space and time happen to share some features (space-time analogies) or so many philosophers have thought. Therefore, if we look into those similarities we may perhaps end up with an idea about how time could be alike space. It is one tentative train of thought devised to carve out what is going on, perhaps not the best but at least a feasible one. Arguably, from a genuine *philosophical* point of view (ix) the outcome of the investigation will find the idea of the space-time analogy somehow wanting, and not entirely clear why this should be the case. Looking into some instances of the philosophical debate upon the analogies between space and time that began in 1955 and languished till the mid '80s of the last century, the major concern has been to point out under what respects space and time were to be considered alike. The debate sounded overall a bit flimsy, and apart from the conclusion that what space and time have in common is the fact that they are both instances of a continuum, the initial question is still up in the air. Therefore, drawing upon Sider's three respects in which space and time are alike, and Lowe's picture of time as extended and a dimension in which reality extends, I shall endeavour myself to get around the stalemate by devising a picture of time which could comply with the requirements just spelt out.

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[60] In conversation, Nancy Cartwright called my attention to the fact that my claim above is odd unless 'I have some special sense of dimension in mind for there are tonnes of dimensions referred to in the natural and social sciences.' My contention is that metaphysics does not fall under either of those sciences therefore there is the *prima facie* evidence that those notions of dimensions refered to by those sciences might not be relevant in this respect. Moreover, since metaphysics' task is concerned with the fundamental structure of reality, clearly the notion of dimension at issue can only be of a *real* dimension. Some of the notions referred to in natural and social sciences are not in this sense real. For instance, for some reasons we might have to draw a diagram of a person's happiness so that the different values of that person's happiness are lined up along a dimension, the dimension of happiness. I do not think that there is to such a dimension of happiness anything more than a mere measuring device; surely the dimension of somebody's happiness is not real, at least not real as we take space and time to be.

The next step in the argument will be to look briefly into the current debate in the philosophy of time with a view to showing (x) which view of time could reasonably be motivated by the picture devised above. I shall argue that such a picture of time seems to fit at best within an eternalist view of time.[61] Again, as claimed at the beginning of the introduction, my approach will not be just after drawing opposition between theories of time: eternalism vs presentism, A-theory vs B-theory, etc.; rather I shall be more interested in teasing out what the different theories of time are really about, namely their basic assumptions as well as ontological implications which are supposed to make manifest how each view sees time and what they try to defend as basic features of a world in which time would play a role.

With the link from perdurance to eternalism, I shall endeavour to address the next issue which will be essentially (xi) to unveil any entailment between that view of persistence and time, and existence. Given the assumptions unravelled previously in the thesis that both perdurance and eternalism seem to be committed to, namely reality as spread-out four-dimensionally with all the space-time points, events, or objects set up once and forever (block universe) - a view of time in which all the instants, events, objects in the past, present, and future coexist - I shall then argue that such a view of persistence and time motivates a view of existence *a là* Quine, namely existence as what is expressed by the existential quantifier: a view of existence that guarantees an *existentially closed* domain of existents, which is what four-dimensionalism and eternalism entail.

The conclusion of the overall argument will be that once it is unpacked what perdurance, eternalism, and a view of existence *a là* Quine imply, and are committed to, there is a principled way in which one motivates the others. The conclusion will be tentative and provisional, and in keeping with what has been stated early on in the introduction, my aim will be to improve the understanding rather than to establish a

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[61] The conclusion perhaps does not sound particularly novel; distinguished thinkers reached it in the recent past, see Carter, W. & Hestevold, H.S. (1994). "On Passage and Persistence". *Americal Philosophical Quarterly* 31: 269-83. Merricks, T. (1994). "Endurance and Indiscernibility". *Journal of Philosophy* 91: 165-84. Le Poidevin, R. (2000). "Continuants and Continuity". *The Monist* 83: 381-98. but from an different way round, normally from theories of time to theories of persistence (e.g. from eternalism to four-dimensionalism/perdurantism). My approach goes instead from perdurance to eternalism, and shows that perdurance's four-dimensional view of reality is at best accommodated by an eternalist view of time. In addition, I shall show how such a commitment could have bearing on the nature of existence too.

position.[62] The particular perspective I take on persistence, time and existence, and the path that I steer in the thesis may well be one among (many) alternative ways to carve out a debate about reality and what fundamentally it is about. In spite of the fact that the alternatives could turn out to be various, what still remains interesting is to see what is preserved in the variety, the invariants as it were, if any, which make reality what we strongly believe *could* be the case.

[62] For instance, an exception to my way of presenting four-dimensionalism could be four-dimensionalism without temporal parts as in Parsons, J. 2000. "Must a Four-dimensionalist Believe in Temporal Parts?" *The Monist* 83: 399-418. The truth is though, whether with temporal parts or not four-dimensionalism conveys the same four-dimensionally extended view of reality, and interestingly the implications could be similar whether temporal parts are factored in or not. I talk about temporal parts as they are very common in the literature, and are, *contra* Parsons, generally assumed as a distinctive feature of four dimensionalism.

Part I: *Persistence*

Ordinary life seems to be cluttered with a number of *truths of common sense*, unquestioned experiences the evidence of which would be trivial and extravagant to dispute. It would indeed be bizarre to question the fact that the bike which is now stored in the shed is the same one I bought twelve months ago (what I call 'my bike'). At present it may look a bit battered and run-down if compared to when it was sitting on the shop floor. It also has new wheels and few other components have been replaced because of ordinary wear and tear. Nonetheless, I am fairly sure that the bike in the shed is the bike I bought a year ago. More importantly, this is not just my wishful thinking: a number of other people believe that the bike in the shed is the bike once sitting in the bike shop, to wit my bike. It is quite plausible for me to believe that I am right after all: the bike in the shed is that bike; it is my bike.

Curiously, it is not just about what I or other people happen to believe, in fact we can all together believe that actually the bike in my neighbour's shed is the bike once sitting on the shop floor; however, the bike in my neighbour's shed is not really the one I bought a year ago, it is indeed his bike. I can *believe* whatever I want, I can decide to deceive myself entertaining false beliefs but this issue is quite different from claiming that I *know* that the bike in the shed is my bike, the one I bought twelve months ago. Without entering the epistemic debate upon the relationships between beliefs and knowledge, and the nature of knowledge itself; we can legitimately claim to know that *p* if we somehow possess enough evidence or good reasons for us to have knowledge that *p*.

Let us look at the evidence. Generally, to find a good reason to show why what I believe is the case, in the current scenario, the first thing would be to look at some features which could *uniquely identify* the bike. So, if the frame number stamped on the

bike in my shed is the one once printed on the bike's frame sitting in the shop then this fact could perhaps solve the apparent puzzle. If there is correspondence then this bike in my shed is *one and the same* with that one once on the shop floor: it is my bike. If not, this bike and that one are two distinct bikes.

Sometimes looking at uniquely identifying features will not do; perhaps there is no such number, or if there is it may be useless. Whatever the motivation, let us suppose, that we get to the point where we have spelt out all the possible uniquely identifying characteristics to straighten this situation out, but actually there is no such ultimately distinctive feature, nothing at all to appeal to when it comes to deliberating if *this* bike is *that* bike. In this situation, would we still be entitled to claim to know that this bike is that bike? That we are talking about the same bike (or 'my bike')? In other words, would the sentence 'This bike in the shed is that one I bought twelve months ago' be true, false, neither true nor false?

We face an epistemic *impasse*, namely we do not *know* what's going on. Still though, I think it would be fairly plausible to say that somehow when someone, say God, decides to count the number of bikes in the universe, They[63] do not really need to look for a frame number or anything else; they know for sure, at a glance, if this bike in the shed must be computed as one with the one once in the shop or not. In other words, apart from the somehow temporary epistemic failure, there seems to be *a fact of the matter* whether they are one or not. If not, then this would be a case in which God would not be sure of the number of bikes in the universe (and I take that we would not be particularly impressed by a divinity so unreliable such that They get it wrong when it comes to computing in general, let alone to count the number of bikes around). This being the case, reality - perhaps just limited to the number of bikes - would be to some extent indeterminate.

I am quite sympathetic to the idea of a metaphysically indeterminate reality, and as far as I understand some of the best science available at this point in time seems to suggest something along these lines; however, contemporary philosophers never quite

[63] I use 'They' since I shall not committing myself to whether God should be referred to as She or He.

liked the sound of it, and the idea raised a few eyebrows.[64]

This train of thought, plausible and somehow appealing to our best discernment, seems to yield to a predicament. Epistemic uncertainty on the one hand: (i) there is a robust sense in which we feel that we do really know what's going on, we think that we know which bike is which without being able to pin down the reasons why this is the case; reasons good enough so that we can claim beyond any reasonable doubt that the bike in the shed is the one bought twelve months ago. And metaphysical certainty on the other: (ii) there must be a fact of the matter about the number of bikes in reality. Seemingly we cannot have both, can we?

This is where philosophy could come into play (if it hasn't already). But before letting it have a say, I shall hint at some other general and methodological issues in addition to those highlighted in the Introduction that the predicament we reached above has prompted into my mind.

Philosophy is, as I take it, the understanding, clarification, and regimentation of our ordinary talking and thinking about the world. Description of what's going on, prescription of how it should be understood. The opposition between a descriptive and a prescriptive or revisionary[65] approach to reality is apparently a turning point of contemporary analytic philosophy, something that anyone with an interest in it should confront with. So be it, although very briefly. As pointed out a few times in the Introduction, I shall once more refrain from framing any issue in terms of oppositions between seemingly mutually exclusive approaches; in this case descriptive and

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[64] See Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 212-3; (1993) "Many, but almost one". In *Ontology, Causality, and Mind: Essays on the Philosophy of D.M. Armstrong*, K. Campbell, J. Bacon & L. Reinhardt (eds.), Cambridge: Cambridge University Press. Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press, 120-39. The debate upon these issues is vaste, and generally draws upon what is known as 'the problem of vagueness'; it also branches off embracing issues regarding composition (or failure of it). To deal adequately with these issues is well beyond the purposes of this thesis so I shall simply flag some basic sources. Just to point out where I stand in the debate, perhaps bluntly, I do not believe that either Lewis' or Sider's arguments succeed in showing what they purport to show. For the record, I acknowledge that if perdurance is supplemented by unrestricted mereological composition, then temporal parts could be a way out of problems of vagueness. It is debateable whether it could be a good or bad solution though. In keeping with the claim made above, I still do not believe perdurance plus temporal parts settle the problem in any philosophically interesting way since I have a problem with how the problem is framed and how it draws upon compositional issues. Anyway, groundbreaking contributions are: Russell, B. (1923) "Vagueness". *Australasian Journal of Philosophy and Psychology*, 1: 84-92. Fine, K.(1975) "Vagueness, truth and logic". *Synthese*, 54: 235–59. Reprinted in Keefe & Smith (eds.) 1996, 119-150. Evans, G. (1978). "Can there be Vague Objects?", *Analysis*, 38: 208. Unger, P. (1979) "There are no ordinary things". *Synthese*, 4: 117-54. Lewis, D.K. (1982). "Logic for Equivocators", *Noûs*. 16: 431-41; (1988). "Vague Identity: Evans Misunderstood". *Analysis*, 48: 128-30. Van Inwagen, P. (1990) *Material Beings*. Ithaca, NY: Cornell University Press. Williamson, T. (1994). *Vagueness*. London: Routledge. Merricks, T. (2001) "Varieties of Vagueness". *Philosophy and Phenomenological Research*, 63: 145-57.

[65] Strawson, P.F. (1959). *Individuals*. London, New York: Routledge, 9.

revisionary, but I acknowledge a robust sense in which Strawson has a point when he claimed that there is a distinction - perhaps a not so clear-cut one but one so that we can still sometimes tell the two apart:

> "Descriptive metaphysics is content to describe the actual structure of our thought about the world, revisionary metaphysics is concerned to produce a better structure. [...] there is another kind of metaphysics [the descriptive variety] which needs no justification at all beyond that of inquiry in general. Revisionary metaphysics is at the service of descriptive metaphysics. Perhaps no actual metaphysician has ever been, both in intention and effect, wholly the one thing or the other. But we can distinguish broadly: Descartes, Leibniz, Berkeley are revisionary, Aristotle and Kant descriptive. Hume, the ironist of philosophy, is more difficult to place. He appears now under one aspect, now under another.

The point is then that there seems to be two quite distinct and distinctive ways to go about in metaphysics, at least in its contemporary analytic variety, which, as it stands, can hardly be reduced one to another. According to Strawson, the dealings of the revisionary variety, although theoretically admirable, are always subjected to those of the descriptive one (which happens not to require any justification beyond that of general enquiry). Looking at the contemporary development of analytic metaphysics, the two approaches tended to polarise over time up to a point where the revisionary/ prescriptive one clearly had the upper hand twisting Strawson's lesson. In Quine's wake, a description of reality[66] is useful insofar as it a beaming proof of its own inadequacy. A veil subtly laid upon reality which once removed reveals its true structure so that at no point the description is at the service of the revision; by contrast, the description must be discarded for the revision to be.[67]

History is written by the victors, or so they say; however, I believe that what the contemporary prescriptivists have overlooked for too long is the profound sense of interplay between the two ways of enquiry which shines through Strawson's words. Setting aside the alleged priority of one over the other (which I must confess I am

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[66] Of course, the expression 'description of reality' must be qualified. If the description corresponds to the outcome of the best sciences available then clearly it cannot be a beaming proof of its own inadequacy (even though it might well be revisable in the light of new empirical evidence - according to Quine even classical logic could be so although in principle). By contrast, if it is a description of reality otherwise pursued then for some additional considerations it might well qualify as inadequate.

[67] Admittedly, my words may well sound harsh on this issue, and perhaps this may seem to end up clashing with my four-dimensional metaphysical impulse. What I think is that there should be a dialectic between description and prescription rather than the establishment of one unless a very good enough story is provided as it seems to transpire from Quine or in his wake.

strongly unsympathetic with but which it requires some further qualification on Strawson's part as well), it seems to me to make good sense to begin a metaphysical investigation (in a genuine analytic spirit) from the point of view of the understanding of what is going on, on the level of language, thought, ordinary experience, etc. which usually happens in terms of descriptions; for example, spelling out all that pertains to it in the attempt to clarify what we are talking about when we talk about such-and-such. Then (and only then) if still unclear and truly unavoidable to discipline the object of investigation through revision.

This ill-fated descriptive approach to reality resembles in many ways the destiny, and role of common sense, and intuitions in the contemporary debate. Recall Russell's well-known fate of naïve realism:

> "We all start from 'naïve realism', i.e., the doctrine that things are what they seem. We think that grass is green, that stones are hard, and that snow is cold. But physics assures us that the greenness of grass, the hardness of stones, and the coldness of snow, are not the greenness, the hardness, the coldness that we know in our own experience, but something very different. [...] Thus science seems to be at war with itself [...] Naïve realism leads to physics, and physics, if true, shows naïve realism to be false. Therefore naïve realism, if true, is false; therefore it is false."[68]

And supplement it with Wittgenstein's ladder metaphor:

> "My propositions serve as elucidations in the following way: anyone who understands me eventually recognises them as nonsensical, when he has used them - as steps - to climb upon beyond them. (He must, so to speak, throw away the ladder after he has climbed up it.) He must transcend these propositions, and then he will see the world aright."[69]

Therefore, we and our investigations seem to be doomed to a great extent: the *prius* or first evidence we begin from turns out blatantly wrong so it ought to be dismissed in order for us to see the world for what it really is. Of course, there are here at play some additional assumptions, for instance the fact that the picture that the best sciences available (physics) draw is the truest representation of reality or the best explanation theory (at least the most reliable till next time around when it will be amended following some new evidence, etc.) which are somehow questionable but for brevity's sake I shall not pursue this further.

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[68] Russell, B. (1940). *An Inquiry into Meaning and Truth*. Allen & Unwin. 14.

[69] Wittgenstein, L. (1961). *Tractatus Logico-Philosophicus*. London: Routledge & Kehan Paul, 151.

Be it as it may, what I think matters to the purposes and methodology of the present research is the fact that historically the revision outweighed the description to such an extent that the description is simply misleading, deceiving, and ultimately wrong, so that it is somehow pointless to pursue. An attitude which overlooks the *sine qua non* element of the understanding (description) which comes before any prescription. Strawson made a very robust point (although he might have gone a bit too far) in claiming the priority of one over the other (but again most hinges upon what kind of priority that priority is), and the fact that there seems to be a core, in terms of conceptual scheme, shared and universal, which we, as human beings have, know that we do have, and for which no further analysis or justification in terms of more fundamental concepts can be offered. However, logically and conceptually speaking I believe that there is something undeniably right about Strawson. Metaphysics is neither descriptive nor revisionary, it must be descriptive in order to be revisionary, namely to understand what is going on before prescribing how such understanding and description should be modified. It cannot be the other way around otherwise, as it seems plausible, we would lack any ground where to apply the revision to. Descriptions, common sense, and intuitions can all potentially be revised if and only if good reasons are provided.[70] If not then I think that the best revision ever, if any, would be as much ungrounded, arbitrary, or the product of ideology as anything could be.

So much for this brief, and surely incomplete detour into the methodology of metaphysics. Going now back to where we have left, the intervention of philosophy might turn out useful to overcome the stalemate, namely the clash between the evidence - we have no good reason to say which bike is which - and our intuitions - we know for sure that there must be a fact of the matter whether they are one or not. But before plunging into these issues, I would like to say something about my commitment to some pieces of philosophical terminology or jargon which have been postponed so far. I believe this is important matter, since to clarify and understand what we are talking

[70] Perhaps this is just one instance in which my asleep and *nuanced* Mooreanism raises its ugly head. 'ugly' because such Moorean attitude (or clutching onto common sense at the expense of philosophical reasoning) could potentially clash with my sympathy for perdurance which in turn is supposedly the outcome of a highly theoretical philosophical speculation. However, as I show later on there is a robust sense in which the basic notion of perdurance, namely temporal parts, draws upon intuitions as well as common sense considerations. Thus, either the conflict is only apparent or it could emerge once that evidence is relinquished in favor of a philosophical concoction of perdurance and temporal parts. In the latter case, I will be more than willing to revise my Mooreanism as long as good reasons are provided to that end as I claimed in the Introduction.

about when we talk about something is traditionally one breakthrough of the analytic tradition, and also it serves to wave off objections such as the alleged equivalence of terms or notions which are on the surface different;[71] or the recently popular charge of philosophers 'talking past each other': people talking about different subjects, whilst they believe that they are talking about the same thing.[72] And this is what I shall endeavour to achieve in the next section.

[71] See for instance the alleged equivalence of 3D and 4D as in Lowe, E.J. & McCall, S. (2006). "The 3D/ 4D controversy: a storm in a teacup". *Noûs* 40: 570-8; (2003). "3D/4D equivalence, the twins paradox, and absolute time". *Analysis* 63: 114-23. See also Miller, K. (2005). "The Metaphysical Equivalence of Three- and Four-dimensionalism. *Erkenntnis* 62: 91-117.

[72] Miller, K. (2013). "Presentism, Eternalism, and the Growing Block". In *A Companion to the Philosophy of Time*. H. Dyke & A. Bardon (eds.). John Wiley & sons, inc. 345-64.

1.0 *Preliminary Remarks*[73]

In this section, I shall briefly set up what it may be called the *terminological commitments* of the thesis, or at least most of it. For example, all along the Introduction as well as the previous section, I employed terms like perdurance, and four-dimensionalism without the care of fixing their meanings within their context of usage.

In the literature, for some time, philosophers have been using the two terms presumably as synonyms, perhaps not explicitly, but clearly with *four-dimensionalism* they just meant what then Lewis named *perdurance*. For instance, let us recall Quine's famous solution of Heracleitus' 'You cannot bathe in the same river twice, for new waters are ever flowing in upon you':

> "The truth is that you *can* bathe in the *same* river twice, but not in the same river stage. You can bathe in two river stages which are stages of the same river, and this is what constitutes bathing in the same river twice. A river is a process through time, and the river stages are its momentary parts."[74]

Therefore, say the river Wear, is (i) a whole which has river stages as parts; and (ii) something which in addition of extending *spatially* from the Pennines, eastwards through Durham city and reaching the North Sea in the city of Sunderland, it extends *temporally* too.[75] If space has three distinct directions along which something can extend, say up, down, and across; time has one, say from the past towards the future.

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[73] Some of the concerns expressed in this section can be found *in nuce* in Hawley, K. (2010). "Temporal Parts". *The Stanford Encyclopedia of Philosophy*.

[74] Quine, W.V.O. (1950). "Identity, Ostention, and Hypostasis". *Journal of Philosophy* 47: 621-33. Reprinted in Quine, W.V.O. (1963). *From a Logical Point of View*. Cambridge, Mass.: Harvard University Press, 65-79.

[75] Admittedly, it might be a bit difficult to see how something like a river extends temporally, but let us say that it does if we factor in the first time ever it qualifies as a river untill the last beyond which, for some reason or another, it does not qualify as a river any more, say it dries up. Otherwise, for convenience's sake, let us think of something that qualifies as a process, say a kid growing up; it is easy to see that such an event extends over time in the sense that a kid growing up includes different temporal stages, say infancy, teenage, etc. If this is plausible then it can be easily carried over to the case of the river with similar results.

Thus, overall reality extends in four dimensions, therefore four-dimensionalism.[76]

Quine was not the first to talk about reality in these terms but sure enough he was one the most influential. Along the same lines, and sometime before Quine, philosophers such as Bertrand Russell, A.N. Whitehead, Nelson Goodman, and most famously D.C. Williams in *The Myth of Passage* did. [77] Ten years later, in 1960, Quine furthers the solution to Heraclitus' problem to a new level:

> "Once we put the temporal extent of the river on a par with the spatial extent, we see no more difficulty in stepping into the same river at two times than at two places. Furthermore the river's change of substance, at a given place from time to time, comes to be seen as quite on a par with the river's difference in substance at a given time from place to place; sameness of river is controverted no more on the one count than on the other. [...] Physical objects, conceived thus four-dimensionally in space-time, are not to be distinguished from events or, in the concrete sense of the term, processes. Each comprises simply the content, however heterogeneous, of some portion of space-time, however disconnected and gerrymandered."[78]

Thus, as stated above, it should now be clear what four-dimensionalism is about, at least in Quine's terms. However, theories tend to evolve over time so perhaps a quick look into whether and how four-dimensionalism developed over the next decades would be instructive.

The next passage worth mentioning would probably be Lewis' 1986 *On the*

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[76] For completeness' sake, there is another sense in the literature in which four-dimensionalism could be understood. For example Michael Rea has it that "Four dimensionalism [...] is a view about the ontological status of non-present objects. Presentists say that only present objects exist. There are no dinosaurs, though there were such things; there are no cities on Mars, though perhaps there will be such things. Four-dimensionalists, on the other hand, say that there are past or future objects (or both); and in saying this, they mean to put such things ontologically on a par with present objects. According to the four-dimensionalist, non-present objects are like spatially distant objects: they exist, just not here, where we are". Rea, M. (2003). "Four-Dimensionalism". In M. Loux and D. W. Zimmerman (eds.) *The Oxford Handbook for Metaphysics*. Oxford: Oxford University Press, 246-80. What Rea is talking about amounts to what is generally called *eternalism* which is a view on time rather than a theory of persistence.

[77] Russell, B. (1914). "The Relation of Sense-Data to Physics". In *Mysticism, and Logic, and Other Essays*. New York: Longman's, Green & co., 112; (1927). *The Analysis of Matter*. New York: Harcourt, Brace & co., 243, 284-9. Whitehead, A.N. (1920). *The Concept of Nature*. Cambridge: Cambridge University Press. Goodman, N. (1951). *The Structure of Appearance*. Cambridge, Mass.: Harvard University Press, Ch. IV, sect. I. Williams, D.C. (1951). "The Myth of Passage". *Journal of Philosophy* 48: 457-72.

[78] Quine, W.V.O. (1960). *Word and Object*. Cambridge, Mass.: MIT Press, 171.

Plurality of Worlds, but from the Introduction we are already familiar with it.[79] Instead, let us see what Frank Jackson made of four-dimensionalism a few years after Lewis:

> "The dispute between three-dimensionalism and four-dimensionalism, or more precisely, that part of the dispute we will be concerned with, concerns what persistence, and correlatively, what change, comes to. Three-dimensionalism holds that an object exists at a time by being wholly present at that time, and, accordingly, that it persists if it is *wholly present* at more than one time. For short, it persists by *enduring*. Four-dimensionalism holds that an object exists at a time by having a *temporal part* at that time, and it persists if it has distinct temporal parts at more than one time. For short, it persists by *perduring*"[80]

Tentatively, I guess it would be safe to say that Jackson is on the same page as Quine and Lewis, four-dimensionalism seems to be linked to temporal parts as well as perdurance.[81]

Lastly, given the prominence in the recent literature, and how the book affected the debate afterwards, I believe a brief look should be given to Sider's *Four-Dimensionalism*. In *The Four-Dimensional Picture*, Sider gives a vivid impression of how four-dimensionalism could be rendered; drawing upon the spatial case he claims that:

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[79] In addition, we could look at Mark Heller, a keen as well as prolific four-dimensionalist: Heller, M. (1984). "Temporal Parts of Four Dimensional Objects". *Philosophical Studies* 46: 323-34; (1990). *The Ontology of Physical Objects: Four Dimensional Hunks of Matter*. Cambridge: Cambridge University Press; (1992). "Things Change". *Philosophy and Phenomenological Research* 52: 695-704; (1993). "Varieties of Four Dimensionalism". *Australasian Journal of Philosophy* 71: 47-59. Heller is also a peculiar four-dimensionalist in the sense that although he believes that the true ontology is the one conveyed by four-dimensionalism, yet none of the objects in this ontology - temporal parts - are referred to by everyday terms.

[80] Jackson, F. (1998). "Metaphysics by Possible Cases". In *Mind, Method, and Conditionals*. London: Routledge, 138.

[81] Parsons would probably disagree with my provisional conclusion. He claims that such use of four-dimensionalism is "[i]napposite. [And] this is not the usage intended by Jackson. Temporal parts are a 'part of the dispute' between four- and three-dimensionalists, not the whole of that dispute. For Jackson, four-dimensionalism is a broader programme that (allegedly) entails a certain specific theory of persistence, namely perdurantism." Parsons, J. (2000). "Must a Four-dimensionalist Believe in Temporal Parts?". *The Monist* 83: 399. I suppose we should then ask Parsons to clarify what four-dimensionalism (and three-dimensionalism) is about apart from persistence and change. I have myself an answer, one which actually fits in with the underlining thesis of the dissertation, namely the idea that persistence, first and foremost, branches off into *time*, and a bit further down the line from time into *existence*. Perhaps, the other part of the dispute, in Parsons' terms, besides temporal parts is indeed time; in the sense that perdurance is primarily a theory of persistence which falls under four-dimensionalism's umbrella - with or without temporal parts. What four-dimensionalism and perdurance happen to share is the thesis that space and time are somehow analogous: the fact that reality extends in four dimensions. Therefore, it seems fair to say that the commitment to such analogy is fundamental, and if this is the case then it must be of crucial importance to investigate how such commitment develops affecting the topic of time, namely the question about what it means for time to be extended (or a dimension), and whether this *could* be the case or not.

> "Four-dimensionalism may be made vivid by pictures: an object with temporal parts persisting through time is like a road with spatial parts extending across space. [...] According to the 'four-dimensional' conception of persons (and all other objects that persist over time), persons are a lot like their stories. Just as my story has a part for my childhood, so *I* have a part consisting just of my childhood. Just as my story has a part describing just this instant, so I have a part that is me at-this-very instant."[82]

Thus, what shines through Sider's words is, once again an analogy between space and time in terms of 'parts'. Undeniable evidence says that things have spatial parts[83]. Drawing upon this remark, four-dimensionalism claims that in addition to spatial parts things have temporal ones since there is an analogy between space and time in respect of parts; and generally the analogy is cashed out via ordinary examples.[84]

The emphasis on the analogy between space and time in respect of parts is strengthened throughout Sider's chapter:

> "My spatial parts extend through time like I do. We call them spatial parts because they are smaller than I, spatially speaking; they are 'cut out of' me along a spatial dimension. Reverse time and space in this description and we obtain a description of my temporal parts, which extend through space like I do but are smaller than I, temporally speaking; they are what you get by slicing me along a temporal dimension."[85]

Lastly, to bring my point home, namely the claim that plausibly four-dimensionalism and Lewis' perdurance have been employed as synonyms for quite a long time, what we should aim for is then a very recent characterisation of four-dimensionalism which

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[82] Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press, 1.

[83] Whether such evidence is empirical or not is a matter of debate. If I understand Parsons, given the thesis that space and time are analogous (Analogy Thesis in its strongest form) then it is an empirical matter whether things *entend* or *pertend*, then it should be similarly an empirical matter whether things *endure* or *perdure*. See Parsons, J. (2000). "Must a Four-dimensionalist Believe in Temporal Parts?". *The Monist* 83: 404, 413.

[84] Quine, W.V.O. (1950). "Identity, Ostention, and Hypostasis". *Journal of Philosophy* 47: 621-33. Reprinted in Quine, W.V.O. (1963). *From a Logical Point of View*. Cambridge, Mass.: Harvard University Press, 65-79. Lewis, D.K. (1983*a*). "Survival and Identity", 63. In Lewis (1983*b*). *Philosophical Papers I*. Oxford: Oxford University Press, 55-77. Sider, T. (1996). "All the World's a Stage". *Australasian Journal of Philosophy* 74: 441.

[85] Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press, 2. I must confess it is quite obscure to me why Sider claims that we call spatial parts spatial because they are smaller; nonetheless I think I can understand the gist of what he is trying to say.

directly refers to temporal parts and perdurance; and timely Sider gives it to us: [86]

> "This picture of persistence over time called four-dimensionalism is also known as the doctrine of temporal parts and the thesis that objects 'perdure'."

Objects perdure if and only if they exist by having different temporal parts, or stages, at different times though no one part of them is wholly present at more than one time, as in Lewis.[87] Therefore, I guess after this lengthy digression in the genealogy of the idea of four-dimensionalism, what we make of it is that what Lewis named perdurance was basically what had been around for quite a while under false pretences, namely four-dimensionalism.

So much so, unfortunately things got a bit more complicated in the aftermath of Sider's work. For example, one issue is to account for a metaphysical picture of reality, in this case four-dimensional; another issue instead is to account for the relationship, if any, between temporal parts and ordinary language; namely how referring expressions, the likes of proper names and definite descriptions, secure their referents; an issue which has primarily to do with semantics rather than metaphysics. The semantic branching out of four-dimensionalism and perdurance has traditionally been known as the *worm theory*:

> "On the *worm view*, it is spacetime worms that are *continuants* - the referents of ordinary terms, members of ordinary domain of quantification, subjects of ordinary predication, and so on."[88]

What space-time worms are is merely mereological sums of temporal as well as spatial

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[86] *Ibid*. 3. It is however interesting to note that perhaps Sider changed his view slightly from what he claimed a few years earlier in the light of the following remark: "We need to look carefully into just what three- and four-dimensionalism amount to. These names for the doctrines [...] are poor guides." Sider, T. (1997). "Four-dimensionalism". *Philosophical Review* 106: 197-231. There is a sense in which Sider's statement is appropriate, for example if we consider Josh Parsons' Flatland case of a three dimensional space-time, would we still call the doctrine of temporal parts four-dimensionalism? Perhaps we will not for it would make very little sense. However, Sider seems to clearly settle for the terms 'four-dimensionalism', 'perdurantism', and 'the doctrine of temporal parts' being interchangeable or somehow definable one in terms of the other.

[87] Lewis (1986), *On the Plurality of Worlds*. Oxford: Basil Blackwell, 202.

[88] Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press, 60. See also Sider, T. (2004). "Symposium on *Four-Dimensionalism*". *Philosophy and Phenomenological Research* 68: 642-7, 674-87. Sider, T. (1996). "All the World's a Stage". *Australasian Journal of Philosophy* 74: 433-53. Lewis, D.K. (1983a). "Survival and Identity". 58-60. In Lewis, D.K. (1983b), *Philosophical Papers I*. Oxford: Oxford University Press, 55–77. Quine, W.V.O. (1976). "Worlds Away." *Journal of Philosophy* 73: 859–63.

parts or stages.[89]

However, in 1996 in a groundbreaking article, and in 2001 - the book quoted quite few times throughout this section - Sider prepares the ground for something along the lines of a semantic revolution:

> "Some philosophers believe that everyday objects are 4-dimensional space-time worms, that a person (for example) persists through time by having temporal parts, or stages, at each moment of her existence. None of these stages is identical to the person herself; rather, she is the aggregate of all her temporal parts. [...] I aim to defend an apparently radical third view: not only do I accept person stages; I claim that we *are* stages. [...] simply don't think spacetime worms are what we typically call persons, name with proper names, quantify over, etc."[90]

Along the same lines:

> "The view I am suggesting is that all continuants are stages, I call this the stage view. The opposing four-dimensionalist view is the 'worm view', according to which continuants are temporally extended spacetime worms."[91]

To conclude, it then seems plausible to say that four-dimensionalism and perdurance are synonyms as both convey the same metaphysical picture of reality: a picture extended in four dimensions and made up with temporal parts (whether instantaneous or not is not crucial at this stage); whereas the worm view and the stage view are two distinct semantic ways to address the issue of how reference is secured, in the background of

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[89] Sider, T. (2004). "Symposium on *Four-Dimensionalism*". *Philosophy and Phenomenological Research* 68: 642.

[90] Sider, T. (1996). "All the World's a Stage". *Australasian Journal of Philosophy* 74: 433-4.

[91] Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press, 191. The stage view is also known in the literature as *exdurance* or *exdurantism*: ordinary persisting objects are stages that persist by having distinct stage counterparts at other times. "[d]uration is via the object's relation to entities other than or outside of it." Haslanger, S. (2003). "Persistence Through Time". 318. In M.J. Loux & D.W. Zimmerman (eds.), *The Oxford Handbook of Metaphysics*. Oxford University Press. 315 - 54.

that metaphysical picture of reality.[92]

Arguably, the complexity goes further: around the same time as Sider's work on four-dimensionalism, Josh Parsons came out with a view according to which it does not seem to be compulsory to endorse temporal parts in order to be a four-dimensionalist; an outcome which defies the tentative conclusion above. Apparently, we could easily do away with temporal parts, Parsons suggests, employing a slightly different theoretical apparatus, namely distributional properties[93]: temporally indexed properties which are genuinely intrinsic and non-relational. Let us briefly see how.

Temporal parts are just a small part of the dispute between three and four-dimensionalism; four-dimensionalism is a broader programme which seemingly entails perdurance (or the doctrine of temporal parts), namely a specific theory of persistence. Does the above-mentioned entailment really hold? According to Parsons it does not. One among the many benefits of endorsing temporal parts is the fact that they can easily address the long-standing problem of temporary intrinsics.[94] Things change their properties over time, my bike's frame was straight when it left the bike shop floor but it is now bent. Being straight or bent is supposed to be an intrinsic properties of things, at least according to Lewis' reading of it, so if I say that the bike's frame was straight and now bent, according to some philosophical regimentation of it what I am really saying is

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[92] Sider's claim might well be debateable. As I showed in my MPhil thesis - *The Persistence of Objects in T. Sider* - there is a robust sense in which Sider's stage theory maps into a metaphysics which could be slightly different from say orthodox perdurance. Therefore, there is more to his version of stage theory than just semantics. However, for the current purposes nothing hinges upon whether it does or not. I am happy to assume Sider's conclusion. Before moving on though, it should be noted that some other stage theorists, the likes of Hawley and Varzi are keen to point out that the stage view is more than just a different semantics for the same metaphysics. See Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press, Ch. 3; and Varzi, A. (2003). "Naming the Stages". *Dialectica* 57: 403. Varzi is quite clear on this: "However, it would be incorrect to infer from this that the stage view is just a variant of four-dimensionalism. *The theories are different both semantically and metaphysically.* [my italic] Semantically, they differ with respect to the basic mechanisms of reference: on the 4D view an ordinary proper name picks out a 4D worm, not the stages that constitute it. Metaphysically, they differ with respect to the basic features of the world. The stage view is truly reductionist, in that all the work is done by the time-bound stages; their temporally extended aggregates, if such there be, add nothing.They are nothing over and above the stages, and their properties reduce to the properties of their stages. On the 4D view, by contrast, there is no commitment to such claims: there is no commitment to the primacy of the stages over their aggregates and, as a matter of fact, there is no commitment at all to the existence of instantaneous stages. The 4D world could consist of temporally atomless gunk."

[93] Parsons, J. (2000). "Must a Four-dimensionalist Believe in Temporal Parts?". *The Monist* 83: 399-418. Recall Lewis' charge against those who do not believe in temporal parts when it comes to addressing the problem of temporary intrinsics. The objection was that perfectly intrinsic properties like shape becomes relational, for example 'bent-at-t_1'. See Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 203-4; (2002). "Tensing the Copula". *Mind* 111: 1-14. I shall look into the temporary intrinsic issue in 1.3.2. For the record, I am skeptical about Lewis' conclusions for I believe that the problem of temporary intrinsics as well as the problem of change in general are ill-posed.

[94] See Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 203-4.

that the bike's frame is straight-at-t_1 and bent at-t_2, and $t_1<t_2$. Although looking a bit fanciful, it might be a fair way to put it. Not on Lewis' view though: being straight and bent are intrinsic properties[95] and a reading like the one above makes them relational - being straight or bent in relation to a time (indexing such properties to times) - which betrays their clear and genuine intrinsicality. So we need something that explains the evidence without making the relevant intrinsic properties relational: temporal parts. On this view, what is indexed to times is an object, a temporal part therefore to say that the bike's frame was straight whereas now is bent amounts to say that the bike's frame temporal part-at-t_1 is straight whilst the bike's frame temporal part-at-t_2 is bent. What gets indexed to time is the object not the relevant intrinsic property, and this is no big deal.

Thus, if we do not like the idea of linking the four-dimensional picture of reality to temporal parts, and if we accept the problem of temporary intrinsics as in Lewis, we would then have to have a different story about it. Parsons has one, one which has to do with distributional properties: temporal indexed properties which are perfectly intrinsic but *disjunctive*.[96] A *spatial* distributional property looks like the following:

> "[t]ake a poker that is hot at one end, and cold at the other. It has a certain heat distribution, and has the distributional property of having that heat distribution. Imagine such a poker, call it *a*, and another poker, *b*, which has a different heat distribution, being uniformly hot, for example. Call the heat distribution of *a*, the property *A*, and that of *b*, *B*. Note that these distributional properties are fully determinate: having any one of them entails that you do *not* [my italic] have any other of the same determinable (in this case the determinable property of having some heat distribution). So, for example, that *a* has *A* entails that *a* does *not* [my italic] have *B*. *A* and *B* are both intrinsic properties. [...] Now notice that we can define now up the property of being hot at one end. It is simply having *A or B or* any other of the fully determinate heat distribution properties that, as it were, put

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[95] The debate over intrinsicality is long-standing and the literature vaste, however to understand what Lewis is going on about, surely the following paper is where to start from: Langton, R. & Lewis, D.K. (1998). "Defining Intrinsic". *Philosophy and Phenomenological Research* 58: 333-45.

[96] Seemingly Lewis' problem was not just about indexing properties to times *per se*, it was rather about the outcome of the indexing properties process: the fact that it makes them non-intrinsic or relational. I say seemingly because another issue Lewis raises against indexers (that I omitted above) is the fact that the relevant properties end up being had by objects non-*simpliciter*. The truth of the matter is that Lewis is playing two distinct games, although he might believe he is just playing the same: when he talks in terms of having properties *simpliciter* he is referring to the single temporal parts being straight, bent, or whatever. Clearly, the properties I refer to when I say the the bike's frame which was such-and-such and now is thus-and-so are *no longer simpliciter* since they are the properties of an aggregate of temporal parts which is straight in virtue of a temporal part straight-at-t_1 and another bent-at-t_2 with $t_1<t_2$ which makes them non-*simpliciter*, period.

heat at one end of the object. And this property is intrinsic as well. You can't get an extrinsic property by conjoining or disjoining two intrinsic ones."[97]

The same applies *mutatis mutandis* in the case of temporally indexed properties. To conclude:

> "wherever we have a temporally indexed property of being *X*-at-*t*, we have a number of corresponding permanent distributional properties: the *X*-ness distributions. *X*-at-*t* is a disjunction of some of those *X*-ness distributions, the ones that are compatible with being *X*-at-*t*."[98]

Parsons seems to make a good case for the fact that four-dimensionalism does not entail perdurance as well as for the more curious conclusion that a four-dimensionalist of Parsons' bend could easily accept an endurantistic account of persistence!

Therefore, it seems to me plausible to use the terms outlined above as follows: by *four-dimensionalism* I shall understand a metaphysical picture in which reality is considered extended in four dimensions, three spatial and one temporal. Crucial to this view is the analogy between space and time.[99] By *perdurance*, I shall understand a theory of persistence which is a conjunction of four-dimensionalism plus temporal parts: something perdures iff it persists by having temporal parts at each time it exists at (Sider's 'doctrine of temporal parts'). Crucial to this view, I shall take a qualified (in terms of parts) analogy between space and time. By the *worm view*, I shall understand one of the two semantic branches of perdurance, namely the one which takes ordinary persisting things - continuants - to be aggregates of temporal parts. Lastly, by the *stage theory* I shall understand Sider's version of it, namely the view according to which ordinary persisting things are instantaneous stages, a view which is neutral whether there are aggregates of the above-mentioned entities or not. And this is the

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[97] Parsons, J. (2000). "Must a Four-dimensionalist Believe in Temporal Parts?". *The Monist* 83: sect. IV.

[98] *Ibid.*

[99] I would be inclined to say 'an unqualified analogy between space and time' but am not sure it would make sense. By unqualified I shall mean 'not in terms of parts' otherwise such four-dimensionalism will yield to perdurance straightaway. However, it might be instructive to look at what D.C. Williams says with regard to this: "The theory of the manifold [four-dimensionalism] leaves abundant room for the sensitive observer to record any describable difference he may find, in intrinsic quality, relational texture, or absolute direction, between the temporal dimension and the spatial ones." But the interesting point is that it is unnecessary to add any of the further differences between space and time he describes above. Space and time are alike in various ways, period. See also Mark Heller's 'minimal four-dimensionalism' in Heller, M. (1993). "Varieties of Four-Dimensionalism". *Australasian Journal of Philosophy* 71: 47-59. See also Parsons, J. (2000). "Must a Four-dimensionalist Believe in Temporal Parts?". *The Monist* 83: footnote 2.

terminological framework I shall commit myself to. I shall reserve the right to define any other extension to this terminological apparatus at due course if required.

Let us now go back to where it all started. I shall quickly recall the case exposed at the outset and the conundrum we discovered ourselves stuck into; and see if philosophy, in its contemporary metaphysics variety, could help to clarify what is going on.

1.1 *Lewis on Persistence: Perdurance vs Endurance*

David Lewis was the first to attempt to discipline the debate about persistence; recalling from the Introduction, he characterised *persistence* as follows:

> "Let us say that something *persists* iff, somehow or other, it exists at various times; this is the neutral word."

Therefore, if we ever come across an entity, say a bike, that presumably exists at various times - say in my shed now, in a bike shop once - then that entity *could* potentially be an instance of a persistent entity. But the recognition that there *could* be persisting entities does not amount to say that there actually are persisting entities, let alone the fact that the bike in the shed is the one I bought twelve months ago. Perhaps, sketching *how* entities persist could clarify whether there are any of such variety or not. In order to figure this out, I shall then suggest focussing on what Lewis writes within parentheses in his definition, i.e. *somehow or other*. The expression, as vague as it gets, succeeds, in hindsight, in orientating the reader towards the two theories of persistence that he is about to expose, i.e. *perdurance and endurance*.

> "Something *perdures* iff it exists by having different temporal parts, or stages, at different times though no one part of it is wholly present at more than one time; whereas it *endures* iff it persists by being wholly present at more than one time."[100]

Lewis' characterisations gathered paramount agreement among philosophers and his

[100] Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 202.

ground-breaking work set out the agenda of the contemporary debate.[101]

Lewis' neutral characterisation might be revised as to include, pre-emptively as it were, perdurance and endurance as follows:

(LP) Something persists iff it exists *partly or wholly* at various times.

One thing that perhaps could be worth pointing out is that in moving from the neutral notion of persistence to those of perdurance and endurance Lewis ignored - whether deliberately or not is debatable - to flag that the *neutral word* of common sense is abandoned in favour of metaphysics, which is no longer neutral. If 'existing at more than one time' could suggest a rough and ready idea of what it takes for something to persist, clearly as soon as the phrase 'partly or wholly' is added then the metaphysical debate fires up. What is crucial though, is the fact that Lewis is quite reasonably assuming that persistence or identity over time has a good deal of claim to factor in as a basic feature of reality, both from the point of view of common sense as well as a metaphysical feature of reality. How then we are to understand such a feature is a matter of philosophical debate.

Sure enough, to ascribe such commitment to Lewis' account of perdurance might sound unusual: for some reasons, perdurance is traditionally associated with a denial of identity over time, or this is what has been believed for some time. I think that with careful consideration there is a robust (although slightly deceiving) sense in which perduring continuants preserve their diachronic identity as I shall argue in the following section.

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[101] Some disagreed, and I think I generally agree with their disagreement. See Lowe E.J. & McCall, S. (2009). "The Definition of Endurance". *Analysis* 69: 277-80. The trouble was that originally both parties, perdurance and endurance accepted to frame their respective views in Lewis' terms. Although, it turned out to be perfectly viable for perdurantists or four-dimensionalists, in hindsight probably it was a mistake for the opponents of Lewis' view. It is paramount how endurantists ended up playing right in Lewis' hands: Lewis used the phrase 'wholly present' against endurance, stressing its obscurity. At that point it was just too late for the endurance supporters to take it back; the die was cast, period. Perhaps, it was not a great move on the endurantists' part to let their philosophical opponent account for their own view but this is history, and most of the literature in the aftermath of Lewis revolved around the attempt to clarify the expression 'wholly present' (see for example Crisp, T. & Smith, D. (2005). "'Wholly Present' Defined". *Philosophy and Phenomenological Research*: 71: 318-44; Olson, E. (2006). "Temporal Parts and Timeless Parthood". *Noûs* 40: 738-52; Wasserman, R. (2004). "Framing the Debate over Persistence". *Metaphysica* 5: 67-80). All this until 2009 when a genuine endurance supporter like Lowe finally claimed what endurance was really about. To this extent, in the following I shall draw upon Lowe & McCall's conclusions when I claim that what seems to crucially discriminate between perdurance and endurance is the notion of temporal parts. Of course, such a line of argument could be supplemented noting for example that the expression 'to exist at more than one time' which is supposedly the common part between the definitions of perdurance and endurance is susceptible of different readings from the point of view of perdurance and endurance (see Lewis' 'partly or wholly'), and therefore not the 'neutral word' as Lewis put it. In a nutshell, it seems that the dice were loaded against endurance right from the beginning.

Going back to Lewis' agenda, it is interesting to note that a few years down the line, his tacit assumption that persistence is an ubiquitous feature of reality is called into question: some philosophers[102], apparently independently, set forth new approaches which, while allegedly relying on the same background, more or less tacitly ended up denying this feature of reality.[103]

In what follows, I shall apply Lewis' perdurance and endurance definitions to the scenario we began with, namely if the bike in the shed is the bike bought twelve months ago, to see how they square with it, and most importantly if they can be of any help in understanding, and clarifying what is going on; as well as potentially overcoming the predicament harboured above.

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[102] Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press. Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press. Varzi, A. (2003*a*). "Naming the Stages". *Dialectica* 57: 403; (2003*c*). "Entia Successiva". *Rivista di Estetica* 22: 139-58.

[103] Perhaps, at this point, one move could be to disentangle the notion of *persistence* from that of *identity over time*. None of the stage theorists, whether *a là* Sider or not, denies that things persists; generally they say that they do by having *different* counterparts at *different* times (analogy time-modality). What they say is instead that there is no sense in which things preserve any identity over time: they are not so since entities existing at different times (those we quantify over) are *not* numerically identical. In addition, they tend not to commit to aggregates to temporal counterparts excluding by *fiat* the only one condidate left able to preserve a sense of identity across time in such four-dimensional/perdurantistic picture.

1.1.1 *Perdurance, Endurance, and...Bikes*

How perdurance describes the situation above would be something along the following lines: [104] what I refer to as 'my bike' is a collection of, broadly speaking, bike-like spatio-temporal *parts* which make up that thing; one spatio-temporal part of it now happens to be in the shed, whereas another one was once on the shop floor (and allegedly many more parts in between, before, and after). From, say, God's perspective what I refer to as 'my bike' looks like a huge worm-like entity which extends in space as well as time or in spacetime. The idea of the worm-like entity is, as we saw above, what gives name to this view as the *worm theory*.[105]

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[104] Eminent perdurantists include: Taylor, R. (1955). "Spatial and Temporal Analogies and the Concept of Identity". *Journal of Philosophy* 52: 599-612;. Armstrong, D.M. (1980). "Identity Through Time". In Peter van Inwagen (ed.) *Time and Cause*. Dordrecht: D. Reidel, 67-78; Robinson, D. (1982). "Re-identifying Matter". *Philosophical Review* 107: 225-60; Heller, M. (1990). *The Ontology of Physical Objects*. Cambridge: Cambridge University Press; (1984). "Temporal Parts of Four-Dimensional Objects". *Philosophical Studies* 46: 323-34; Le Poidevin, R. (1991). *Change, Cause, and Contradiction*. Basingstoke: Macmillan; (2000). "Continuants and Continuity". *The Monist* 83: 381-398; Jubien, M. (1993). *Ontology, Modality, and the Fallacy of Reference*. Cambridge: Cambridge University Press; Hudson, H. (2000). "Universalism, Four-Dimensionalism, and Vagueness". *Philosophy and Phenomenological Research* 60: 547-60; Jubien, M. (1992). *Ontology, Modality, and the Fallacy of Reference*. Cambridge: Cambridge University Press; Le Poidevin, R. (2000). "Continuants and Continuity". *The Monist* 83: 381-98; (1991). *Change, Cause and Contradiction*. New York: St Martin's Press; Lewis, D.K. (1988). "Rearrangement of Particles: Reply to Lowe". *Analysis* 48: 65-72; (1986). *On the Plurality of Worlds*. Oxford: Blackwell, 202-4; (1976). "Survival and Identity". In Amelie Rorty (ed.) *The Identities of Persons*. Berkeley, CA: University of California Press, 117-40. Reprinted in Lewis, D.K. (1983). *Philosophical Papers I*. New York: Oxford University Press; (1971). "Counterparts of Persons and their Bodies". *Journal of Philosophy* 68: 203-11; Lotze, H. (1887). *Metaphysics, Book I (Ontology)*. B. Bosanquet (ed.). Oxford: Clarendon Press, Ch. 1-4; McTaggart, J.M.E. (1921). *The Nature of Existence, I*. Cambridge: Cambridge University Press, 176-7; Noonan, H. (1988). "Substance, Identity and Time". *Proceedings of the Aristotelian Society, suppl. vol.* 62: 79-100; (1976). "The Four-Dimensional World". *Analysis* 37: 32-9; Quine, W.V.O. (1981). *Theories and Things*. Cambridge MA: Harvard University Press, 10-3; (1976a). "Whither Physical Objects". In R.S. Cohen, P.K. Feyerabend & M.W. Wartofsky (eds.) *Essays in Memory of Imre Lakatos*. Dordrecht: D. Reidel Publishing Company, 497-504; (1960). *Word and Object*. Cambridge MA: MIT Press, sect. 36; (1953). "Identity, Ostention, and Hypostasis". In *From a Logical Point of View*. Cambridge, MA: Harvard University Press, 65-79; Robinson, D. (1985). "Can Amoebe Divide without Multiplying?". *Australasian Journal of Philosophy* 63: 299-319; Russell, B. (1914). *Our Knowledge of the External World*. London: Allen & Unwin Ltd., 112; (1927). *The Analysis of Matter*. New York: Harcour, Brace & Company, 243, 284-9; Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press, 1-11; (1997). "Four-Dimensionalism". *Philosophical Review* 106: 197-231; (1996). "All the World's a Stage". *Australasian Journal of Philosophy* 74: 433-53; Smart, J.J. (1972). "Space, Time and Individuals". In R. Rudner & Israel Scheffler (eds.) *Logic and Art: Essays in Honor of Nelson Goodman*. New York: Macmillan Publishing Company, 3-20; (1963). *Philosophy and Scientific Realism*. London: Routledge & Kegan Paul, Ch. VII; Whitehead, A.N. (1920). The Concept of Nature. Cambridge: Cambridge University Press; Williams, D.C. (1951). "The Myth of Passage". *Journal of Philosophy* 48: 457-72.

[105] *Mutatis mutandis*, what I just said could be easily applied to each of the two spatio-temporal parts 'the bike in the shed' and 'the bike once in the bike shop'. According to perdurance, they are both aggregates of bike-like spatio-temporal parts, and in turn each part of each bike, say frame, handlebars, etc. is an aggregate of frame-like, handlebars-like, etc. spatio-temporal parts. Something that could potentially give God a headache in case They decided to count how many things there really are.

In relation to the question at issue, a perdurance theorist would probably say that what I call 'the bike in the shed', and 'the bike once in the bike shop' refer to different *parts* of only one bike, the one I call 'my bike', an overarching entity, which has those entities as its parts. For a perdurantist there is such an entity so that what I call 'my bike' is a persisting entity, a part of which was once in a bike shop whilst another is now in my shed.[106]

Curiously though, the three entities which allegedly refer to what I call 'my bike', 'the bike in the shed', and 'the bike in the bike shop' are by no means one and the same: they are three different entities (numerically non-identical), each one of which is identical with itself but not so with any of the others. Therefore, strictly speaking they are three: three different parts[107] of the one and the same[108] overarching entity. So, if the reader ever suspected that the question at the outset whether the bike in the shed is the one once in the bike shop was about one bike, at this point perhaps she could feel a bit disheartened for there are actually quite a few bikes at issue.

As confusing as it gets, *prima facie* it seems as though perdurance is playing two different games, it claims that if we count the number of bikes the result is one: 'my bike'; but also that it is three: my bike, the bike in the shed, and the one once in the shop.[109] Potentially though, there might be many more than just three, there could be a bike for each moment or interval of time we see fit; for instance, suppose between the

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[106] For perdurance, parthood is primarily atemporal. My use of tenses like 'is now' and 'once was' is just instructive. For completeness' sake, a further issue to be added to those highlighted in this section regards, if perdurance is true, how numerically different spatio-temporal parts stick together to form a numerically identical worm. The relevant literature offers various options: without entering in much detail, generally what sticks parts together is a relation, something along the lines of Lewin's *genidentity* (made then popular by Reichenbach), which is salient and relevant in the case at issue. For example, what bonds parts could be a spatiotemporal, causal, psychological, etc. glue. See for example, Lewis' I- and R-relation in (1976). "Survival and Identity", 63-4. Reprinted in Lewis, D.K. (1983). *Philosophical Papers I*. New York: Oxford University Press, 55-77; Armstrong, D.M. (2010). *Sketch for a Systematic Metaphysics*. Oxford: Oxford University Press, Ch. 7; (1980). "Identity Through Time". In P. van Inwagen (ed.). *Time and Cause*. Dordrecht: Reidel Publishing Company, 67-78; Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press, Ch 3; just to name few. It is for sure an important issue *per se*, but one which is not crucial for the purposes of my argument so I shall flag it and leave it aside for the time being.

[107] I say three for what I call 'my bike', the worm-like entity, figures as 'part', although an *improper* one, of itself. But when it comes to counting, things become a bit complicated as I shall flag in the following.

[108] This is why I claimed early on that contrary to the established view according to which perdurance denies diachronic identiy, there is a robust sense in which an entity which persists by perduring is identical over time.

[109] The situation is slightly more complicated than that. Generally speaking, if perdurance is supplemented with unrestricted mereological composition, the total amount of bikes in this situation would probably be two since once you have the parts, the whole is no addition to them, or as in jargon 'an ontological free lunch'. See Armstrong, D. M. (1997), *A World of States of Affairs*. Cambridge: Cambridge University Press, 12.

shed and the shop floor the bike spent some time at my parents' house, on a plane, etc. then there would be a spatio-temporal part of 'my bike' which crashed at my parents' as well as another one on a plane, etc. so that the number of bikes would be more than just three. Interestingly, nothing seems to be able to hold the procedure back, in fact it could be easily reiterated so that at the end of the day what we could get is a potentially infinite number of bikes, one for each instant or interval of time; how many they are or, what seems more sensible, how many perdurance is content to posit.[110] To conclude, when it comes to counting the number of bikes, it all comes down to what is, relevantly and saliently, to be counted[111]: 'my bike' as a collection of all its parts in space and time, or just some of its parts. As long as we are clear with this then there is no problem. The epistemic *impasse* is overcome, we find ourselves somehow undecided simply because we do not realise what exactly has to be counted; but as soon as we figure that out then the epistemic uncertainty vanishes. Counting is somehow relative, relevant, and sensitive to what is counted; therefore relative to the sheer number of entities which make up the furniture of reality then the count would presumably be two[112] - the bike in the shed, and the one on the shop floor. Whereas relative to the question whether my bike is one or many, clearly it is one but one which has many parts: one of which *is now* in the shed whilst another *was once* on the shop floor.

By the same token, the metaphysical certainty is preserved, God would count the

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[110] I guess the number of parts in time could depend also on the nature of time itself, whether discrete, continuous, or dense. Once more, as I claimed at the outset of this part on persistence, it might well be the case that there is more to four-dimensionalism than just temporal parts, namely the question about time and its nature.

[111] On *counting* see Lewis, D.K. (1976). "Survival and Identity", 63-4. Reprinted in Lewis, D.K. (1983). *Philosophical Papers I*. New York: Oxford University Press, 55-77; Armstrong, D.M. (2004). *Truth and Truthmakers*. Cambridge: Cambridge University Press, 103; (1997), *A World of States of Affairs*. Cambridge: Cambridge University Press, 17, 47; (1989). *Universals: An Opinionated Introduction*. Boulder: Westview Press, 2-5; (1978). *Universals and Scientific Realism Volume I: Nominalism and Realism*. 37, 111-2; Baxter, D.L.M. (2001*a*). "Instantiation as Partial Identity". *Australasian Journal of Philosophy* 79: 449-64; (2001*b*) "Loose Identity and Becoming Something Else". *Noûs* 35: 592-601; (1999). "The Discernibility of Identicals". *Journal of Philosophical Research* 24: 37-55; (1988*a*). "Identity in the Loose and Popular Sense". *Mind* 97: 575-82; (1988*b*). "Many-One Identity". *Philosophical Papers* 17: 193-216; See also Bishop Butler's "Of Personal Identity", in *The Analogy of Religion*, S. Halifax (ed.). Oxford: Oxford University Press (1833), 361-70.

[112] See previous footnote. Once more, I shall stress how all must be taken with a grain of salt. The situation is more complicated than it looks. There is here at play quite a peculiar view on composition (unrestricted: for any plurality of non-overlapping objects, those objects compose something; supervenience: the whole is nothing over and above its parts, etc.) together with a question on quantification, namely over what entities we do/should quantify. All these issues are philosophically contentious, and could potentially influence a sharp answer to the counting question. Regrettably, given the broad nature of the topic and the approach of this thesis, I shall drop most of these issues but whenever needed I shall briefly flag, footnote or refer to what I think would be crucial for a sound understanding of them.

sheer number of bikes as two, the one in the shed, and the one once in the shop as distinct entities in their own right since they so are, but also as belonging as spatiotemporal parts to one entity, what I refer to as 'my bike'.

It is questionable if Lewis' account of perdurance clarifies the initial scenario, however what matters is that although intricate, the perdurance's machinery seems to do the trick, namely to wave off the predicament we found ourselves into between the evidence available (or the lack of it) on one hand, and our intuitions on the other. Either us or God would obtain the correct number insofar as both realise that counting is relative to what is counted. To sum up: relative to the number of bikes in the shed, the number would be one; relative to the number of bikes once on the shop floor, again the number would be one; lastly, relative to the number of bikes which would qualify as 'my bike', once more the result would be one although by no means would the three count as just one bike.

Faced with this argument and conclusion, the average person on the street may understandably feel a bit confused; perhaps she has been thinking all along that the whole thing was mainly about one bike, 'my bike' whether the one in the shed was the one once in the shop (in the case it had turned out it wasn't then it would have been about two bikes but this is a negligible detail) whereas Lewis opened the lid on a can of worms; he showed that actually there is an awful lot of bikes going on.[113]

Pointing at the huge number of bikes Lewis shows why the average Jane and Joe got in trouble in the first place, namely Lewis offers a solution to the puzzle. And presumably this is what we were looking for. From the point of view of the methodology discussed in passing in the Introduction Lewis' way is impeccable: beginning from a fairly ordinary situation, he would draw upon our beliefs and intuitions about what is going on; he would then point out how they lead to a puzzling situation (the reason why the situation is puzzling); and lastly he would offer a way out. A way out which comes at a cost: the cost of revising some of our beliefs about the number of objects involved in that particular situation. Isn't this the whole point of philosophy?

To raise the objection that this view is counter-intuitive, that clashes with our common sense beliefs that the whole thing is about one bike will not do; in the same

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[113] See also Lewis, D.K. (1993). "Many but Almost One". In K. Cambell, J. Bacon & L. Reinhardt (eds.). *Ontology, Causality, and Mind: Essays on the Philosophy of D. M. Armstrong*. Cambridge: Cambridge University Press. 23-38.

way as it will not do to point out that a philosophical system devised by a prescriptive rationalist, say Spinoza or Leibniz, is at odds with common sense. The whole point of their undertaking is to prove that what we ordinarily believe is, to some extent, wrong; saying conversely what should be the case. So I guess the lesson we could draw at this point is to accept perdurance as a clever, and robust explanation of what happens when an object persists through time.

So much for perdurance, I shall now highlight how endurance would allegedly account for that circumstantial evidence; and how, if at all, they could escape the predicament. According to endurance, something persists by enduring if and only if it persists by being wholly present at more than one time. As vague as it comes, Lewis attempts a clarification when he says that:

> "Endurance corresponds to the way a universal, if there are such things, would be wholly present wherever and whenever it is instantiated. Endurance involve overlap: the content of two different times has the enduring thing as a common part."[114]

Whether the *addendum* is clarificatory or not is matter of debate, particularly given the contentious status of universal entities; more to the point since it does not explain the apparently obscure phrase 'wholly present'. Given this uncertainty, to outline how an endurance theorist would deal with the scenario presented at the outset would be ultimately unfair to endurance, therefore the first thing I shall do is to possibly implement Lewis' *dictum*. Lowe & McCall decided not to play right into Lewis' hands,

[114] Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 202.

and so provided an insightful definition of endurance:[115]

> "An object *endures* iff (i) it lacks temporal parts, and (ii) it exists at more than one time"[116]

Therefore, going back to the bike in the shed, the one in the shop, and the one I refer to

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[115] Paramount endurantists include: Baker, L.R. (2000). *Persons and Bodies*. Cambridge: Cambridge University Press; (1997). "Why Constitution is not Identity". *Journal of Philosophy* 94: 599-621; Burke, M. (1994*a*). "Dion and Theon: An Essentialist Solution to an Ancient Puzzle". *Journal of Philosophy* 91: 129-39; (1994*b*). "Preserving the Principle of One Object to a Place: A Novel Account of the Relations Among Objects, Sorts, Sortals, and Persistence Conditions". *Philosophy and Phenomenological Research* 54: 591-624. Reprinted in Micheal Rea (ed.) *Material Constitution*. Lanham, MD: Rowman & Littlefield Publishers; (1992). "Copper Statue and Pieces of Copper: A Challenge to the Standard Account". *Analysis* 52: 12-17; Chisholm, R.M. (1973). "Parts are Essential to their Wholes". *Review of Metaphysics* 26: 581-603; Doepke, F. (1982). "Spatially Coinciding Objects". *Ratio* 24: 45-60; Fine, K. (2008). "In Defence of Three-Dimensionalism". *Philosophy* 83: 1-16. First published in the *Journal of Philosophy* 103: 699-714 (2006); Forbes, G. (1987). "Is There a Problem about Persistence?". *Proceedings of the Aristotelian Society* 61: 137-55; Gallois, A. (1998). *Occasions of Identity*. Oxford: Clarendon Press; Geach, P.T. (1967). "Identity". *Review of Metaphysics* 21: 2-12; (1966). "Some Problems about Time". *Proceedings of the British Academy* 60. Reprinted in Peter van Inwagen and Dean W. Zimmerman (eds.) *Metaphysics: The Big Questions*. Oxford: Blackwell, 192-203; Haslanger, S. (1994). "Humean Supervenience and Enduring Things". *Australasian Journal of Philosophy* 72: 339-59; (1989*a*). "Persistence, Change, and Explanation". *Philosophical Studies* 56: 1-28; (1989*b*). "Endurance and Temporary Intrinsics". *Analysis* 49: 119-25; Hinchliff, M. (1996). "The Puzzle of Change". In J. Tomberlin (ed.) *Philosophical Perspectives 10, Metaphysics*. Cambridge, Mass: Blackwell; Johnston, M. (1992). "Constitution Is Not Identity". *Mind* 101: 89-105; (1987). "Is There a Problem About Persistence?". *Proceedings of the Aristotelian Society* 61: 107-35; Lombard, L. (1994). "The Doctrine of Temporal Parts and The 'No-Change' Objection". *Philosophy and Phenomenological Research* 54: 365-72; Lowe, E.J. (1998). *The Possibility of Metaphysics*. Oxford: Oxford University Press; (1989). *Kinds of Being*. Oxford: Blackwell; (1988*a*). "Substance, Identity, and Time". *Proceedings of the Aristotelian Society* 62: 61-78; (1988*b*). "The Problem of Intrinsic Change: Rejoinder to Lewis". *Analysis* 48: 72-7; (1987). "Lewis on Perdurance versus Endurance". *Analysis* 47: 152-4; (1983*a*). "Instantiation, Identity, and Constitution". *Philosophical Studies* 44: 45-59; (1983*b*). "On the Identity of Artifacts". *Journal of Philosophy* 80: 220-32; Melia, J. (2000). "Continuants and Occurrent". *Proceedings of the Aristotelian Society* 74: 77-92; Mellor, D.H. (1998). *Real Time II*. London: Routledge; (1981). *Real Time*. Cambridge: Cambridge University Press; (1980). "On Things and Causes in Spacetime". *British Journal of the Philosophy of Science* 31: 282-8; Merricks, T. (1999). "Persistence, Parts, and Presentism". *Noûs* 33: 421-38; (1995). "On the Incompatibility of Enduring and Perduring Entities". *Mind* 104; 523-31; (1994). "Endurance and Indiscernibility". *Journal of Philosophy* 91: 165-84; Oderberg, D. (1996). "Coincidence Under a Sortal". *Philosophical Review* 105: 145-71; (1993). *The Metaphysics of Identity Over Time*. London/New York: Macmillan/St Martin's Press; Rea, M. (2000). "Constitution and Kind Membership". *Philosophical Studies* 97: 169-93; (1999). "One Really Big Liquid Sphere: Reply to Lewis". *Australasian Journal of Philosophy* 77: 213-15; (1998*a*). "Temporary Intrinsics and Presentism". In Dean W. Zimmerman & Peter van Inwagen (eds.) *Metaphysics: The Big Questions*. Cambridge, Mass.: Blackwell; (1998*b*). "Temporal Parts and Supervenient Causation: The Incompatibility of Two Humean Doctrines". *Australasian Journal of Philosophy* 76: 265-88; (1998*c*). "Temporal Parts Unmotivated". *Philosophical Review* 107: 225-60; (1995). "The Problem of Material Constitution". *Philosophical Review* 104: 525-52; Simons, P. (2008). "Modes of Extension: Comment on Kit Fine's 'In Defence of Three-Dimensionalism'". *Philosophy* 83: 17-21; (1987). *Parts: A Study in Ontology.* Oxford: Clarendon Press; Thomson, J.J. (1965). "Time, Space, and Objects". *Mind* 74: 1-27; (1983). "Parthood and Identity Across Time". *Journal of Philosophy* 80: 201-20; van Cleve, J. (1986). "Mereological Essentialism, Mereological Conjunctivism, and Identity Through Time". In P. French, T. Uehling, and H. Wettstein (eds.) *Midwest Studies in Philosophy* xi. Minneapolis: University of Minnesota Press; van Inwagen, P. (1990*a*). "Four-Dimensional Objects". *Noûs* 24: 245-55; (1990*b*). *Material Beings*. Ithaca, NY: Cornell University Press; Wiggins, D. (1980). *Sameness and Substance*. Cambridge, Mass.: Harvard University Press; (1968). "On Being in the Same Place at the Same Time". *Philosophical Review* 77: 90-5; Zimmerman, D.W. (1995). "Theories of Masses and Problems of Constitution". *Philosophical Review* 104: 53-110; (1997). "Immanent Causation". In James Tomberlin (ed.) *Philosophical Perspectives* xi. Cambridge, Mass.: Blackwell.

[116] Lowe, E.J. & McCall, S. (2009). "The Definition of Endurance". *Analysis* 69: 278.

as ‘my bike’, endurance would likely says that there is an entity, the one I call ‘my bike’, which is a bike, it does not have any temporal parts (of course it has spatial parts but this is trivial), and most importantly it existed all along: it was once in the bike shop whilst now is in my shed (and they would add that this is no big deal). Would this explanation do any good in waving off the predicament we stumbled upon? Not quite. Suppose we say that according to endurance what I call ‘my bike’ is an example of a persisting-by-enduring entity, therefore at any point in its life path, career, or whatnot it does not have temporal parts, it just exists at different times. Would this clarify the epistemic stalemate we agreed upon at the beginning? Not really. Still we would be clueless as to what enables us to ground why we believe what we believe, namely that the bike in the shed is the one once in the shop. To claim that this is the case because ‘my bike’ is an enduring entity would sound a bit question begging, or as in Lewis’ words a clear lack of analysis. Thus, endurance needs to have a good story about this otherwise perdurance might have an edge.[117]

How about the metaphysical certainty that there is a fact of the matter whether my bike is now in the shed whilst once was in the shop? I think in this case, we could easily use the same remark above, that metaphysically speaking my bike qualifies as an enduring entity therefore, my bike which is now in the shed, twelve months ago was in a bike shop, period. What seemed to be a not so insightful reason earlier, turned out to be potentially a very good one; it is good for it is adequate to the current context (metaphysics) whereas it was not in the one just above (epistemic). Still though, we do need a story good enough to address the epistemic stalemate, and eventually to overcome it. Yet perdurance seems to have an edge despite the ridiculous number of bikes involved.

It would not take us very far to claim that we do not need to provide good reasons when it comes to bestowing why we believe that my bike is the bike now in the shed which was once in the shop just because this is the way it is. Getting rid of a question because it sounds somehow suspicious is never a great idea, to show why it is,

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[117] In conversation, Dr. Francis Pearson called to my attention that what I say might sound unfair to endurance. Ideally, it would be nice to be as fair as possible to both contenders although my sympathy goes for perdurance. In any case, what I am saying is that how endurance purports to explain why there is only one bike all along by claiming that a bike is an instance of an entity which persists by enduring - a shorthand for it has no temporal parts and it exists at more than one time - fails to address the epistemic issue above. We still do not know on what ground the bike in the shed is the one once in the shop; and to claim that the bike in the shed *is* the one once in the shop does not help. It never helps to answer an epistemic question with a metaphysical answer.

and then to get rid of it would definitely be more fruitful.

To this extent, I think it would be appropriate to raise a couple of remarks, perhaps a little subtle, just to make clear what we are talking about when we talk about bikes persisting over time; so that at the end of the day it might be possible to come down on one side or the other of the perdurance/endurance debate. Otherwise, the dice would be unfairly loaded against endurance, as Lowe & McCall point out.

To this end, I shall now introduce a topic which I overlooked whilst exposing perdurance since I thought it would not be needed to show what a perdurance theorist would say about the scenario at stake. Though the reader may think that this is a case in which the medicine is worse than the disease, I respond that more often than not the medicine is bad when it is not clear or adequately understood the disease which it is used for. What I think is that perdurance might be a good remedy insofar as the disease is taken at face value; once we scratch the surface then there might be a chance for endurance to even out perdurance's edge (which at no point settles the question whether we should go for one or the other).

1.1.2 *Identity, Individuation, and Identification*

In this brief section, I shall outline what I take to be a promising view which employs some subtle distinctions (often overlooked), useful for the purpose of clarifying what's at stake, and also helpful for restricting the range of the inquiry. I am referring to a terminological and conceptual issue which regards a conflation and a consequent misunderstanding of three philosophical notions: *identity*, *individuation* and *identification*. Although, often used as synonyms in the literature; a careful analysis shows that they are not.

In this, I shall draw upon Lowe's idea that there are two ways in which identity is understood: [118] (i) as a relation, and (ii) as a name which picks out the individual essence of something. The former way characterizes what we call *criteria of identity* while the latter yields to what we call *principles of individuation*. Individuation, metaphysically speaking, is a determination relation between entities: a relation which obtains between entities *x* and *y* when *x* determines or fixes which entity of its kind *y* is. And when *x* stands in such relation to *y* then *x* is an individuator of *y*. However, something more has to be said about this issue, in particular focusing on the epistemic or cognitive side which happens to be what we need to address the epistemic stalemate that seems to penalise the endurance account.

Identity is then a logical and metaphysical relation. *Individuation*, in a metaphysical sense, expresses the individual essence of an entity whereas in a *cognitive* sense it amounts to singling out some object by pointing or description: for instance, we single out an object via its properties - at one time it possesses some properties while at a later time it possesses different properties (think about the case of my bike, it is now a bit run-down but it was in perfect condition a while ago). Individuation in this epistemic sense is not sufficient to explain such evidence, thus something else seems to be needed, namely *identification*. Again it qualifies as an epistemological relation, namely a cognitive act or a judgement between two distinct acts of epistemic individuation.

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[118] Lowe, E.J. (2010). "On the Individuation of Powers". In A. Marmodoro (ed.). *The Metaphysics of Powers: Their Grounding and Their Manifestations*. New York: Routledge, Ch. 1; (2007). "Sortals and the Individuation of Objects". *Mind and Language* 22: 514-533; (2003). "Individuation". In M.J. Loux & D.W. Zimmerman (eds.). *The Oxford Handbook of Metaphysics*, Ch. 3.

Let us then apply the above to the bike-now-in-the-shed/once-in-the-shop scenario, a situation in which we are curious of the whereabouts of a bike over a stretch of time: following from Lowe, we start picking out via two distinct acts of individuation an object at t_1, say the battered bike in the shed, and another at t_2, the new bike when it first was bought twelve months ago. Now the philosophical issue concerns whether the two objects are the very same objects (diachronic scenario, but the same holds *mutatis mutandis* in synchronic cases). A plausible answer, I gather, would be that they are the very same object or in a more refined way, by those two acts of individuation we picked out the same object. But several times such identification is not that easy to be attained. Sometimes it is *epistemically indeterminate* if the two objects we singled out are the same or distinct but this cognitive indeterminacy does not affect the metaphysical side of the matter. It is just epistemic indeterminacy.[119]

How then could this brief digression help endurance in dealing away with the predicament? In all fairness, I think that endurance does have to do away with nothing really, let alone the predicament; instead what endurance should point out is that there is more than just what meets the eye (in a sense in which seems to resemble what perdurance did, but without overgrowing the number of bikes)[120]. Once all is said and done, to live with such alleged epistemic indeterminacy is just the way it is without affecting our everyday life, and most importantly without affecting the metaphysical certainty about the number of bikes which furnish reality (if we are so keen to go for metaphysical determinacy at any rate). Perhaps, we could attempt to rephrase it as follows: epistemic *undecidability* is simply a feature of our situated/perspectual condition/situation, therefore we must understand how it works, and live with it. If this is really the case, surely, the urge to fix it qualifies as a case in which the medicine could be worse than the disease.

So much for how the two main contenders would describe and address the

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[119] The whole thing can be easily rephrased in terms of identification and re-identification. Such a way of naming may be misleading for the following reason: it seems that re-identification means that identification never fails whereas as I pointed out above, more often than not, it is indeterminate whether it holds or not. However, *mutatis mutandis* the distinction between identification and re-identification amounts to the distinction between individuation and identification. Identification according to the first distinction is an act of individuation while re-identification corresponds to a judgement between two distinct acts of individuation, thus it amounts to identification in the sense I presented above.

[120] Perdurance gave us two distinct things/parts and a question about whether they form one/a whole; a question which may have a determinate metaphysical answer even if we do not have a determinate epistemological one. Similarly, endurance has given its two specific identifications, and a question about whether they identify the same thing; again, a question with a determinate metaphysical answer even if not a determinate epistemological one. And to this degree the two seem to be on an equal footing.

scenario at the outset. It would be incomplete though just to leave it like that since there is at least another contender which reclaims, allegedly with a good deal of reasons, its own place in the dispute. I am hinting at what is well-known as the *Stage Theory*.[121]

[121] The stage theory seems to come in many ways, in particular it first came to the fore in 1996 after Sider's paper *All the World's a Stage*, whilst it got sanctioned, philosophically speaking, in 2001 with Sider's well-regarded book *Four Dimensionalism: An Ontology of Persistence and Time*. At the same time though, a couple of other philosophers saw it at a viable approach to persistence and, generally a solution to more or less traditional puzzles of identity over time, composition, constitution, etc. In 2001, Hawley published *How things Persist*, which is a full-blown stage theoretic view of persistence, whereas the stage theory took Varzi's fancy in *Naming the Stages* in 2003. Although, generally speaking the trio sings along the same lines, some decisive features could be tracked down to fundamental differences among the three. I shall hint at the potentially crucial differences in the following of the section.

1.1.3 *Instantaneous Stages and...Instantanous Bikes*

According to its first propounder the stage theory is supposed to be a semantic contender to the worm theory in the economy of a perdurance account of persistence.[122] As we know, the worm theory is a semantic account of how expressions like 'my bike', 'the bike in the shed', etc. work; namely what items they refer to. When I utter the expression 'my bike' what I am actually referring to is an extended object, taking up the three dimensions of space and the one of time whereas my referring expression like 'the bike in the shed' points at just a small but still spatio-temporally extended part of that huge object.

Surely, there is a good sense in which when we quantify over a common object like a bike, what we do is just to quantify over that object without really meaning any extended worm-like entity. Thus, from the point of view of the stage view, whether there are worms or not does not matter since the ultimate subjects of quantification are single *instantaneous* stages. Therefore, there is no more hesitation when it comes to decide on what we are really quantifying over when we claim that something is such-and-such. According to Sider, the entities quantified over are instantaneous temporal parts, three dimensional slices of four-dimensional wholes, even though there might not be any (the extension of which is non-zero when it comes to their spatial dimensions whereas zero when it comes to their temporal one). Instantaneity does not defy temporality, or this is what the story tells.[123]

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[122] Eminent stage theorists include: Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press, 1-11; (1997). "All the World's a Stage". *Australasian Journal of Philosophy* 74: 433-53; Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press; Varzi A. (2003*a*). "Perdurantism, Universalism and Quantifiers". *Australasian Journal of Philosophy* 81: 202-15; (2003*b*). "Naming the Stages". *Dialectica* 57: 387-412; (2003*c*). "Entia Successiva". *Rivista di Estetica* 22: 139-58. In addition, Yuri Balashov attempts to draw a precise definition of stage theory or exdurance in Balashov, Y. (2007). "Defining 'Exdurance'". *Philosophical Studies* 133: 143-9.

[123] There are again some further issues lurking underneath; for example, how something with no temporal extension could adequately be thought of as making up a temporally extended entity. Secondly, there is a question concerning the nature of an instantaneous entity; for instance, how instantaneous is an instant. Thirdly, if the stage theory is fundamentally about three-dimensional entities, how come it is said to fall under a four-dimensional view of reality? In addition to it, following from the first question advertised above (perhaps a trivial question but one which has never been adequately addressed): namely how many three-dimensional stages are needed in order to make the sum four-dimensional? All these questions are doubtlessly interesting (and some trivial also) but I shall drop them since nothing from what I say in the following of the thesis depends on my answer or an answer to them. They are interesting in their own right and there is plenty of literature for a keen reader to delve into them.

Applied to the present case of a bike now in the shed which was or not once in the shop, the stage theory's pronouncement could sound like the following: right now what I call my bike is an instantaneous entity which happens to be in my shed (which in turn is an instantaneous stage of a shed-like entity) but twelve months ago it was *another* instantaneous stage of an entity which was, incidentally or not, in a bike shop (which in turn is an instantaneous stage of a bike shop-like entity). Thus, metaphysically speaking what I call my bike is really just that instantaneous entity (stage) which sits in my shed. It has though, say, an instantaneous *temporal counterpart* located twelve months ago in a bike shop but the one is *not* the other, which is the same as one is not *one and the same* with the other. The novelty behind the stage view or exdurance is the fact that temporality is treated analogously to modality (modal counterpart theory to be precise), that is identity over time and identity over possible worlds are somehow comparable.[124]

Going back to the predicament, the stage view's contribution could be this: again, there is no epistemic undecidability, when I presently say 'my bike' what I mean is the instantaneous stage which is now in my shed whereas if/when I said 'my bike' twelve months ago what I referred to was an instantaneous entity in a bike shop. The two instantaneous existences are clearly distinct but related by a temporal variety of Lewis' counterpart relation, such that one bike is the temporal counterpart of the other (how temporal counterparts stick one another is a bit of a puzzle in itself though). Therefore, is the bike in the shed the same as the one in the bike shop? Of course it is not. So then, how many bikes are there at the end of the day? Doubtlessly two (perhaps three if it turns out that there are aggregates of stages, but this also depends on which of the many views on material composition is endorsed).

To conclude, as in the perdurance's case above, the epistemic *impasse* is disencumbered, what we need to do is to figure out what we are talking about when uttering an expression like 'my bike'. Once this is done, we gain certainty of what/how many items there are at play (in this case two bikes). Lastly, if God decided to count the number of bikes the outcome would be two in line with perdurance, distinct bike-like

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[124] We should bear in mind that Lewis did not seem to be willing to go all the way with this temporal/modal parallel. See Lewis, D.K. (1986). *On the Plurality of Worlds.* Oxford. Basil Blackwell, Ch. 4; (1968). "Counterpart Theory and Quantified Modal Logic". *Journal of Philosophy* 65: 113-126. See also Hawley, K. (Forthcoming). "Lewis on Persistence". In B. Loewer & J. Schaffer (eds.) *Blackwell Companion to David Lewis*. For an unconventional stance on the time/modality analogy see Lowe, E.J. (2006). "Endurantism Versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 713-27; (1986). "On the Supposed Temporal/Modal Parallel". *Analysis* 46: 195-7.

instantaneous entities somehow related by a temporal counterpart relation.

1.2 *Assessment*

The purpose of these initial sections above was to introduce the topic of concern, to wit the persistence of material objects, via an ordinary case of an allegedly persisting object. This ordinary case, on closer examination, gave us a puzzle: is the bike currently in my shed the same thing as the bike that was in the shop some time previously? It was shown that we have quite strong intuitions about the case, i.e. that the two bikes are the same; these intuitions might then be supplemented by some common sense considerations, i.e. even though we might not be able to tell whether the two bikes are the same, we anyway believe that they must be a fact of the matter whether they so are or not. Together these intuitions and considerations moved us in a particular direction that harboured a predicament, namely the thought that the number of bikes must be determinate although we might not be able to tell on what grounds. Further to this, the point was to see if philosophy could shed some light on that situation: at first, to see what the predicament was about, and to provide a viable way out in the case the predicament was genuine.

Perdurance (in its two varieties, worm and stage theory), and endurance all had a saying: perdurance provided a clever solution to the predicament (the fact that the number of bikes must be determinate even though we might not be able to tell what it is and more importantly why it is so), one which involved some sort of theoretical entities called temporal parts (whether instantaneous or not has no particular bearing when it comes to solving the puzzle). Whereas the endurance answer was more along the lines of seeing the predicament's outcome as not genuine: distinguishing between two distinct aspects of the issue, one epistemic and one metaphysical, and then claiming that the epistemic failure of identification does not imply the metaphysical failure of there being a fact of the matter concerning the number of entities in question.

I think the conclusion we could draw at this stage is that all of them provided quite good stories about the legitimacy of the predicament or not, and in both cases, whether there is a predicament or not, they again afforded quite good stories about how to acquit the appearance of it. Since there is no clear-cut answer (for instance there would be a clear-cut one if one view sounded blatantly bizarre whilst the other robust

and sound) it is then quite difficult to come down on one side or the other. Perdurance, in the attempt to preserve some sort of homogeneity between our epistemology and metaphysics prescribes a deep revision of our language and thought showing how semantically and metaphysically we talk and think about the world really works. Conversely, endurance professes the awareness that the epistemic impasse might not be likely to be overcome and could be read as giving up the idea of a clean and tidy epistemology. However, what is important is that this awareness at no point affects the alleged metaphysical order and tidiness; as mentioned a few lines above, the epistemic uncertainty/undecidability does not yield to a similarly sloppy metaphysics.

Thus, both perdurance and endurance appear to say sensible and adequate things but which one should we go for? They both seem to provide good reasons why persistence should be read with one's filter or the other. But how good are their reasons? Surely, there would not be an easy to answer to this question. Assessing the goodness of a theory's reasons is just a small part of the task. Reasons could be good for different reasons (it sounds like a pun but if we replace the second 'reasons' with 'considerations' it then sounds less of a pun), and for different purposes: practical, explanatory, useful, etc. So perhaps, what we should try to tease out are, say, the small prints that come with a theory, in this case theories of persistence. Theories have implications thus an indirect and complementary way to evaluate a theory is to make as plain as day all these small prints, so that the strength and likelihood of a theory could be motivated by the more or less strength and likelihood of its commitments.

Admittedly, the question about on what grounds a theory's commitments should be judged is a contentious one, potentially one that could easily take up a research project by itself.[125] For this and similar reasons, I am forced to leave it like that. What I shall attempt to do is to make clear, at any stage, what my intuitions and considerations are and thus why I end up claiming what I do.

In the next chapter, I shall start the review of what I think is the most crucial element of distinction between perdurance and endurance's approach to persistence (in

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[125] See for example the debate about Ockham's Razor and parsimony (for the record, it is debateable whether they are about the same thing or not). Theoretical economy is supposed to be a crucial requirement when it comes to weighing competing theories but as we saw over the last few decades parsimony seems to come in many ways, for instance qualitative vs. quantitative; therefore it is still quite a hot topic in philosophy. I acknowledge the need to look into this since the outcome of the debate is left wanting but unfortunately for convenience's sake I will not be able to follow up on this. See for example: Lewis, D. (1986). *On the Plurality of Worlds.* Oxford: Basil Blackwell, 115-27; (1973). *Counterfactuals*. Oxford: Basil Blackwell, 87.

the light of Lowe & McCalls' definition of endurance), namely the concept of temporal parts. As I shall point out in the following, there is a sense in which temporal parts seem to be what discriminates between the two theories of persistence: pick a material object, it persists by perduring if it exists at more than one time *by* having different temporal parts for the different times it exists, or it persists by enduring if it exists at more than one time *without* having temporal parts for each time it exists. If this is plausible, then temporal parts carry out much philosophical work which I think ought to be untangled.

1.3 *Temporal Parts*

What seems to follow from how perdurance and endurance are traditionally defined is that the opposition rests, crucially, upon the notion of temporal part: perdurance claims that perduring things *exist at more than one time* by having different temporal parts for each time they exist, whereas endurance hits back saying that enduring things *exist at more than one time* without having temporal parts.[126] In its stage theoretic variety, perdurance claims that persisting things *exist at more than one time* in virtue of having instantaneous temporal counterparts at different times, but whether it amounts to a denial of persistence (or diachronic identity) rather than an affirmation of it is controversial.[127]

What seems to be obvious is that there is a good deal of theoretical pressure, as it were, put on this notion, and an equal amount of responsibility for perdurance adequately to account for it. Or so it should be I think. It looks like a case in which the burden of proof, if any, should be on perdurance rather than on endurance, despite the fact that endurance denies the notion of temporal parts, given that the burden of proof is generally on the denier. Perhaps, this is just a case in which the burden of proof is on who says more, and perdurance seems to say a lot more. It may also be added that seemingly perdurance claims things which are not readily apparent in everyday talk, so the burden of proof may be on it insofar as it proposes a change from our common outlook. However, as I shall show later in the chapter, it may actually be that the most basic intuition in the background of perdurance is all but against our common outlook.

Be it as it may, if this line of thought is plausible, it is fair to say that perdurance ought to explain in the first place what temporal parts are about and why they are so crucial, and what has been done so far in this direction seems to be far from exhaustive or conclusive. Therefore, in this chapter, I shall pursue the investigation of what

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[126] Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 202. Lowe, E.J. & McCall, S. (2009). "The Definition of Endurance". *Analysis* 69: 278-9. As I mentioned earlier in the thesis, I shall consider Lowe & McCall's as the most insightful and satisfactory definition of endurance; therefore, I shall leave Lewis' and others characterisation of endurance in terms of 'wholly present'. See footnote 103.

[127] Sider seems to be happy to bite the bullet, and Varzi too. See also footnote 105 on the suggestion of disentangling *persistence* from *diachronic identity* in the light of the stage theory.

temporal parts are[128] for the following reason: temporal parts (whether instantaneous or not) are a fascinating as well as a fundamental feature of perdurance, thus a proper account and understanding of them is compulsory.[129] If not, I believe this would then be a case similar to constructing a magnificent building on weak/cheap foundations, it looks good but it may fall down at any time after all.

Conversely, I shall not pursue an investigation of the very many objections raised against the concept of temporal parts. The reason is the following: at no point shall the aim be to line up, for taxonomy's sake as it were, all the various and eventual flaws in the notion which most of the time come from those who would not buy into temporal parts anyway. The stress instead will be on whether and how, which admittedly sounds quite unusual, temporal parts could stand scrutiny from the point of view of perdurance itself, and four-dimensionalism generally. This sort of theoretical sincerity and integrity is what I shall be looking for. Arguably though, at the end of the inquiry there seems to be a sense in which temporal parts do not seem to be able to meet such requirements unless some features of perdurance are dismissed. I shall show why and how I believe so in the following of this chapter.

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[128] This statement will need some qualification as I shall do at the outset of the next section. I shall not be after what temporal parts are in the sense of a definition (I shall assume Olson's conclusion that Sider's temporal definition of temporal parts is not good enough), rather I shall focus on those intuitions which are in the background of the notion which plausibly helped and moved temporal parts theorists to define temporal parts as they did.

[129] Apparently, temporal parts are not mandatory for a four dimensional view of reality, as argued in chapter 1.0. We can get away without them by positing distributional properties. See Parsons, J. (2000). "Must a four-dimensionalist believe in temporal parts?". *The Monist* 83: 399-418; and (2004). "Distributional properties". In F. Jackson and G. Priest (eds.) *Lewisian Themes*, Oxford University Press, 173-180.

1.3.1 *Temporal Parts Exposed*[130]

The question about the nature of temporal parts has been present in the literature for quite a while, more often than not from the perspective of the critics to show it wanting altogether with perdurance as the doctrine which takes the notion so crucially. As I made clear early on, I have sympathy for perdurance, and have looked forward to buying into temporal parts, but arguably, flicking through the literature, they remain a bit obscure. The dispute between enthusiasts and opponents turned out as barren as it gets. Nonetheless, I find temporal parts quite appealing and perhaps this is one of the reasons which has driven me into this investigation in the first place.

As briefly mentioned above, the originality of this section concerning the nature of temporal parts lies in the approach rather than in the outcome: we are all well aware that however temporal parts are defined, tentatively or not, in mereological[131] or

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[130] The literature is abundant: objections are raised for instance by Thomson, J.J. (1965). "Time, Space, and Objects". *Mind* 74: 1-27; Meiland, J.W. (1966). "Temporal Parts and Spatio-Temporal Analogies". *American Philosophical Quarterly* 3: 64-70; Mellor, H. (1981). *Real Time*. Cambridge: Cambridge University Press, 133; Van Inwagen, P. (1981). "The Doctrine of Arbitrary Undetached Parts". *Pacific Philosophical Quarterly* 62: 123-37; Hacker, P.M. (1982). "Events and Objects in Space and Time". *Mind* 92: 1-19; Thomson, J.J. (1983). "Parthood and Identity Across Time". *The Journal of Philosophy* 80: 201-20; Butterfield, J. (1984). "Spatial and Temporal Parts". *The Philosophical Quarterly* 35: 32-44; Le Poidevin, R. (1991). *Change, Cause and Contradiction*. New York: St. Martin's Press, Ch. 4; Lowe, E.J. (1998). *The Possibility of Metaphysics*. Oxford: Oxford University Press, 98-102; Rea, M.C. (1998). "Temporal Parts Unmotivated" *The Philosophical Review* 107: 225-60; Merricks, T. (1999*a*). "Persistence, Parts, and Presentism". *Noûs* 33: 421-38; Loux, M.J. (1998). *Metaphysics: A Contemporary Introduction*. London: Routledge, ch. 6; van Inwagen, P. (2000). "Temporal Parts and Identity Across Time". *The Monist* 83: 437-59; Haslanger, S. (2003). "Persistence Through Time". In Michael J. Loux & Dean Zimmermann (eds.) *The Oxford Handbook of Metaphysics*. Oxford: Oxford University Press, 315-54; Olson, E.T. (2006). "Temporal Parts and Timeless Parthood". *Noûs* 40: 738-52. In favor of temporal parts see are Quine, W.V.O. (1953). *From a Logical Point of View*. Cambridge, MA: Harvard University Press, 65-6; (1960). *Word and Object*. Cambridge, MA: The MIT Press, §24, 36. Lewis, D.K. (1976). "Survival and Identity". In Amelie Rorty (ed.) *The Identities of Persons*. Berkeley, CA: University of California Press, 117-40. Reprinted in Lewis, D.K. (1983). *Philosophical Papers I*. New York: Oxford University Press; Armstrong, D.M. (1980). "Identity Through Time". In P. van Inwagen (ed.) *Time and Cause: Essay Presented to Richard Taylor*. Dordrecht: D. Reidel, 67-78. Heller, M. (1984). "Temporal Parts of Four Dimensional Objects". *Philosophical Studies* 46: 323-34; Sider, T. (1997). "Four-Dimensionalism". *Philosophical Review* 106: 197-231; Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press, sect. 1.6; Sider, T. (2001). *Four-Dimensionalism*. Oxford: Oxford University Press, sect. 3.3; Conee, E. & Sider, T. (2005). *Riddles of Existence*. New York: Oxford University Press, 47-52; Sider, T. (2008). "Temporal Parts". In *Contemporary Debates in Metaphysics*, John Hawthorne, Theodore Sider, & Dean Zimmerman (eds.). Oxford: Blackwell, 241-62. See also McKinnon, N. (2002). "The Endurance/Perdurance Distinction". *Australasian Journal of Philosophy* 80: 288-306; Noonan, H. (2003*a*). " A Flawed Argument for Perdurance". *Analysis* 63: 213-5; Braddon-Mitchell, D. & Miller, K. (2004). "The Loneliness of Stages". *Analysis* 64: 235-42; McGrath, M. (2007). "Temporal Parts". *Philosophy Compass* 2: 730-46.

[131] See Simons, P. (1987). *Parts. A Study in Ontology*. Oxford: Clarendon Press. Sider, T. (1997). "Four-dimensionalism". *Philosophical Review* 106: 197-231. Parsons, J. (2007). "Theories of Location". In Zimmerman D. (ed.) *Oxford Studies in Metaphysics. Vol 3*. Oxford University Press, 201-32.

spatial[132] terms, so on and so forth, the chances for the definition to succeed - to be somehow exhaustive in giving necessary as well as sufficient conditions as definitions should do - is uncertain. The concept of temporal parts is theoretical and considerations in favour or against, quibbles and the likes are easy to spot or make up as the literature clearly shows. Perhaps, temporal parts just come down to an instance of David Lewis' famous pronouncement according to which "any philosopher who does not understand something will take care not to understand anything else whereby it might be explained."[133]

In any case, the long-standing debate among supporters and sceptics has seemingly reached a stalemate after, say, the Sider-Olson exchange to the conclusion that the doctrine of temporal parts failed to address the notion of temporal parts from an angle which could be intelligible and understandable by the detractors. According to perdurance parthood is essentially timeless (or atemporal) whereas for the opponents, generally endurance theorists, parthood is essentially temporal.[134] In short, for the latter, temporal parts are temporal, for the former timeless.[135] If Olson is right, one cannot frame the concept in a fashion on which both sides could agree. Therefore, when it comes to the *philosophy* of temporal parts, the outcome is uncertain: it might not be as successful as it was thought it could be. If this is really the case then it might be the case that there is a break in the communication between the party of the supporters of temporal parts and those who deny them; a failure of communication which does settle nothing apart from the fact that (i) one party does not understand what the other is talking about; or (ii) they are talking past each other - worst case scenario. Arguably, for the purposes of my argument, I shall assume Olson's conclusion for it sounds quite

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[132] Thomson, J.J. (1983). "Parthood and Identity Across Time". *The Journal of Philosophy* 80: 207-20. Heller, M. (1984). "Temporal Parts of Four Dimensional Objects". *Philosophical Studies* 46: 145-7. McGrath, M. (2007). "Temporal Parts". *Philosophy Compass* 2: 730-48.

[133] Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 203.

[134] "When the perdurantist claims that objects have temporal parts, the endurantist might wonder what he means. The perdurantist generally appeals to timeless parthood - simply being a part of something simpliciter [...] *x* is a temporal part of *y* iff, roughly, there is a time *t* such that: (1) *x* and *y* exist at *t*; (2) *x* exists at and only at *t*; (3) *x* is a part of *y*; and (4) everything that overlaps *x* overlaps *y*. The endurantist [...] might protest that at least when speaking of material objects she doesn't understand what it is to simply be a part of something. She might say she understands only temporally qualified parthood, parthood at a time." McGrath, M. (2007). "Temporal Parts". *Philosophy Compass* 2: 740.

[135] See Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. New York: Oxford University Press, 59; Miller, K. (2005). "The Metaphysical Equivalence of Three and Four Dimensionalism". *Erkenntnis* 62: 91-117; McGrath, M. (2007). "Temporal Parts". *Philosophy Compass* 2: 730-48.

plausible and, more to the point, in the light of the fact that philosophers in both parties consider the atemporality of parthood by perdurance a point taken.[136] We would then be, I guess, better off looking elsewhere.[137]

My contention is that perhaps we could look into what fosters the idea of temporal parts, something along the lines of a set of intuitions and/or common sense considerations which might lie at the rock bottom of the notion. As pointed out in the Introduction, what I mean by 'intuition' cannot be more distant from the philosophically uneducated set of platitudes which allegedly seem to lead out our lives on a everyday basis; therefore anything resembling Lewis' trivialities and platitudes will be taken off the table right now. 'Intuitions' as seeing something to be the case, an awareness and appreciation which could be potentially further enlivened via auxiliary explanation whether theoretical or practical.

Perhaps the last statement needs to be qualified further: temporal parts are a theoretical entity, an artful term which presumably conveys a meaning. Thus, perhaps the investigation of the set of considerations upon which philosophers have drawn to include temporal parts as elements of the furniture of reality might be somehow

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[136] Olson, E. (2006). "Temporal Parts and Timeless Parthood". *Noûs* 40: 738-52. In *Four-Dimensionalism: An Ontology of Persistence and Time*, Sider exposes the apparatus of notions required before coming to a definition of temporal parts (temporal and atemporal parthood plus the notion of existence at a time which is distinct from quantification): "The temporal part of *x* at time *t* is sometimes defined as the part of *x* that exists only at *t* and has the same spatial location as *x*, but I distrust the appeal to spatial location. The idea is to insure that the temporal part of *x* is a 'big enough' part of *x*, but the definition fails for an object without spatial location, and for an object sharing spatial location with one of its proper parts (for example a 'trope' for its shape). I therefore prefer a purely mereological definition: *x* is an *instantaneous temporal part* of *y* at instant $t =_{df}$ (1) *x* exists at, but only at, *t*; (2) *x* is part of *y* at *t*; and (3) *x* overlaps at *t* everything that is part of *y* at *t*. [...] 'Temporal part' can also be defined using the atemporal part-whole relation of the Calculus of Individuals: *x* is an instantaneous temporal part of *y* at instant $t =_{df}$ (1) *x* is a part of *y*; (2) *x* exists at, but only at, *t*; and (3) *x* overlaps every part of *y* that exists at *t*. This definition is more perspicuous for a four−dimensionalist since it is stated using atemporal parthood, but as noted it is sometimes better to have a definition that the three-dimensionalist can accept as intelligible." Pace Sider, Olson concludes that: "I doubt whether any other attempt to define 'temporal part' in terms of temporally qualified parthood will do any better than Sider's. You need to understand parthood timelessly in order to understand the concept of a temporal part. To put it paradoxically, temporal parts are timeless parts. Sider's goal is admirable - to explain what temporal parts are to those who take parthood to be irreducibly time-relative - can never be attained." For the purposes of the thesis I shall not dispute Olson's conclusion, I shall assume he is right since what I shall attempt to do is to gather agreement between perdurance and endurance *not* on how temporal parts are philosophically defined, rather on what intuitions and common sense considerations, if any, the concept of temporal parts rests upon.

[137] My attitude on this issue might sound dismissive but actually is not. I would like to stress that the attempt to define temporal parts in a fashion which could be grasped by those who do not see what they are about, whatever the reason, has not been successful so far. This recognition does not imply that any temporal definition whatsoever will ever fail, which is by the way a slightly different issue from the, say, contingent failure of communicating the notion in temporal terms. The former is perhaps Olson's conclusion but I am not after the assessment of the implications more or less concealed in Olson's argument. If it is the latter, then the possibility is open for somebody to come out with a better story somehow sometime.

enlightening or simply a new and original way to go about and to look at a long-standing debate whose outcome seems to be unsettling as well as to leave the reader wanting (or at least this is the feeling I had myself).

Further to the claim that temporal parts are theoretical entities[138] it might well be added that they so are in a way that does not need any particular recourse to scientific evidence in order to be posited; in fact, if we look at the way they are generally cashed out in the literature, as I shall shortly do, it is obvious that we do not need to appeal to any sort of subtle scientific remark or evidence to figure that out. For instance, as the narrative goes, material things appear to have parts in space, one is here another one is there: looking at my road bike sitting by my desk, the rear wheel is right here whilst the front one is further away. Similarly, an attentive outlook suggests that things might behave in time in a similar way: for instance, the bike Marco Pantani won the Tour de France in 1998 on was, at that time, a state-of-the-art product of bike engineering whereas now it sits demure in a museum. Things have a history, if so a part of that bike was in 1998 in France whilst the 2014 one is in Cesenatico. Most importantly, things have histories in time so to speak.[139]

There seems little appeal to scientific or empirical experience in the argument above. Temporal parts are such an instance of a theoretical posit which is cashed out mostly without recurring to any superior sort of evidence; it is the outcome of what I clearly 'see' to be the case.[140] If this sounds plausible then it might be that the expectation for temporal parts to be validated by the best sciences available is a wishful thinking at best or a category mistake at worst; and the fact that the sciences seem somehow to go in that direction (they seem to be talking in terms of events which are a paradigmatic sample of things with temporal parts) is again an indication or a promise, if at all, that certain philosophy and certain sciences happen to be on the same page but

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[138] By 'theoretical' I mean 'not empirical'. And the reference to 'scientific' evidence means 'experimental/empirical'. Given temporal parts' status that sort of evidence would be incongruous.

[139] And people too: my infancy, teenage, etc. are all parts of me; not in space but in time.

[140] It might be argued that Pantani's bike is not Pantani's bike *history*. It might well be so. However, I confess that I am not sure how to address this remark apart from asking the objector to show me in what they differ.

nothing more than that. To conclude, no empirical undertaking could establish whether there are temporal parts and what they are.[141]

Moving closer towards the focus of this section, I believe that a careful investigation into how temporal parts are usually *introduced* and *presented* in the literature could turn out to be beneficial for the clarification and understanding of where the notion comes from; and in addition to see if it is possible to gather some agreement by the opponents bypassing in one go the not wishy-washy problem of the disagreement upon the philosophical regimentation of the notion.

First thing first, it is instructive to notice that generally how temporal parts are introduced and explained is via examples which draw upon some sort of intuitions about parthood that our thinking as well as language seem to be endowed with; intuitions about parts of things in space and in time plus some other common sense considerations. Let us now see how.

To recapitulate, a very brief survey on how temporal parts are generally introduced and presented in the literature.

The first *locus* is Quine. In *Identity, Ostension, and Hypostasis*, perhaps one of the most celebrated examples, Quine has it that:

> "The truth is that you can bathe in the same river twice, but not in the same river stage. You can bathe in two river stages which are stages of the same river, and this is what constitutes bathing in the same river twice. *A river is a process through time, and the river stages are its momentary parts.* [my italic] Identification of the river bathed in once with the river bathed in again is just what determines our subject matter to be a river process as opposed to a rive stage. [...] We begin [...] with momentary things and their interrelations. *One of these momentary things, called a, is a momentary stage of the river Caÿster, in Lydia, around 400 B.C.* [my italic]"[142]

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[141] See Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D. Zimmerman, *Contemporary Debates in Metaphysics*. Blackwell: 241-62. Whether no empirical undertaking could *ever* establish the existence and nature of temporal parts is an interesting question. Sider seems to leave the possibility open. I do not have myself a cristal ball so at best what I could offer is the following remark: if the questions upon the existence and the nature of temporal parts are genuine metaphysical questions then any scientific answer, whether from the best or the worst sciences available, would not count as a good answer to that question. See also Mark Johnston's remark: "Temporal part theory is not meant to poach on empirical preserves." in Johnston, M. (1987). "Is There a Problem About Persistence?". *Proceedings of the Aristotelian Society, Supplementary Volume* 61: 107-35.

[142] Quine, W.V.O. (1953). *From a Logical Point of View*. Cambridge, MA: Harvard University Press, 65-6. See also Quine, W.V.O. (1960). *Word and Object*. Cambridge, MA: The MIT Press, §24, 36. In the passage quoted, Quine sketches the notion of spatiotemporal stage as well as how stages could be different stages of the same entity, namely what Quine calls 'their interrelations'.

As celebrated as the one above, in the Appendix B to *Survival and Identity*, a few years down the line, Lewis claimed that:

> "Some would protest that they do not know what I mean by "more or less momentary person-stages, or time-slices of continuant persons, or persons-at-times". Others do know what I mean, but don't believe there are any such things [...] *A person-stage is a physical object,* [my italics] just as a person is. [...] It does many of the same things that a person does: it talks and walks and thinks, it has beliefs and desires, it has a size and shape and location. It even has a temporal duration. *But only a brief one, for it does not last long.* [my italics] [...] It begins to exist abruptly, and it abruptly ceases to exist soon after. Hence a stage cannot do everything that a person can do, for it cannot do those things that a person does over a longish interval."[143]

As van Inwagen put it, 'if one cannot understand a philosophical question, [what temporal parts are] one's best course is to look at some alleged answers to it; sometimes these answers enable one to see what question it is that they are offered as answers to it.'[144] Let us then see how Lewis argues for the existence of temporal parts:[145]

> First: it is possible that a person-stage might exist. Suppose it to appear out of thin air, then vanish again. Never mind whether it is a stage *of* any person (though in fact I think it is). My point is that it is the right sort of thing.
>
> Second: it is possible that two person-stages might exist in succession, one right after the other but without overlap. Further, the qualities and location of the second at its appearance might exactly match those of the first at its disappearance. Here I rely on a *patchwork principle* for possibility: if it is possible that X happen intrinsically in a spatiotemporal region, and if it is likewise possible that Y happen

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[143] Lewis, D.K. (1983). "In Defense of Stages", Appendix B to "Survival and Identity". In *Philosophical Papers I*. New York: Oxford University Press, 76. Although, as I pointed out in the Introduction, for convenience's sake I shall be concerned only with ordinary material objects and not persons; still I think Lewis' passage would be inescapable for the purposes to address the question of the nature of temporal parts. After all, Lewis' talk in terms of persons could be easily rephrased in terms of ordinary material objects, for example a table-stage is "a physical object, just as a table is. [...] It does many of the same things that a table does: [...] it has a size and shape and location. It even has a temporal duration. But only a brief one, for it does not last long."

[144] van Inwagen, P. (2000). "Temporal Parts and Identity Across Time". *The Monist* 83, 437-59.

[145] What Lewis claims in the following is decisively affected by Lewis' peculiar stand on modality and other things. Lewis was a modal realist therefore when he claims that 'it is possible that a person-stage might exist', what he really means must be read in the light of famous pronouncement that "absolutely every way that a world could possibly be is a way that some world is." Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 2. In addition, it is also affected by his humean supervenience, or "the thesis that the whole truth about a world like ours supervenes on the spatiotemporal distribution of local qualities." Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, ix-xvi. See also Lewis, D.K. (1994). "Humean Supervenience Debugged". *Mind* 103: 473-90.

> in a region, then also it is possible that both X and Y happen in two distinct but adjacent regions. There are no necessary incompatibilities between distinct existences. Anything can follow anything.
>
> [...]
>
> Sixth: then our own world is a world of stages. In particular, person-stages exist.
>
> Seventh: but persons exist too, and persons (in most cases) are not person-stages.[146] They last too long. *Yet persons and person-stages, like tables and table-legs, do not occupy spatiotemporal regions twice over. That can only be because they are not distinct. They are part−identical; in other words, the person-stages are parts of the persons.* [my italic]"[147]

It is contentious if the passages above count as an adequate account of temporal parts, what they are or what content the concept is supposed to convey; I do not think myself they do a great deal of elucidation but, at the same time, it does not seem to make any further harm. More to the point, I had to start from somewhere and Quine and Lewis generally qualify as the basics.

Any case, what seems to emerge quite clearly is the fact that (i) there are good reasons to believe there are such momentary things (Lewis), and that (ii) they also seem to do some decisive philosophical work (Quine). I shall then take (i) and (ii) seriously, and shape the remainder of this first part of the thesis accordingly. At first, as I pointed out above, given the failure of defining what temporal parts are from a strict philosophical perspective, I shall look at the reasons, if any, lurking in the background which might turn out beneficial to account for the existence of temporal parts: in other words what entitles perdurance to believe that temporal parts exist; and secondly, I shall look into what temporal parts are supposed to do: in other words what philosophical work they carry out, which again will be a way to answer, indirectly, the question about their existence as well as nature.

So much so, I believe I still owe the reader an answer to the question (which I am sure has been tacitly hovering around since I first exposed my strategy in this

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[146] It is interesting to contrast this stamement with Sider's *incipit* of *All the World's a Stage*: "not only do I accept person stages; I claim that we are stages." Sider, T. (1996). "All the World's a Stage". *Australasian Journal of Philosophy* 74: 433-53.

[147] Lewis, D.K. (1983). "In Defense of Stages", Appendix B to "Survival and Identity". In *Philosophical Papers I*. New York: Oxford University Press, pp. 76-7. For the record, Lewis' explanation of what temporal parts are supposed to be is quite lengthy and uninstructive at times therefore in the quotation above I shall highlight only those points which I believe are relevant for the purposes of my argument.

chapter): why should I bother looking at what lies in the background if the sheer attempt of defining temporal parts turned out pointless? There could be two answers to this question: the first one (i) draws upon the fact that to say that the attempt of defining temporal parts in a way that they could be grasped by their opponents was idle does not amount to saying that any definition of temporal parts is so: definitions in terms of atemporal parthood are quite appropriate although difficult to communicate.[148] Secondly, (ii) even though a definition in terms of necessary and sufficient conditions does not succeed (or it partially does), it does not amount straight away to say that we do not have a clue of what's going on in that situation: a philosophical definition is generally a regimentation of a set of intuitions, common sense considerations and beliefs which need to be systematised. It seems to me plausible to have strong intuitions as well as to be able to make common sense considerations even though I am momentarily unable to pin them down and to frame them into a definition. A lack or failure of definition does not affect the strength of the intuitions and the reasons which seemingly support some common sense considerations, if any, which the definition is supposed to regiment.

In addition, if such bedrock could be ever reached, it could be then used to gather agreement in a way in which it is precluded to any philosophical definition or argument: intuitions and common sense considerations speak for themselves, as it were. It is undeniable that different people sometimes have different intuitions and draw different conclusions appealing to presumably different common sense considerations; I am perfectly happy with that. The aim is not to impose my own intuitions and common sense considerations over other people; what I shall try to achieve is to provide clear and good reasons why my intuitions and common sense considerations are what they are. If they will be found convincing then I shall consider my job successful.

So much for Quine, and Lewis. One philosopher who thought of implementing the notion of temporal parts with mixed blessing is Ted Sider. In the attempt to arguing for the notion of temporal parts he drew upon a parallel between parts of things in space and parts of things in time as in the following:

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[148] We could easily carry the same pattern over Lewis' definition of endurance in terms of 'being wholly present' and note that the outcome would be similar: the attempt to define what it takes for something to be 'wholly present' remains obscure to a perdurance theorist however it might be explained. For this reason, we ought to take these issues with a grain of salt.

> "Having a part at a time is familiar. The end of my fingernail is part of me today but is not part of me tomorrow if I clip it off; a plank is part of a ship at one time but not another." [149]

On a slightly different note, perhaps less rigorous but definitely more instructive for our purposes, temporal parts are accounted for as follows:

> "A temporal part of an object at a time is a temporal cross-section of that object; it is that-object-at-that-time. Consider the temporal part of the person in 2000. [...] This object is the exact same *spatial size* as the person in 2000. But the temporal part is not the same *temporal size* as the person; the temporal part exists only in 2000 whereas the person exists at later times as well. The person herself is the sum total of all her temporal parts [...] Time is just one of the dimensions of space-time, alongside the three spatial dimensions, just as it appears to be in the space-time diagrams. Time does not flow; time is like space.[150]

Although time is not completely like space, time and space are analogous at least in three respects: reality [151], parts, and in terms of here and now[152]:

> "[In terms of *parts*.] Material objects take up space by having different parts. My body occupies a certain region of space. Part of this region is occupied by my head, another by my torso; other parts of the region are occupied by my arms and legs.

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[149] Sider, T. (2001). *Four-Dimensionalism*. Oxford: Oxford University Press, 55-6. Sider goes on adding that: "Familiar as this notion is, it is *not* the notion of parthood usually discussed by four−dimensionalists. [They] tend to speak of the parts of an object *simpliciter*, rather than the parts it has at this time or that. This is actually a special case of a more general fact: four-dimensionalists tend to employ an atemporal notion of exemplification of properties and relations. Thus, a four-dimensionalist will say that my current temporal part is, atemporally, sitting, 69 inches tall, and wearing a (temporal part of a) hat. Likewise, the four-dimensionalist will say that my current temporal part is, atemporally, part of the larger spacetime worm that is me. This is not to say that four-dimensionalists reject change. Intrinsic change is difference between successive temporal parts. I change from sitting to standing by having a temporal part that sits and a later one that stands. Change in relations is analogous: I sit in a chair at one time but not another because my earlier temporal part sits (*simpliciter*, atemporally) in a temporal part of the chair whereas one of my later temporal parts fails to sit in the corresponding later temporal part of the chair. Mereological change is a special case of relational change: my fingernail end ceases to be a part of me because its later temporal parts are not part of my later temporal parts.

[150] Conee, E. & Sider, T. (2005). *Riddles of Existence*. New York: Oxford University Press, 49. Which by the way echoes Lewis' passage above.

[151] *Ibid.* 50. " Objects far away in space [...] are obviously just as real as things here on Earth. We may not know as much about the far-away objects as we know about things around here, but that doesn't make [them] any less real. Likewise, objects far away in time are just as real as objects that exist now. [...] Distant objects, whether temporally or spatially distant, all exist somewhere in space-time."

[152] *Ibid.* 51. "If I say on the phone 'here it is raining' to a friend in California, and she replies 'here is sunny', which one one of us is right? Where is the *real here*, California or New Jersey? [...] There is no 'real here'. The word 'here' just refers to whatever place the person saying it happens to be. [...] The space-time theory says an analogous thing about time: just as there is no objective here, so there is no objective *now*. If I say 'It is now 2005', and Guy Fawkes said 'It is now 1606', each statement is correct. There is no single, real, objective 'now'. The word 'now' refers to the time at which the speaker happens to be located."

> These parts may be called my spatial parts, since they are really spatially smaller than I am. The corresponding fact about time is that an object lasts over a stretch of time by having different parts located at the different times within that stretch. These parts are the temporal parts mentioned above. These temporal parts are just as real objects as my spatial parts: my head, arms, and legs."[153]

It seems that, slowly but steadily, it is all coming together. To strengthen my overall point I think that a couple more samples could be beneficial. The first two are once again by Lewis and Sider, the final one by Katherine Hawley.

To illustrate the idea that something persists by perduring, Lewis draws upon a very ordinary case:

> "Perdurance [the doctrine of temporal parts] corresponds to the way a road persists through space; part of it is here and part of it is there, and no part is wholly present at two different places."[154]

Along the same lines Sider claims that:

> "Temporal parts theory is the claim that time is like space in one particular respect, namely, with respect to parts. First think about parts in space. A spatially extended object such as a person has spatial parts: her head, arms, etc. Likewise, according to temporal parts theory, a temporally extended object has temporal parts. Following the analogy, since spatial parts are smaller than the whole object in spatial dimensions, temporal parts are smaller than the whole object in the temporal dimension. They are shorter-lived."[155]

Finally Katherine Hawley, in the entry 'Temporal Parts' of the Stanford Encyclopedia of Philosophy offers a very instructive exposition of what temporal parts are supposed to be:

> "You're performing an amazing trick right now: you're in two places at once. How do you manage to be down there, near the floor, and yet also be a meter or two up in the air? Well, it's not so very amazing: your feet are down there on the floor, and your head is up in the air. *Having spatial parts enables you to be in several*

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[153] *Ibid.* 51. It must be noted that Sider in the piece titled "Temporal Parts" adds that space and time are similar also under another respect, namely in terms of *distant objects* (which corresponds to the first respect mentioned above. See footnote 157) . It is an important remark which now might sound a bit off the peg but in Part II on Time I will try to explain why I think it is significant. Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D. Zimmerman, *Contemporary Debates in Metaphysics*. Blackwell: 241-62.

[154] Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 202.

[155] Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D. Zimmerman, *Contemporary Debates in Metaphysics*. Blackwell: 241-62.

> *different places, and to have different properties in different places:* [my italic] you're cold down there on the tiled floor, and also warm up there by the heater, because your feet are cold and your head is warm. Moreover, having parts could let you be in the same place as someone else: if you shared a hand with a conjoined ('Siamese') twin, then you could both wear the same glove without jostling for space.
>
> None of this is special to people: inanimate objects also extend through space by having spatial parts. They have different properties in different places, and sometimes they overlap by sharing their parts. These simple facts about spatial parts explain basic features about the way things and people occupy space.
>
> *Things and people take up time as well as taking up space: you existed yesterday, and,* unless reading this article is a real strain, *you will exist tomorrow too. Just as you can have different properties at different places* (hot up here, cold down there), *you can have different properties at different times* [my italic] (yesterday you hadn't heard of temporal parts, by tomorrow you'll know plenty about them).
>
> Some philosophers believe that you take up time by having different temporal parts at different times. Your spatial parts are things like your head, your feet and your nose; your temporal parts are things like you-yesterday, you-today and you-tomorrow. *If you have different temporal parts, this would explain how you can exist at different times, and it would also explain how you can have different properties at different times* [my italic] (you-yesterday hasn't heard of temporal parts, you-tomorrow is an expert). According to these philosophers, then, persisting through time is pretty much like extending through space: it's all a matter of parts."[156]

Perhaps, it is now time to take stock. Surely, there seems to be a *leitmotif* running through the few passages quoted above: a recurring feature they all happen to urge upon. It looks as though we have some sort of strong intuitions when it comes to things and their parts. It is quite uncontentious, part and parcel with common sense, to think that material objects like tables and chairs (uncontentious examples of composite objects) take up space by means of having different spatial parts in different regions of space: one table's leg is here whilst another is there, with 'here' and 'there' as a loose way to mark off different places or regions of space as in philosophical jargon. In addition, things seem to take up time in quite a similar way, they have different temporal parts at different times: for instance, that table has a history; it has been sitting

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[156] Hawley, K. (2010). "Temporal Parts". In *The Stanford Encyclopedia of Philosophy*. I agree with the gist of Hawley's passage, I am inclined to disagree when she argues for a parallel between *properties* and *parts* of things.

in the living room for nearly four years and now it lies in the skip across the road. It is surely a petty remark which does not take a great deal of effort to figure it out. As flimsy as it gets, the remark is quite decisive though. Traditionally, perdurance has been charged of being counter-intuitive to begin with, all that weird business about parts of things in time, all the way down to its implications and consequences. (For truth's sake, most of the objections were directed to the various odd features and consequences of a world in which perdurance was true, rather than towards what I believe is very a solid core of intuitions, if any, which moved perdurance towards temporal parts in the first place).

Be this as it may, at a careful analysis, there seems to me a perfectly reasonable sense in which temporal parts are in line with what intuitions and common sense considerations would seem to indicate: the bedrock which bolsters the concept of temporal parts consists of intuitions and common sense considerations which regards things *having parts* and *being parts of*. This appreciation and awareness occurs both in language and thought: our language is endowed with a part-whole apparatus which, although naively, affords us to understand what's going on when it comes to things having parts or being parts of something else *either in space or in time*. In addition, our understanding and thinking of parts is quite straightforward, at least on this sincere level: it is not rocket science to appreciate that a table has one leg as a part and that one leg is part of that table; and that the two legs of a table in virtue of being two different things occupy two distinct portions of space, one here the other one there.[157]

To conclude, if the argument above stands a chance, then there is a sense in which the traditional arguments against perdurance's being preposterous water down: perdurance in its essence is no more no less counter-intuitive than any other theory of persistence which claims to have an edge because it allegedly complies better with intuitions and common sense (to wit endurance). The fact that most of the objections raised over the years targeted the consequences rather than the premises could have happened for two reasons: (i) perhaps the import of a recognition along the lines of the argument above has been overlooked by perdurance theorists in the first place; perhaps

[157] By 'naively' and 'on this sincere level' I mean to stress that to understand the train of thought sketched above (the alleged sense in which the innermost part that gives way to the notion of temporal parts is anything but counter-intuitive) there is no need to deploy any philosophical weaponry. For example, to raise the objection that it is all but clear what 'to be a part of' stands for, or 'to be a part in space/time' means is untimely. Philosophical tools will be required to set off from there: namely when a regimentation of those intuitions and common sense considerations is, for whatever reason, a requisite.

it was simply light-heartedly accepted that the notion of temporal parts happened not to square very well with intuitions and did not fully met the standards of common sense (for the record, as pointed out in the Introduction, perdurance theorists have always been quite prompt in remarking how easily intuitions and common sense considerations fall through: perdurance qualifies as a revisionary/prescriptive theory of persistence after all). Or (ii) that perhaps the emphasis has been given to just counter those objections in virtue of a mainstream methodological approach, namely the need to provide piecemeal solutions to philosophical more or less puzzling situations; overlooking in turn the requisite of the understanding of that particular puzzling situation which comes first, , as repeatedly stressed in the Introduction,.

Thus, to venture a tentative conclusion, I shall say that apart from the alleged success or failure of a philosophical account of temporal parts, when we look at what lies at the basis of that philosophical regimentation, we find something clear, straightforward and robust: the evidence that objects seem to have parts in space as well as in time which is made clear by all the quotations I just gave, in the applicability of the notion of part to everyday examples. If so then perdurance can push it further stressing that space and time are similar under that respect, to wit in respect to parts. In addition to this, space - whatever it may turn out to be[158] - seems to qualify paradigmatically as extended, in order for things to take it up and have parts in it. If this is the case, and space and time are analogous in respect to parts then it seems quite plausible to infer that time qualifies as extended as well in order for things to take it up and have parts in it. Space seems also to qualify, again paradigmatically, as an instance of a dimension, one along which things extend. If this is the case, then again in virtue of the analogy between space and time it would make good sense to claim that time is too. Thus, to conclude, the three dimensions of space plus the one dimension of time constitute the four dimensions in which reality extends.

If this train of thought makes sense, it then conveys an innovative way to look at these issues which, if adequately supported, could definitely earn my most enthusiastic support. But perhaps at this stage it looks a bit premature, unless it is clear, and, say, beyond any reasonable doubt that space and time are alike in the sense above spelt out: namely, as extended as well as instances of a dimension in which things extend. I shall

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[158] The phrase ‘whatever it may be’ flags the fact that it is philosophically controversial what the true nature of space is, see for instance the traditional controversy between Relationalism and Substantivalism.

drop the investigation into space and time analogies for now since it will be pursued in the second part of the thesis, the one on Time. What I shall go on investigating is instead whether that robust core singled out above, from which the notion of temporal parts seem to arise, could be legitimately exploited by perdurance for its own good.

Before moving on, I shall make a quick recapitulation so my contention could be even clearer: I pointed at a bedrock which seems to prop up the notion of temporal parts directly, and perdurance as the doctrine of temporal parts indirectly: the fact that we have some sort of strong intuitions when it comes to things and their parts. It is common sense consideration to think that material objects take up space by having different spatial parts in different regions of space. Likewise, things seem to take up time, by having different temporal parts at different times.

As it stands, the attempt to gather agreement from the opponents of the notion of temporal parts upon a definition turned out unsuccessful. Suppose it being the case, the question that must be asked is now this: could we ever succeed in gathering any agreement whatsoever on the idea of temporal parts from their opponents? I think we could, specifically upon that bedrock. But this will not come for free: we will have to set perdurance and temporal parts free from the methodological burden or attitude which David Lewis could be seen as a beaming example of. Few lines after the popular definitions of persistence, perdurance, and endurance, he boasts that:

> "Discussions of endurance versus perdurance tend to be endarkened by people who say such things as this: 'Of course you are wholly present at every moment of your life, except in case of amputation. For at every moment all your parts are there: your legs, your lips, your liver...' These endarkeners may think themselves partisans of endurance, but they are not. *They are perforce neutral, because they lack the conceptual resources to understand what is at issue.* [my italic] Their speech betrays - and they may acknowledge it willingly - that they have no concept of temporal part. (or at any rate none that applies to a person, say, as opposed to a process or a stretch of time.) Therefore they are on neither side of a dispute about whether or not persisting things are divisible into temporal parts. They understand neither the affirmation nor the denial. They are like the people - fictional, I hope, who say that the whole of the long road is in their village, for not one single lane of it is missing. Meaning less than others do by 'part', since they omit parts cut crosswise, they also mean less than others do by 'whole'. They say the 'whole' road is in the village; by which they mean that every 'part' is; but by that, they only mean that every part cut lengthwise is. Divide the road into its least lengthwise parts; they cannot even raise the question whether those are in the village wholly or

> only partly. For, that is a question about crosswise parts, and the concept of a crosswise part is what they lack. Perhaps 'crosswise part' really does sound to them like a blatant contradiction. Or perhaps it seems to them that they understand it, but the village philosophers have persuaded them that really they couldn't, so their impression to the contrary must be an illusion. At any rate, *I* have the concept of a temporal part; and for some while I shall be addressing only those of you who share it."[159]

Lewis' passage is surely pregnant, it clearly says what is and what is not allowed into the dispute between perdurance and endurance[160]. By the end, the passage sounds quite patronising but this is generally a distinctive feature of those who - for some reasons still unclear - know what's going on behind those same curtains which happen to conceal anyone else from truth. Sarcasm aside, Lewis stoutly claims that if people rely on our intuitions and common sense considerations when it comes to appreciating what is really at issue (whether things have temporal parts or not, I gather) we would end up in the wrong place: "They are perforce neutral, because they lack the conceptual resources to understand what is at issue. [...] Therefore they are on neither side of a dispute about whether or not persisting things are divisible into temporal parts. They understand neither the affirmation nor the denial."[161]

Let us now examine the situation more carefully: first things first, Lewis says that 'the endarkeners' do not possess such conceptual resources: who is Lewis referring to? Does he mean the average Jane and Joe? If so, does he really believe that they would engage in any philosophical dispute at all, let alone one on the persistence of material objects? If not, are then the endarkeners those philosophers which support endurance? Lewis owes us an answer to each of the above questions but he never obliges.

Secondly, whoever the endarkeners are, Lewis claims that they do not possess the adequate theoretical apparatus to understand what is at issue (whether things have temporal parts or not, as I understand it). Curiously, if we recall how Lewis himself illustrated the idea of something persisting by perduring, that is 'Perdurance [the doctrine of temporal parts] corresponds to the way a road persists through space; part of

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[159] Lewis, D.K. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell, 203.

[160] For the record, at no point does Lewis claim just what *should* or *should not* be allowed in the dispute. In addition to setting the agenda of the debate on persistence, he also took care of setting up *how* to go about.

[161] *Ibid.*

it is here and part of it is there, and no part is wholly present at two different places.' there seems to be a sense in which the latter statement clashes with the former.

I shall now clarify in what sense: for argument's sake, let us suppose that Lewis is right: the endarkeners lack the theoretical resources to understand what is at issue. Although they are not adequately equipped to understand what is at issue, either (i) they can understand Lewis' example of the road (part of which is here whilst part of which is there) or (ii) they cannot. (i) Suppose they can, how would that example help an endarkener who although understands it yet does not have the adequate apparatus to understand what is at issue? A road has a part here and another one there, and no part is wholly present at two different places, but then what? What is the point of introducing perdurance (as the doctrine of temporal parts) via the analogy with the road if the endarkeners by Lewis' *fiat* will not be able to close the gap from one to another because of a lack of theoretical apparatus? (ii) suppose instead they do not understand the example of the road which has a part here and a part there, and no part is wholly present at two different places; how beneficial would it be for them to have an explanation in terms of a road which has a part here and one there, whereas no part is wholly present at two different places? More to the point, let us ask Lewis: what other subtle theoretical apparatus do we need to possess to fully grasp the example of the road and what is at issue? Perhaps, the answer lies simply in what Lewis says at the end of the passage above: "At any rate, *I* have the concept of a temporal part; and for some while I shall be addressing only those of you who share it."

Lastly, let us put Lewis aside and recall how the other supporters of perdurance quoted early on introduced the notion of temporal parts. It goes without saying how clearly they drew upon intuitions and common sense considerations that we have in those situations in which ordinary objects are involved. Therefore, it seems more than just plausible to say that intuitions and common sense considerations play a crucial role in this respect. But then, as Lewis put it, it seems that intuitions and common sense considerations suddenly cease to be so decisive, for instance when it comes to deciding how things persists. This being so, then there has to be some confusion: firstly, on the role ascribed to intuitions and common sense at this level of explanation; and secondly on which methodological attitude to follow in order to engage the notion of temporal parts. To begin with, intuitions and common sense considerations are decisively drawn upon but then bluntly dismissed since that very same evidence turns out deceiving as

soon as we have to pronounce which theory of persistence to go for. If this is the case then it would be legitimate to ask how far intuitions and common sense considerations could go in the argument/explanation? Clearly, they cannot go all the way. Why not?

Perhaps a tentative answer could be the following: perdurance theorists in general, and Lewis in particular, have always been cautious about the opportunity to concede an edge to their opponents on the topic of intuitions and common sense since traditionally endurance is thought of as having an advantage on the understanding of how things persist in time. Endurance does have an advantage but one which turns out utterly unharmful. Let me dig this point out a bit more.

The question is whether we could save intuitions and common sense considerations for the purposes outlined above or if we should give up on them. Sure enough, we cannot have both like Lewis pretends: the outcome of his approach looks like an example of an *ad hoc*, somehow shifty methodology which sounds a bit like bad philosophy. My judgement sounds harsh but I believe Lewis' attitude deserves it. The thing is that if we follow Lewis we end up with a questionable methodology which sooner or later will affect our philosophy overall. Conversely, if we give up totally on intuitions and common sense considerations we lose the chance to start the dispute between perdurance and endurance from a levelled field. A field upon which the philosophical debate will then be played. But at least both views have a solid ground where to start from.

If the idea of giving up on intuitions and common sense does not look theoretically tempting for the reasons offered above; and if Lewis' dealing with intuitions and common sense does not too; then the question becomes whether there is a way out to Lewis' attitude. Suppose there isn't so that we ought to stick to Lewis. In that case, the evidence would be that the philosophical regimentation of the notion of temporal parts, the one which was supposed to be understandable by the opponents, has failed: for perdurance parthood is atemporal so however we try to dress it up it does not work for endurance, according to which parthood is essentially temporal. Therefore, it looks like the whole debate would not even start: incomunicability would set in, and likely the whole thing would carry on wearily as it did for quite a while; with the two parties yelling at each other arguments, presumably compelling, without really grasping what one says to the other.

But there is a way out. Indeed it would be to dismiss Lewis' dodgy attitude and methodology and allow perdurance and endurance to dwell on intuitions and common sense considerations as much as they want, and to articulate a philosophical debate upon that. Lewis' worry that endurance could have an edge over perdurance because 'Of course you are wholly present at every moment of your life, except in case of amputation. For at every moment all your parts are there: your legs, your lips, your liver...'[162] turns out to be, on one hand Lewis' own mistake: after all he characterised endurance in that way, and then twisted that definition against endurance itself; whereas on the other, Lewis' worry has no grounds at all: let us concede that endurance has an advantage, for some reasons it conveys quite well the initial understanding that we have in cases of material objects persisting over time. Is that initial understanding, all it is needed when it comes to answer the philosophical question of how material things persist over time? Surely it is not. The question is philosophical and *qua talis* it will have to be addressed with philosophical means; isn't the whole point of philosophy to question where we start from, our assumptions which, more often than not, are made up with materials coming from our intuitions and common sense considerations?

To conclude, I think there is a clear and straightforward sense in which material things could have parts in time along the same lines as they have in space. Such recognition is gained without any appeal to remarkable speculation, our intuitions and common sense considerations seem to nicely allow for that outcome. If this sounds plausible then the idea of temporal parts upon which perdurance as the doctrine of temporal parts cashes in is, at least in its bedrock, no more no less counter-intuitive as endurance is in assuming that material things persist by being wholly present at all times they exist (or to persist without having temporal parts at all times they exist): the play field is levelled.

More importantly, upon this core we can easily gather agreement from our opponents, and agree with them about theirs: for perdurance, as mentioned above, the fact that it is plausible to take material things as having parts in time along the same lines as they do in space; whereas for endurance, the fact that it is plausible to take material things as being present as a whole whenever they exist.

The next step will be to afford a systematisation of that core of intuitions and common sense considerations, building on it a philosophy of how material things persist

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[162] *Ibid.*

over time. In this case, it is likely that the initial agreement might well quickly vanish but as long as the whole dispute is fought with philosophically legitimate weapons then there should be at no point any trepidation in discovering that actually one party manages to give a more philosophically reliable account than the other. Isn't the whole point of philosophy to question our assumptions with a view to near the truth and reaching it eventually?

What the line of thought outlined in this chapter shows is that the notion of temporal parts could be easily cashed out from the evidence that time and space happen to be analogous in some respects, in respect to their reality, *parts*, their giving rise to indexical notions, as Sider argues.[163] Therefore, it seems to me that the analogy between space and time which gives way to the idea of temporal parts must precede the idea itself so that the investigation of such analogy should come first in order to assess whether there really are temporal parts. Actually, a strand in the contemporary analytic philosophy looked into that issue from a more general perspective rather than just in respect to parts[164]; thus I believe it might be helpful to see what they came up with. Perhaps their conclusions could shed some light on the thesis that space and time are alike which happens to bolster the notion as well as existence of temporal parts. This investigation will be afforded in Part II of the thesis which will concern Time.

For the time being, even though there might not be an unequivocal way to define what temporal parts are; yet there is another sense, perhaps indirect, in which temporal parts seem to deserve their place in philosophy: they are said to solve numerous philosophical puzzles. One of them (and perhaps the most challenging) is the long-

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[163] Conee, E. & Sider, T. (2005). *Riddles of Existence.* New York: Oxford University Press, 51-2. Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D. Zimmerman, *Contemporary Debates in Metaphysics*. Blackwell, 244. I take the similarity between space and time in respect to their *reality* to correspond to their being similar in respect to *distant objects*.

[164] Taylor, R. (1955). "Spatial and Temporal Analogies and the Concept of Identity". *The Journal of Philosophy*, 52, 599-612; (1959). "Moving About in Time". *The Philosophical Quarterly*, 9, 289-301; Huggett, W.J. (1960). "Losing One's Way in Time". *The Philosophical Quarterly*, 10, 264-7; Mayo, B. (1961). "Objects, Events, and Complementarity". *The Philosophical Review*. 70, 340-61; (1976) "Space and Time Re-assimilated". *Mind*, 85, 576-80; Dretske, F.I. (1962). "Moving Backward in Time". *The Philosophical Review*, 71, 94-8; Thomson, J.J. (1965). "Time, Space, and Objects". *Mind*, 74, 1-27; Meiland, J.W. (1966). "Temporal Parts and Spatio-Temporal Analogies". *American Philosophical Quarterly*, 3, 64-70; Gale, R.M. (1969). "Here and Now". *The Monist*, 53, 396-409; Schlesinger, G. (1975). "The Similarities Between Space and Time". *Mind*, 84, 161-76; (1978). "Comparing Space and Time Once More". *Mind*, 87, 264-66; Shorter, J.M. (1981). "Space and Time". *Mind*, 90, 61-78; Slowick, E. (2002). "Spatiotemporal Analogies: Are Space and Time Similar?". *The Southern Journal of Philosophy*, 40, 123-34. See also Reichenbach, H. (1928). *Philosophie der Raum-Zeit-Lehre*. English translation: Reichenbach, M. (1957), *The Philosophy of Space and Time*. Dover; Goodman, N. (1951). *The Structure of Appearance*. Cambridge, Mass: Hardvard University Press; Williams, D.C. (1951). "The Myth of Passage". *The Journal of Philosophy*, 48, 457-72.

standing problem or puzzle of change. I shall now redirect the focus of the thesis on it to see how temporal parts are supposed to fit nicely into that picture.

1.3.2 *The Problem of Change*

Why is the remark that things take up time as they do space so crucial for perdurance? One way to look at it could be this: having spatial parts enables a thing to be (partly of course) in many different places at one time, to be (partly) in the same place as something else, and finally to have different properties in different places. For instance, take a poker[165], it lies across the floor, one end by the fireplace the other on the carpet (which means the poker is partly where the fireplace is and partly on the carpet, both the fireplace and the carpet being far apart). Also it is hot at one end (by the fireplace) and cold at the other (on the carpet).

Let us now focus on the last remark: usually the story goes on saying that just as something can have different properties at different places, it can likewise have different properties at different times. For example, the poker was hot this morning but it cooled down this afternoon. Thus, parthood whether spatial or temporal seems to guarantee the *discontinuity* of intrinsic properties: namely, for a thing to have different, even incompatible, intrinsic properties at a time (synchronically) as well as over time (diachronically). Which surely is a datum that, taken at face value, can hardly be denied. However, it has also traditionally been one of the most puzzling issues in philosophy.

In this chapter, I shall first look into this issue and see if the fact that temporal parts are said to be a good solution the so-called *problem of change* could somehow tell in favour of their existence. Secondly, I will see if the most recent varieties of what is commonly called the problem of change, i.e. the *problem of temporary intrinsics* as well as the argument from Leibniz's Law, qualify as a philosophical problem at all. The feeling is that once the two situations which are said to generate the problem are adequately understood then it is not so clear whether there really is such a problem, or rather it has been somehow artificially made up starting from unclear assumptions, to

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[165] Any other ordinary material object would do but an apparently popular one which over the years seemed to have fascinated philosophers' minds to such an extent to become ubiquitous is the poker. See for example Parsons, J. (2000) "Must a Four-dimensionalist Believe in Temporal Parts?". *The Monist* 83: 399-418; Balashov, Y. (2007). "About Stage Universalism". *Philosophical Quarterly* 57: 21-39; Sider, T. (2006). "Quantifiers and Temporal Ontology". *Mind* 115: 75-97; (2007). "Parthood". *Philosophical Review* 107: 51-91; Wasserman, R. (2006). "The Problem of Change". *Philosophy Compass* 1: 48-57.

the conclusion that there are better, more intuitive ways, of motivating perdurance. Be this as it may, I shall substantiate my contention in what follows.

Tentatively, the previous chapter concluded as follows: there seems to be an asymmetry between how temporal parts are described from the perdurance point of view, namely atemporally or tenselessly, and how they should be in order to be intelligible for the opponents. I (duly or unduly) assumed Olson's conclusion as the beginning of my argument and tried to see if that no-start could be somehow overcome. For example, I then found that appealing to alternative evidence some sort of agreement could be gathered upon what I called the 'bedrock' of the notion of temporal parts: a set of intuitions and common sense considerations (that is why I called it 'bedrock') which advocates of temporal parts seemed to rely on in order to present and explain the notion itself. As loose as it gets (the bedrock comes before any philosophical regimentation at all), I myself believe it to be clear, robust and persuasive enough, at least according to my standard of intuitions and common sense considerations, with the trust that it could be so for others as well.[166] If this could be the case, there might then be a solid basis from where to start from in devising an adequate definition of temporal parts, one which desirably should be understandable to those who deny them.[167] Therefore, despite the fact that we may contingently lack a philosophically unambiguous definition, still we have a solid appreciation of what is going on.

If we deny this, as I argued early on, we are then doomed to a predicament: we do not know what temporal parts are supposed to be (Olson's caveat) - as a perdurance enthusiast I am sure I do know but there is no chance to communicate it to my opponents in a way such that a philosophical debate could be generated - and we cannot draw upon intuitions and common sense considerations to gather agreement in order to initiate a philosophical debate (Lewis' proviso).

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[166] Endurance relies on pretty much the same source of evidence for the legitimacy of its own position; the equivalent of Lewis' phrase 'wholly present' which is cashed out via ordinary examples of a thing existing at different times as the same despite exhibiting different features (sometimes incompatible) as well as parts. At this stage, to remark that the expression 'wholly present' should be somehow substantiated would be ill-timed. There is a sense in which we all understand what it is about. Of course, as soon as we scratch the surface we realise that that tacit assent was just provisional, an assent which after all may not stand philosophical scrutiny.

[167] I find it hard to think of the possibility of denying something without having a suitable understanding and appraisal of what it is about. For instance, even in those situations in which a contradiction emerges as obvious, still the understanding of the fact that there is a contradiction going on seems to me to precede the refusal of that situation.

I tried to steer a middle path between Olson and Lewis (I assumed the plausibility of the former and argued for the implausibility of the latter) but for the time being I shall put my beliefs aside since it will not be crucial for what will follow: the good news is that whether the definition of temporal parts fails or not, whether we could appeal to intuition and common sense considerations to pin them down, it is common currency that temporal parts are decisive in taking the sting out of various philosophical puzzling situations, at least from the perspective of perdurance.

Matthew McGrath, in his excellent survey of temporal parts[168], spells out list of arguments given for the doctrine of temporal parts which at rock bottom represents the philosophical work that temporal parts are supposed to carry out:

1. Arguments from spatial analogy.
2. Arguments from relativistic considerations.
3. Arguments concerning the solution of the puzzles of coincidence.
4. Arguments concerning the explanation of intrinsic change over time.
5. Arguments from considerations of the vagueness of composition.[169]

For the record, in the thesis I will focus only on two of McGrath's claimed advantages of temporal parts, point 1 and 4, the latter being named by Lewis as the problem of temporary intrinsics. My reasons for so focussing are: (i) the analogy between space and time seems to play a crucial role, an assumption which the notion of temporal parts seems to draw upon, as I argued early on; and (ii) Lewis himself claims that the problem of temporary intrinsics is 'the principal and decisive objection to endurance' which implies that perdurance has a clear advantage over endurance for the latter cannot easily account for it on pain of undesirable consequences, as Lewis duly pointed out.

It is also worth noting that there is more to the problem of temporary intrinsics than just what Lewis claimed: for instance, apparently the solutions to the problem of temporary intrinsics are not just three as Lewis claims: Johnston, Haslanger, and Lowe independently elaborate a fourth solution which is commonly known in the literature as

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[168] McGrath, M. (2007). "Temporal Parts". *Philosophy Compass* 2: 730-48.

[169] *Ibid.* 732.

the *adverbial view*.[170] An approach which is best understood in the light of Lowe's distinction between *semantic* and *metaphysical* aspects of the problem of change.[171]

In any case, what matters is that McGrath's voice is accompanied by a multitude of others, perdurance theorists in particular, who have been traditionally sensitive and prompt in selling temporal parts as the occasion arose. The bandwagon of those who conversely claim that the allegedly puzzling situations above - point 3, 4 and 5 - could be explained doing away with temporal parts is just as large. The literature is copious, the debate ongoing and fiercely fought.[172]

Be it as it may, of McGrath's five proposed advantages, the problem of temporary intrinsics has posed, and continues to pose the most philosophical questions. Thus, I shall begin presenting the problem as in Lewis:

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[170] See Johnston, M. (1987). "Is There a Problem About Persistence?". *Proceedings of the Aristotelian Society, Supplementary Volumes* 61: 107-35. Haslanger, S (1985). *Change, Persistence and Explanation.* (Berkeley PhD Thesis); (1989*a*). "Persistence, Change and Explanation", *Philosophical Studies* 56: 1-28; (1989*b*). "Endurance and Temporary Intrinsics". *Analysis* 49: 119-125. Lowe, E.J. (1987). "Lewis on Perdurance versus Endurance". *Analysis* 47: 152-4; (1988). "The Problems of Intrinsic Change: Rejoinder to Lewis". *Analysis* 48: 72-7. Curiously, the solutions might be more than four; for example Jeffrey Brower offers a type of solution available to endurantists, one which is structurally identical to the temporal parts one usually offered by perdurance theorists. See Brower, J.E. (2010). "Aristotelian Endurantism: A New Solution to the Problem of Temporary Intrinsics". *Mind* 119: 883-905.

[171] The *Semantic Problem of Change*: To specify the logical form of the sentences ascribing temporary intrinsic properties to persisting objects in such a way that we do not run into contradiction in describing such an object as undergoing a change from possessing one such property to possessing another incompatible one. The *Metaphysical Problem of Change*: How there can be objects for the description of which the semantic problem arises - that is, how there can exist objects such that we need to be able to say, without fear of contradicting ourselves, that one and the same object may undergo a change from possessing one intrinsic property to possessing another incompatible one. See also Lewis' reply: (1988). "Re-arrangement of Particles: Reply to Lowe". *Analysis*. 48: 65-72; (2002). "Tensing the Copula". *Mind* 111: 1-13. In addition, few years further down the line, Thomas Hofweber distinguished three kinds of problems related to change: an *Empirica*l, a *Metaphysical*, and a *Meta-Problem of Change*. See Hofweber, T. (2009). "The Meta-Problem of Change". *Noûs* 43: 286-314.

[172] Since the aim of this chapter concerns a particular argument for perdurance, to wit what Lewis named the problem of the temporary intrinsic, the references I shall give in the following of this footnote contain arguments that reflect it. See for example: Taylor, R. (1955). "Spatial and Temporal Analogies and the Concept of Identity". *The Journal of Philosophy*, 52, 599-612; (1959). "Moving About in Time". *The Philosophical Quarterly*, 9, 289-301. Armstrong, D.M. (1980). "Identity Through Time". In P. van Inwagen (ed.) *Time and Cause: Essay Presented to Richard Taylor.* Dordrecht: D. Reidel, 67-78. Heller, M. (1984). "Temporal Parts of Four Dimensional Objects". *Philosophical Studies* 46: 323-334. Lewis, D.K. (1986). *On the Plurality of Worlds.* Oxford: Oxford University Press. Heller, M. (1987). "The Best Candidate Approach to Diachronic Identity". *The Australasian Journal of Philosophy* 65: 434-51; (1990). *The Ontology of Physical Objects*. New York: Cambridge University Press; (1992). "Things Change". *Philosophy and Phenomenological Research* 52: 695-704; "Varieties of Four-Dimensionalism". *Australasian Journal of Philosophy* 71: 47-59; (2000) "Temporal Overlap is not Coincidence". *The Monist* 83: 362-80. Hawley, K. (2001). *How Things Persist*. Oxford: Oxford University Press. Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time.* New York: Oxford University Press. McGrath, M. (2007). "Temporal Parts". *Philosophy Compass* 2: 730-48. Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D. Zimmerman, *Contemporary Debates in Metaphysics*. Blackwell: 241-62. Hawley, K. (2010). "Temporal Parts". In *The Stanford Encyclopedia of Philosophy.* For objections as well as alternative approaches to the problems spelt out in the main text I shall suggest to look at Lowe's excellent overviews: Lowe E.J. (1998). *The Possibility of Metaphysics: Substance, Identity, and Time*. Oxford: Oxford University Press, Ch. 4, 5; and (2002). *A Survey of Metaphysics*. Oxford: Oxford University Press, Ch. 2, 3, 4.

> "The principal and decisive objection against endurance, as an account of the persistence of ordinary things such as people or puddles, is the problem of temporary intrinsics. For instance shape: when I sit, I have a bent shape; when I stand, I have a straightened shape. Both shapes are temporary intrinsic properties; I have them only some of the time. How is such change possible? I know of only three solutions."[173]

The three solutions Lewis offers are: (i) shapes are not genuine intrinsic properties but disguised relations which things may bear to times; (ii) the intrinsic properties of a thing are only those it has at the present moment; and (iii) different temporary intrinsics belong to different things; things are made up of temporal parts, and the temporary intrinsics are properties of such parts 'wherein they differ one from another'. Lewis takes only the last one to be tenable. It would be incredible, as Lewis claims, if the solution to the problem of temporary intrinsics were that there are *no* temporary *intrinsics* as suggested by (i). And it would be just as incredible to claim that a solution to a problem of persistence must rejected persistence altogether. The only intrinsic properties of a thing would be those it has at the present moment whereas 'Other times are like false stories' 'which represent or misrepresent the way things are', as in (ii).[174] Therefore, what is left is to embrace the doctrine of temporal parts and say that yes there are genuinely temporary intrinsic properties but there is no problem, as clearly there isn't, about how different things can differ in their intrinsic properties.

The problem originally posed is supposed to be how can something change its intrinsic properties, as one seems to, when they change from being bent to being straight when they stand up? It is controversial whether Lewis' argument actually addresses this problem, unless Lewis' 'what we all believe' is that the two 'I's in Lewis' passage refer to distinct things to begin with. I will not pick this up against Lewis (others did as we shall shortly see); however, my contention is clear from the beginning: Lewis' dealings

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[173] Lewis, D.K. (1986). *On the Plurality of Worlds.* Oxford: Oxford University Press, 203.

[174] Presentism rejects persistence for there is a sense in which it fails to comply with the basic requirement of the definition of persistence: 'something persists iff it exists at more than one time. If presentism is true then nothing exists at more than one time since anything exists only at one time, to wit the present. However, it is interesting to note how Lewis plays with the phrase 'what we all believe' in respect to the second solution. If 'what we all believe' were so crucial in ruling out a philosophical answer to a philosophical problem then it would be plausible to grant endurance a decisive edge over perdurance since 'what we all believe' is that things persists by being the same whenever they exist ('being wholly present'), which curiously goes against what Lewis himself claims a few lines above. Once more, it looks like Lewis should say clearly where he stands when using intuitions and common sense considerations ('what we all believe').

are suspicious, and I am sure I offered good reasons for this conclusion in the Introduction as well as in the last chapter.

Let us grant that Lewis is right, that there is such a problem and that the doctrine of temporal parts and perdurance is the only response. If so, then I think a good question to ask would be what exactly generates the problem of temporary intrinsics, and once the cause is individuated why temporal parts supposedly are an excellent remedy, and apparently the only one. If perdurance can afford to adequately answer those two questions then, given Lewis' blunt conclusions against endurance, there is clear evidence for temporal parts and perdurance. Let us see if perdurance can attain it.

The expression 'temporary intrinsics' is an artfully contrived name for a long-standing philosophical problem, namely what is traditionally known as the problem of change:

> "Begin with a stick. Bend it. The stick changes from being straight to being bent. But nothing can be both bent and straight, and so it can't be one and the same stick which is straight and which is bent. But it has to be the same stick if this is to be genuine change. Thus, change is impossible."[175]

The discontinuity of intrinsic properties - whether an ordinary object, say a stick, can exhibit incompatible intrinsic properties: impossible according to some, perfectly plausible according to others - turns out to be a tough nut to crack.[176] As pointed out by Lewis, what 'what we all believe' suggests will not do in this case: the stick above is at one time straight whereas at another bent, period. There is no contradiction but it seems that what we are saying is that a stick *S* is bent at t_1 and that the same stick *S* is straight at t_2 with $t_1<t_2$ which ends up making an allegedly intrinsic property like shape into a

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[175] McGrath, M. (2007). "Temporal Parts". *Philosophy Compass* 2: 737.

[176] A quick look at the literature will give the pulse of how the plot is entangled. For a recent overview on the topic see S. Haslanger & R.M. Kurtz (2006) *Persistence. Contemporary Readings*. Cambridge, Mass.: The MIT Press. Traditional literature is: Lewis, D.K. (1986). *On the Plurality of Worlds.* Oxford: Oxford University Press. Lewis, D.K. (1988). "Re-arrangement of Particles: Reply to Lowe". *Analysis*. 48: 65-72; (2002). "Tensing the Copula". *Mind* 111: 1-13. Johnston, M. (1987). "Is There a Problem About Persistence?". *Proceedings of the Aristotelian Society, Supplementary Volumes* 61: 107-35. Haslanger, S. (1989*a*). "Persistence, Change and Explanation", *Philosophical Studies* 56: 1-28; (1989*b*). "Endurance and Temporary Intrinsics". *Analysis* 49: 119-125. Lowe, E.J. (1987). "Lewis on Perdurance versus Endurance". *Analysis* 47: 152-4; (1988). "The Problems of Intrinsic Change: Rejoinder to Lewis". *Analysis* 48: 72-7. Hinchliff, M. (1994). "The Puzzle of Change". *Philosophical Perspectives* 10: 119-36. Oaklander, N.L. (1998). "The Problem of Time and Change". *Stoa* 1: 85-109. Bottani, A. (2005). "Introduction". *Dialectica* 59: 381-400. Wasserman, R. (2006). "The Problem of Change". *Philosophy Compass* 1: 48-57. Recent 'enemies' of the problem of change (and temporary intrinsics) as traditionally posited are: Oderberg, D.S. (2004). "Temporal Parts and the Possibility of Change". *Philosophy and Phenomenological Research* 69: 686- 708. Hansson, T. (2007). "The Problem of Change Revisited". *Dialectica* 61: 265-74. Hofweber, T. (2009). "The Meta-Problem of Change". *Noûs* 43: 286-314. Rychter, P. (2009) "There is No Puzzle About Change". *Dialectica* 63: 7-22.

relation to a time (see Lewis' point (i) above), so that an object cannot be bent or straight *simpliciter* but only relative to a time.[177]

Interestingly, in addition to Lewis' formulation, there seems to be another way in which the problem of change can be generated, a way which does not seem to appeal directly to Lewis' problem of temporary intrinsics, but one that shows that the problem can be easily generated via the discontinuity of properties or parts in general. In *Things Change*, the overall purpose of Mark Heller's piece is to rescue the doctrine of temporal parts from an allegedly knock-down objection: the fact that an ontology that includes temporal parts is inconsistent with the evidence, or metaphysical datum as in Oderberg[178], that things change.[179] Heller's argument goes as follows:[180]

(1) When Heller was young (at a time, *t*, let us say), he was not bearded;

(2) Today (at *t'*), Heller is bearded.

From (1) and (2), and given $t \neq t'$, Heller infers that

(3) Little Markie and Dr. Mark differ in their properties.[181]

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[177] What the term *simpliciter* is supposed to pick out is a bit of a philosophical mystery. I shall take it to be, as I will point out in the next chapter, a fancy word somehow equivalent to *timelessly*. To say that an object is straight *simpliciter* is, on my reading, equivalent to saying that that object possesses that property, period. For istance, the temporal part of a stick at *t* is straight *simpliciter* whereas the stick as a whole is straight in virtue of having a temporal part at *t* which is straight (*simpliciter*). Whether this is what Lewis meant is still obscure to me. Along the same lines, Sider claims that *simpliciter* means *atemporally*. See Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time.* New York: Oxford University Press. For the record, I shall urge that the problem alluded to by Lewis is one aspect of a larger problem of change: in addition to a change of properties (whether intrinsics or not) we need to factor in a change of parts as Heller and Sider seem to refer to. Paramount is Quine's passage: 'Undergoing a change as I do, how can I be said to continue to be myself? Considering that a complete replacement of my material substance takes place every few years, how can I be said to continue to be I for more than such a period at best?' Or referring to the allegedly analogous Heraclitus' problem about rivers 'how can you step in the same river twice if new waters are ever flowing upon you? In these cases, 'the most obvious and dismissive answers to these questions' (along the lines of the one above, namely being bent or straight at-*t* or at-t_1) such as 'It is just of the nature of persisting human beings and rivers that they are constituted by different matter *at different times* [my italic], not wholly and abruptly different matter of course, but not too different matter as between not too distant times' will not do for similar reasons. See Quine, W.V.O. (1963). "Identity, Ostention and Hypostasis". In W.V.O. Quine, *From a Logical Point of View*. New Tork: Harper and Row; and Johnston, M. (1987). "Is There a Problem About Persistence?". *Proceedings of the Aristotelian Society, Supplementary Volumes* 61: 107-35.

[178] Oderberg, D. (2004). "Temporal Parts and the Possibility of Change". *Philosophy and Phenomenological Research* 69: 686-708. For the record, Oderberg is one of the 'enemies of temporal parts' as Heller calls them.

[179] Heller, M. (1992). "Things Change". *Philosophy and Phenomenological Research* 52: 695-704.

[180] *Ibid.* 698-9.

[181] I must confess I cannot see the point of renaming, say, Heller-at-*t* and Heller at-*t'* with Little Markie and Dr. Mark; Heller is a friend of temporal parts after all. I believe this move to be ultimately self-defeating in the sense that it leaves his argument open to Oderberg and Hansson's objections as I shall point out shortly. However, for argument's sake I shall not take issue with it.

From (3) plus the principle of the Identity of the Indiscernible which says that:

(4) For any objects, *x* and *y*, if *x* and *y* differ in their properties, then *x* and *y* are not identical.

He can then conclude that:

(5) Little Markie and Dr. Mark are not identical.

In Lombard's words:[182]

> "In saying that the beardless Little Markie and the bearded Dr. Mark are distinct, (5) appears inconsistent with the claim that just one person, namely Heller, was first beardless and then bearded. Thus, Heller undertakes to show how it is possible, despite (5)'s truth, for just one thing, Heller, to have survived a certain change. The explanation is that persisting things, like persons, are composed of distinct temporal parts. And while neither Little Markie nor Dr. Mark changed, Heller did change in the sense that he is composed of temporal parts at least two of which, Little Markie and Dr. Mark, are qualitatively different."[183]

In *Four-Dimensionalism*, Sider tells a similar story (swapping 'beard' with 'hair' would do the trick):

> "But now consider any ordinary case of change. Suppose I get a haircut. It would seem that the person before the haircut, call him Longhair, has different properties from the person, Shorthair, after the haircut; one has long hair while the other has short hair. Leibniz's Law then seems to imply that Longhair and Shorthair are distinct, and thus that I do not survive the haircut, since the person after the haircut is not the same person as the person before the haircut.
>
> The puzzle is that Leibniz's Law seems to prohibit anything's surviving any change. [...] for now I wish only to note that the four-dimensionalist has a nice solution. Leibniz's Law does indeed imply that there are two distinct objects with different properties involved: a temporal part, which we may call 'Longhair', and a distinct temporal part, 'Shorthair'. Longhair is my temporal part before the haircut, and does not survive the haircut; Shorthair is my temporal part after the haircut, and did not exist before the haircut. But it does not follow that *I* do not survive the haircut, for I am not identical to Longhair, nor am I identical to Shorthair. I am a sum of temporal parts that includes both Longhair and Shorthair, and survive the haircut in virtue of including each as parts. Change over time for the four-dimensionalist is thus a matter of dissimilarity between successive temporal parts.

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[182] Lombard, L.B. (1994). "The Doctrine of Temporal Parts and the 'No-Change' Objection". *Philosophy and Phenomenological Research* 54: 365-72.

[183] *Ibid.* 696-7.

> As noted above, a changing person can be likened to a changing road with dissimilar subsections."[184]

Thus, the conclusion is that endurance is in trouble whenever it attempts to account for the evidence of change. Endurantists believe that an object persists through time by enduring just if the object itself, the subject of persistence so to speak, is numerically the same despite the discontinuity of intrinsic properties that it may exemplify. But the principle of the Indiscernibility of the Identicals tells a different story: it prescribes that identity of things yields identity of properties; thus, if the properties are not the same, indeed they are discontinuous, then what we thought were the same thing are instead two distinct things.

Reflecting on the passages quoted above, seemingly there are two distinct ways in which the problem of change can be generated, one *a là* Lewis whereas a second one as Heller and Sider propose. The former appeals to discontinuous intrinsic properties, the latter to Leibniz's Law (and it looks as if it does not take issue with intrinsicality).[185] The question now arises as to why Lewis focused on intrinsicality when the puzzle could be otherwise established (intrinsicality is quite a contentious topic, Leibniz's Law understood as the principle of the Indiscernibility of the Identicals is generally less controversial).

If I understand Lewis' intent, the insistence upon intrinsicality was due, once again, to his commitment to modal realism, and thereby to the parallel between space,

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[184] Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time.* New York: Oxford University Press.

[185] Oderberg, Hansson, and Rychter reconstruct what brings about the problem of change in a similar way. See Oderberg, D.S. (2004). "Temporal Parts and the Possibility of Change". *Philosophy and Phenomenological Research* 69: 686-708; Hansson, T. (2007). "The Problem(s) of Change Reviseted". *Dialectica* 61: 265-74; and Rychter, P. (2009). "There is No Puzzle about Change". *Dialectica* 63: 7-22. I believe the first who initiated this way of arguing against how the problem of change traditionally draws upon Leibniz's Law was Lowe; see for example his remarks in Lowe, E.J. (1998). *The Possibility of Metaphysics.* Oxford: Clarendon Press, Ch. 2, 4, 5; and (2002). *A Survey of Metaphysics*. Oxford: Oxford University Press, Ch. 2, 3, 4.

time, and modality. If we assume the parallel (and his view of intrinsicality[186]) we can then frame the *modal* problem in a way similar to the *temporal* one (or *vice versa*): how can an object *o* have the intrinsic property *F* in one possible world, say w_1, and the intrinsic property $\neg F$ in a possible world w_2, and be (the object *o*) wholly present in both worlds? There seems to be no easy answer to this question if, as Lewis does, we believe in (or are committed to) the reality of non-actual worlds; in this case the metaphysical worry would be to account for *o*'s contradictory intrinsic properties in two worlds which both contain *o*. In the light of this commitment and Lewis' view of intrinsicality, what he is forced to do is to embrace the counterpart theory giving up the idea that in worlds w_1 and w_2 we are talking about the same (numerically the same) object *o*. The similarity with the temporal problem is obvious.[187]

What if one rejects modal realism and therefore does not face Lewis' metaphysical worry? Still, one seems to face the same puzzling situation since the problem of change looks like it arises anyway via Leibniz's Law; and again the only way to go seems to be the doctrine of temporal parts: the fact that at the end of the day what we are looking at are two fundamentally distinct things, one beardless or short-haired and another one with a beard or long hair.[188]

That the problem of change is quite a heart-felt issue is clear just looking at the many instances of the phrase which litter the literature. For this reason, I shall begin assuming that there is such problem.[189] But before moving to my argument against how

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[186] Lewis, D.K. (1983). "Extrinsic Properties". *Philosophical Studies* 44: 197-200; (1986). On the Plurality of Worlds. Oxford: Basil Blackwell, 61-2; Langton, R. & Lewis, D.K. (1998). "Defining 'Intrinsic'". *Philosophy and Phenomenological Research* 58: 333-45. For the record, Lewis defines 'intrinsicality' as follows: an intrinsic property is a property 'which things have in virtue of the way they themselves are', as opposed to an extrinsic property, which things have 'in virtue of their relations or lack of relations to other things'. Therefore, 'being long-haired/bearded' qualifies as an intrinsic property whereas 'having a long-haired/bearded brother' is not. This core idea is then formulated in terms of *duplicate*: 'If something has an intrinsic property then so does any perfect duplicate of that thing.' And 'two things are *duplicates* iff (1) they have exactly the same perfectly natural properties, and (2) their parts can be put into correspondence in such a way that corresponding parts have exactly the same perfectly natural properties, and stand in the same perfectly natural relations... an intrinsic property is one that can never differ between two duplicates.' See also Sider, T. (1996). "Intrinsic Properties". *Philosophical Studies* 83: 1-27.

[187] More on this in Oderberg, D.S. (2004). "Temporal Parts and the Possibility of Change". *Philosophy and Phenomenological Research* 69: 686-708.

[188] For the record, I shall stress that the properties in both Heller's and Sider's examples (being bearded or not, and being long-haired or short-haired) would qualify as intrinsic according to Lewis' definition. Thus, what we believed got kicked out through the door, has come back in through the window. See footnote 189.

[189] I am not appealing to a sort of principle of authority; I am rather looking at the evidence. It will be the aim of this chapter to question this evidence and to assess if there is any problem of change as claimed by and articulated in the literature.

Heller and Sider generate the problem appealing to Leibniz's Law, I think it would be advantageous to look into how change, philosophically speaking, is understood, in order to gain a better understanding and appraisal of what is at stake.

1.3.3 *Change*

We take things to exist, to remain the very same (at least we refer to them as if they would) notwithstanding the gain or loss of some of their features or parts. [190] There is a bike in my shed; despite looking different, it is the same bike as the one originally on the shop floor. It was new and unmarked whilst now looks a bit run-down. It changed over time in virtue of exhibiting discontinuous properties over time despite being one and the same. Such common sense understanding of what is going on when we face a case of change is exactly what makes philosophers considerably suspicious about it. Therefore, it seems to be reasonable to question our assumptions about change.[191]

What do we mean by change and how should we understand this supposed feature of reality? As I mentioned above, in the first place, intuitions and common sense considerations tell us that in addition to just changing, things change in particular respects. For instance, colour, shape, parts, from one place to another, from being close to far, so on and so forth; whereas they do not seem to be able to change in others: for example, we never experience a bike changing into a table.[192] Thus, the first distinction we may postulate is between a change in/of features - or *qualitative* change - on the one hand, say shape, size, colour, weight and so forth, and a change in/of composition - or *compositional* change - on the other, namely the fact that things can acquire or lose parts, or that their parts can be re-arranged resulting in a new layout. As a matter of fact,

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[190] At least this is how it appears. See Ch. 1.1.1, 1.1.2, and 1.1.3.

[191] See for instance Oderberg: "Things change. If anything counts as a *datum* [my italic] of metaphysics, that does. [...] All change is from something into something else, and hence is at least a two-term relation, involving a term from which and a term to which. Although not every change requires the survival of the subject of the change, every change entails a change in something which itself survives the change. Hence every substantial change entails a non-substantial change. On the face of it, I think we, perdurance or endurance theorists, may all agree with Oderberg's characterisation although Oderberg's distinction between substantial and non-substantial change may be said to smuggle a certain amount of contentious philosophy in.

[192] Which somehow reminds me of Oderberg's distinction between substantial and non-substantial change. See note 194. See also Oderberg, D.S. (2004). "Temporal Parts and the Possibility of Change". *Philosophy and Phenomenological Research* 69: 686-708. For the record, there might be cases in which a bike is said to become a table, say for example some fanciful instance of modern design. In these cases, to say that a bike *becomes* a table is just a manner of speech since the bike has been previously stripped down and pulled apart, for instance cutting its frame tubes etc. a process through which it plausibly ceases to be a bike, before being rearranged and reassembled into a table (perhaps with the addition of some new parts which previously did not belong to the bike).

these two distinct kinds of change are more intimately related than it at first seems, thus perhaps the initial distinction could be improved. There are cases in which from a particular re-arrangement of parts, a thing can gain either new qualities and features or lose old ones. Take Tibbles, the prone-to-injuries cat and imagine that one dismembers it; clearly the dismemberment and the following re-arrangement of its limbs results in the loss of a particular property: Tibbles is no longer alive.

On further investigation, one arguably can pick out other respects under which things change but which are not included by the distinction suggested above. For instance, things seem to change not only in their *intrinsic* features but also in their *extrinsic* ones; that is, they change in respect to their relational characteristics. An extrinsic characteristic is one that depends upon things other than the individual that has it, rather on the environment in which it is immersed. E.g. take two distinct things one at one end of a table and the other on the opposite side which become progressively spatially closer, they gradually change their relations between themselves and towards their environment.

A fourth type of change which can be straightforwardly detected regards neither features nor parts of things or relations between them or their environment; rather it applies to things themselves, namely it is neither a change in themselves nor outside themselves. By contrast, it is a more basic experience such as when a thing either comes into or goes out of existence; that is, when something is either created or destroyed. Such peculiar change has been called by philosophers *substantial* change since it regards things themselves - individual substances - and it amounts to a change in the number of things which exist.

Customarily, all these four types of change are said to be instances of *genuine* change. Such a remark seems to indicate that there ought to be at least one other instance of change besides genuine, which might be called *apparent*. Philosophers who take these matters seriously are inclined to acknowledge all such varieties of change and to contrast them with the following instances of apparent change: (i) mere Cambridge change: a change which an entity undergoes when another entity actually changes: for instance, take two trees, the second grows taller making the first less tall than it. But what really changed was the second tree, no genuine change occurred to the first one; (ii) McTaggartian change: the fact that what was future is now present and it will soon be past; (iii) passage of time: the change that each thing undergoes every single day

becoming one day older; and finally (iv) ostensible change: for instance, Goodman's example of the positional property 'grue'[193]. Following Shoemaker, let us introduce the predicate 'grue' as follows: '*x* is grue at *t* iff it is earlier than 2000 A.D. and *x* is green at *t* or *t* is 2000 A.D. or later and *x* is blue at *t*'.[194] Then, accordingly anything which is green up to 2000 A.D. and remains green for some time after 2000 A.D. necessarily changes at 2000 A.D. from being grue to being non-grue. The lesson to be learnt, I gather, from the example is that we might very well invent a similar predicate such that - for any interval of time in which something remains unchanged with respect to whatever property - that thing either comes to exemplify or ceases to exemplify it. Furthermore, if we take to be for every grue-like predicate a genuine grue-like property and we count the gain or loss of this property as genuine change, then we end up with the conclusion that whenever anything remains unchanged in any respect, at once it changes in some other respect.

So much for genuine and apparent kinds of change. However, I believe that there may be at least one additional type of change and which happens to result from philosophers' vivid imagination. I do not have a name for such a variety of change thus I shall tentatively call it *numerical* change. Basically, it is a sort of change which things undergo when they go through cases of fission and fusion: when a thing splits into two distinct things, and when two distinct things merge into one; both cases seemingly being a challenge to the transitivity of identity.[195] Admittedly, it is a peculiar, fanciful kind of change, perhaps not a kind of change at all, which is not the subject of our ordinary experience (at least not now), which regards the number of entities existing before and after the change in question. Since it regards the number of entities which exist, it seems it might well be reduced to an instance of substantial change. However, since I take such cases to be quite different from everyday cases of substantial change - for instance cases of fission and fusion lack several of the conditions of cases of individual substances coming to be and going out of existence - I venture that such an unusual and unlikely type of change must be counted apart but I will not commit to its there being; what I shall do is to flag the fact that it has been around for a while in the philosophical debate, and it looks different from other types of change spelt out.

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[193] Goodman, N. (1979). *Facts, Fiction, and Forecast*. Cambridge, Mass.: Harvard University Press, 74.

[194] Shoemaker, S. (1969). "Time Without Change". *Journal of Philosophy* 66: 363-81.

[195] Parfit, D. (1971). "Personal Identity". *Philosophical Review* 80: 3-27.

So much so, it seems to me that only four are in fact genuine types of change: *qualitative*, *compositional*, *relational*, and *substantial*; whereas I take any other identifiable variety of change that philosophers can come up with as merely apparent.[196]

The fact that they are all genuine does not entail that they are all fundamental. It might be that within certain theoretical frameworks, some of them can be considered dependent upon one or more of the other genuine varieties of change which appear to possess some sort of priority (either in the order of being or explanation or both), although I am not myself persuaded by that. Briefly, to show where I stand, I think that there is a sense in which the so-called individual substances are somehow prior to properties which in turn are dependent on substances. Hence, I take substantial change as a seemingly persuasive and fundamental feature of reality whereas qualitative change as somehow dependent upon it. Furthermore, I am inclined to deny the reality of those types of change I classified as apparent for I take a sparse view on properties: I do not like the idea that for every meaningful predicate we manage to construct there is a corresponding property. Finally, I oppose the idea that those supposed properties that McTaggart singles out in his famous argument, past, present and future, are in any sense properties of individual substances. Clearly, all the claims above ought to be substantiated but the good news is that for the purposes and conclusions of this thesis nothing depends on them being the case. I shall then plead the reader to consider them an offhand avowal.

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[196] Lastly, it might be instructive to add to the mix Bertrand Russell's eminent characterisation of change. In *The Principles of Mathematics*, he had it that: "Change is the difference, in respect to truth or falsehood, between a proposition concerning an entity and a time T and a proposition concerning the same entity and another time T' provided that the two propositions differ only by the fact that T occurs in the one where T' occurs in the other." Russell, B. (1903). *The Principles of Mathematics*. London: Allen & Unwin, 469. For an insightful criticism of Russell's definition see Le Poidevin, R. (1991). *Change, Cause and Contradiction*. New York: St. Martin's Press, Ch. 5.

1.3.4 *Is There a Problem About Change?*

Apparently, there is. The purpose of the previous section was to highlight the different and intricate ways in which change is understood, from the point of view of ordinary life up to the philosophically refined and subtle regimentation of it. The characterisation above is in no way exhaustive and it will not affect the issues addressed in what follows; it was meant to be an instructive interlude before coming down to the main argument, and so I should like it to be read.

The problem of change seems to be generated in two ways: Lewis' problem of temporary intrinsics, and the line of argument which draws on Leibniz's Law. Once we reject Lewis' modal realism and the metaphysical worry it originates from, we are left with the question of how Leibniz's Law allegedly manages to succeed in bringing about the problem.

In the recent literature, some people have put forth a line of argument which pleads that what the use of Leibniz's Law really achieves in generating the problem of change is to produce a pseudo-problem at best, the pseudo-problem of change.[197] Admittedly, I find this train of thought quite interesting and, unfortunately given my sympathy with perdurance, compelling. Therefore, I shall take advantage of how those precedents framed the problem but I shall also attempt to push their arguments a bit further, and to draw a slightly different conclusion; one which emphasises the fact that Leibniz's Law looks at best like a law of logic - indeed it is customarily considered one of the principles governing the *logic* of identity - whereas in general the use of the principle by Heller and Sider as an argument for temporal parts and perdurance betrays a *metaphysical* use of Leibniz's Law which is, firstly, never clearly announced, and secondly difficult to justify unless some other assumptions are made.

For convenience's sake, I shall not outline all the instances in the literature in which the use of Leibniz's Law is called into question as the main reason why the puzzle of change is perpetrated whereas I shall briefly flag and register why what I

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[197] Lowe, E.J. (1998). *The Possibility of Metaphysics.* Oxford: Clarendon Press, Ch. 2, 4, 5; (2002). *A Survey of Metaphysics*. Oxford: Oxford University Press, Ch. 2, 3, 4. Oderberg, D.S. (2004). "Temporal Parts and the Possibility of Change". *Philosophy and Phenomenological Research* 69: 686-708. Hansson, T. (2007). "The Problem(s) of Change Revisited". *Dialectica* 61: 265-74. Rychter, P. (2009). "There is No Puzzle about Change". *Dialectica* 63: 7-22.

present is relevant as well as how it fits within the bigger picture. I shall commence once more with Oderberg: he focuses on Heller's Little Markie/Dr. Mark argument outlined above and notes that the argument is 'every bit as suspicious as it looks'[198] depending on an equivocation over the meaning of the phrase 'differ in property'[199], and over the proper formulation of the principle of the Indiscernibility of the Identicals. Two issues which happen to be more tied together than they look. Oderberg's first conclusion is that Heller's argument is somehow circular: he begins from the evidence that Little Mark and Dr. Mark are indiscernible for they are identical over time. He then goes on to claim that they are, as a matter of fact not so, but clearly this claim about their distinctness presupposes Little Markie and Dr. Mark's distinctness as temporal parts which is what Heller is meant to prove.[200]

The argument just given criticises the use of the principle of the indiscernibility of the identicals for being circular. The criticism could be made even more profound as not just the use but also the formulation of Leibniz's Law appears troubling[201]:

> "The principle [...] must mention the possession by objects of the same property *at the same time*. [...] for any two objects and any time, if the objects are numerically identical then they share all their properties at that time. But it does not allow Heller to infer the distinctness of Little Markie and Dr. Mark because they differ with respect to having a beard at distinct times. The reason [Leibniz's Law] needs to be formulated in terms of the times at which properties are possessed, and hence the reason it is a basic metaphysical truth, is that it is entailed by the Law of Non-

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198 Oderberg, D.S. (2004). "Temporal Parts and the Possibility of Change". *Philosophy and Phenomenological Research* 69: 689.

199 *Ibid.*

200 Of course, Heller could complain that the opponent herself is presupposing the identity of Little Markie and Dr. Mark as the reason for claiming their being indiscernible, a presumption which in all fairness it would be somehow preposterous to call into question. Any case, granting Heller's rejoinder, what this situation shows is that perhaps the principle of the Identity of the Indiscernibles should not be used as a reason to assert distinctness or identity (over time) on pain of circularity. See Oderberg, D.S. (2004). "Temporal Parts and the Possibility of Change". *Philosophy and Phenomenological Research* 69: 690.

201 A quick clarification may be required since it seems I have been switching between the two phrases 'the indiscernibility of the identicals' and 'Leibniz's Law' as if they were interchangeable. I take them to be so but I am aware that someone may disagree. For example, I have come across, mainly in conversation, with people who thought of Leibniz's Law as the bi-conditional, the principle of the indiscernibility of the identicals and the identity of the indiscernibles all in one. In this thesis, I shall follow Lowe's formulation of the principle of the indiscernibility of the identicals and Leibniz's Law as expressing 'Whatever is true of a thing is true of anything identical with that thing, since anything identical with that thing is that very thing itself'. Lowe, E.J. (2002). *A Survey of Metaphysics*. Oxford: Oxford University Press, 23.

> Contradiction. [...] the law [which] holds that nothing can both be and not be *at the same time and in the same respect*."[202]

Thus, if Oderberg's argument is plausible, and I am inclined to believe it is, then the *prima facie* evidence for the generation of the problem of change from Leibniz's Law waters down. More to the point, if Heller's use and formulation of Leibniz's Law were the basis for the generation of the problem of change then, given that the use is inappropriate and the formulation misleading, the conclusion to be drawn is that there is no evidence to support the traditional problem of change. So there seems to be no problem of change after all.

Interestingly, the criticism can be sharpened and thereby cut deeper as in Hansson's revisitation of the problem of change. Once again, for Hansson the line of argument which leads to the conclusion that there is a problem of change is twofold: the argument from Leibniz's Law and the argument from the Instantiation of Incompatible Properties (Lewis' problem of temporary intrinsics). Hansson's investigation is cogently pursued within the framework of the B-theory[203] of time 'because those who press the arguments into service are typically B-theorists'; but also, and more interestingly, those two arguments are generally put forth as evidence in favour of temporal parts. Given that perdurance is considered the doctrine of temporal parts as in Sider, then there is a sense in which perdurance is somehow the preferred view of persistence to go with the B-theory (or eternalism as I shall argue in Part II of the thesis) although the link between the two will have to be qualified further.

In any case, Hansson's presentation of the argument from Leibniz's Law follows the same lines as Heller's and Oderberg's so I shall omit most of the details and go straight to his conclusion.[204] There is clearly something contradictory going on since the inference begins by assuming an object (a candle) which persists by enduring and which changes one of its intrinsic properties (shape: from being straight to being bent) between two times. (Of course the object is taken as numerically identical at both times, which is

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[202] *Ibid.* 691.

[203] Roughly by the expression B-theory Hansson means quite uncontentiously that "all times are to be understood as being ontologically on a par, properties such as being past, present or future are to be rejected, and verbs and copulas are to be regarded as tenseless." Hansson, T. (2007). "The Problem(s) of Change Revisited". *Dialectica* 61: 265-6. More on the B-theory in chapter 2.2.

[204] I shall omit to look at Hansson's formulation of the argument from the instantiation of incompatible properties since I believe the case to be closed with the denial of Lewis' commitment to modal realism and the relevant metaphysical worry.

the whole point of persisting by enduring, as I understand it). Because of the application of Leibniz's Law, contrary to what has been assumed in the premise, the conclusion must be that the candle at t_1 which is straight is not numerically identical with the one at t_2 which in fact is bent, 'and if we must choose between Leibniz's Law and the idea that objects persist by enduring, it is the latter that has to go.'

According to Hansson, the argument is question begging in a sense which is reminiscent of Oderberg's above but with a twist: the interesting observation which will turn out useful for my argument shortly is that 'Leibniz's Law incorporates no restriction on the truths concerning the entity under scrutiny. All truths regarding the entities are relevant'; in fact, what the principle expresses is the idea that 'if *a* and *b* are numerically identical, then whatever is true of *a* is true of *b* and whatever is true of *b* is true of *a*.' We need now to remember that the argument is pursued within the framework of the B-theory so that the claim above about the fact that 'All truths are relevant' becomes 'All tenseless truths are relevant'.[205] According to perdurance, the entity at t_1, say a candle, is straight so it is true to assert that the candle at t_1 is straight. At t_2 the candle is bent so it is *not* true of the candle at t_2 that it is straight (and *vice versa*: the candle at t_1 is straight so it is *not* true of it that at t_1 is bent, etc.). If this is the case, then Hansson - regrettably for perdurance - asks a very cogent question: why should an endurance theorists accept *that* formulation of the candle changing shape from straight to bent? Unless the endurance theorist accepted temporal parts which would be bizarre (at least in the case of ordinary material objects like candles whereas it may not be for other kinds of things, say events) if the candle is numerically identical between t_1 and t_2 then there is no need for the endurance theorist to grant that it is *not* true of the candle at t_2 that it is straight. Actually, it would be false to say of the candle at t_2 that it is not straight: it is straight since the candle as an enduring object is straight, as it is so at t_1. In concocting his argument, Hansson interestingly draws upon an analogy between spatial and temporal contexts:

> "In the case of Jon, as long as he is (present tense) playing football *at some place or another*, the present tensed 'Jon is playing football' is true. In the case of the

[205] In conversation, Dr. Francis Pearson called my attention to why this ('All tenseless truths are relevant') would be the case since many B-theorists still think that there are tensed truths, they just have tenseless thruth-makers, so why the tensed ones be ignored? I am not sure in virtue of what Hansson claimed that, however I think that a B-theorist might take issue with Dr. Pearson's 'there are tensed truth'. It is true that the New B-theory of time gave up on linguistic reductions but still at the end of the day all there is is tenseless. So perhaps this is what Hansson meant by 'All tenseless truth are relevant'.

> candle, as long as it is (with the tenseless 'is') straight *at some time or another* in B-time - i.e. somewhere in the B-series - the tenseless 'the candle is straight' is true. In order for the tenseless 'the candle is straight' to be false it would have to be the case that the candle is never, at any point in the B-series, straight. But it is a premise of the alleged reduction that the candle is straight at [t_1]. Thus, given that the expression [candle at t_2] picks out an enduring entity, as endurance theorists maintain, and given that the enduring entity is straight at [t_1], as an explicit premise of the argument has it, the tenseless '[candle at t_2] is straight has to be regarded as true, not false."[206]

If Hansson's argument makes sense then 'there is no conflict with Leibniz's Law. Everything that is true of candle at t_1 is true of candle at t_2, and *vice versa*.'[207] Seemingly, endurance theorists have a great deal of evidence to claim that the argument from Leibniz's Law is not sound. Hansson's conclusion echoes Oderberg's:

> "By presuming that it is true of [candle at t_1] that it is straight and that it is not true of [candle at t_2] that it is straight, the argument presupposes that we are dealing with two different entities - in effect, with stages, or temporal parts, trapped at [t_1] and [t_2] respectively - and that is to beg the question against those who insist that objects endure through change."[208]

Once more, from a point of view that is independent from Oderberg's, there seems to be quite a good deal of evidence which casts doubt on the traditional formulation of the problem of change. Therefore, a tentative conclusion could be that the way the problem (or puzzle) of change is traditionally generated is suspicious at best, and question begging/circular at worst, if not simply invalid/unsound.

I can see where Oderberg and Hansson[209] are coming from and for argument's sake I shall accept their conclusions. (Actually I find them quite compelling so it is not just about biting the bullet). However, I think that their criticism of this use of Leibniz's

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[206] Hansson, T. (2007). "The Problem(s) of Change Revisited". *Dialectica* 61: 267.

[207] *Ibid.* Admittedly, there is a sense in which Hansson's point may sound like a flat contradiction. However, recalling how Hansson framed his argument, namely assuming the B-theory of time, it should help to wave the appearance off: as long as the candle is (tenseless) straight *at some time or another* in the B-series (say at t_1) the tenseless sentence 'the candle is straight' is true. In order for the sentence'the candle is straight' to be false it would have to be the case that the candle is never, at any point in the B-series, straight but this would contradict one of the premises of the argument which claimed that the candle is straight at t_1 and successively bent at t_2.

[208] *Ibid.* 268.

[209] And Rychter too, in particular section 1 and 2 of his piece. See Rychter, P. (2009). "There is No Puzzle about Change". *Dialectica* 63: 7-22.

Law could be pushed even further, specifically to a new level of generality as I shall shortly show.

I shall start my argument looking at the notion of *identity*. As I pointed out in the previous chapter, there seems to be two distinct senses of the word 'identity': the first one which singles out identity as a *relation*; the second one expresses identity as a *name*.[210] For the purposes of my argument I shall focus mainly on the first sense, namely the relation which logicians standardly represent by means of the equality sign flanked by two terms.

The first distinction I believe worth pointing out emerges in combination with the phenomenon at issue, namely change. Recall what has been said previously about things changing over time: one and the same thing can be different at different times; in other words, one (and only one thing) can exhibit discontinuous/incompatible intrinsic properties over time. But this, as we now know, has been deemed highly suspicious or even contradictory by philosophers of a certain bent. As a matter of fact, things seem to be not as negative as they look, as Lowe points out:

> "[i]t may seem to be nothing short of contradiction to say that a thing can be both the same and different, that is, both the same and not the same. Here philosophers are always quick to draw a distinction between what they call *numerical* and qualitative identity. [...] when a thing changes, it remains numerically one and the same thing but becomes qualitatively different [...] Are there, then, two different kinds of identity, or two different senses of the word 'same'? Most philosophers and logicians would answer 'No' to this question. They would say that when we speak of a thing becoming qualitatively different over time, we simply mean that this thing has numerically different qualities at numerically different times [...] On this view, all identity is really numerical identity, but we have to distinguish between the identity of a thing and the identity of its qualities."[211]

Therefore, the conclusion is that one and only one identity relation (numerical identity) applies to different kinds of things. In turn, numerical identity can be defined as the

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[210] The distinction is important, and as Lowe puts it, the latter way in which identity is understood picks out what he calls the *individual essence* of something, that is its very being or what it is, as in Locke. In addition, these two ways of understanding identity play a crucial role when it comes to adequately distinguish between *criteria of identity* and *principles of individuation*. See Lowe, E.J. (2010). "On the Individuation of Powers". In A. Marmodoro (ed.) *The Metaphysics of Powers: Their Grounding and Their Manifestation*. New York: Routledge, 8-26; (2009). *More Kinds of Being: A Further Study of Individuation, Identity, and the Logic of Sortal Terms*. Oxford: Basil Blackwell, Ch. 1, 3, 4; (2003). "Individuation". In M.J. Loux & D.W. Zimmerman (eds.) *The Oxford Handbook of Metaphysics*. Oxford: Oxford University Press, Ch. 3.

[211] Lowe, E.J. (2002). *A Survey of Metaphysics.* Oxford: Oxford University Press, 23-4.

smallest equivalence relation satisfying or governed by Leibniz's Law. An equivalence relation is one which is *reflexive*, *symmetric* and *transitive*. Such basic principles characterizing identity are:

(i) *Reflexivity* or *Self-Identity*: $x = x$, everything is identical to itself;

(ii) *Indiscernibility of Identicals* or *Leibniz's Law*: $x = y \rightarrow (\varphi x \leftrightarrow \varphi y)$, if x and y are identical then whatever is true of x is true of y and *vice versa*;[212]

(iii) *Symmetry*: $x = y \rightarrow y = x$, (it follows from Reflexivity and the Indiscernibility of Identicals taking φ to be the condition expressed by "... = x");

(iv) *Transitivity*: $x = y \ \& \ y = z \rightarrow x = z$, (it follows from the Indiscernibility of Identicals taking φ to be the condition expressed by "... = z");

(v) *Identity of Indiscernibles*: $(\varphi x \leftrightarrow \varphi y) \rightarrow x = y$, which is the converse of Leibniz's Law, it claims that if everything true of x is true of y then x is identical with y.[213]

For completeness' sake, another basic principle which we come across dealing with identity is Leibniz's *Substitutivity Principle* which claims that if a and b are codesignators, if $a = b$ is a true sentence of English (or of other language), then they are everywhere substitutable *salva veritate*. This principle seems to be highly problematic

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[212] On this formulation, the Indiscernibility of Identicals is fairly uncontroversial, but often when "x" and "y" are restricted to objects and "what is true of x" and "what is true of y" to properties it suddenly becomes philosophically controversial. And this is where I will shortly level my objection at.

[213] For concerns against the identity of indiscernibles one might look at Max Black, (Black, M. (1952). "The Identity of Indiscernibles". *Mind*, 61: 153-64) who suggests that we might conceive of a symmetrical universe consisting solely of two qualitatively indiscernible spheres, hence it would follow that the principle is not necessarily true. Hacking (Hacking, I. (1975). "The Identity of Indiscernibles". *Journal of Philosophy*, 72: 249-56) points out that Black's situation might well be re-interpreted as one sphere immersed in a non-Euclidean space. On this view, what Black describes as a journey from one sphere to another qualitatively identical might by contrast be re-described as a journey around space back to the very same sphere. A further proposal instead, suggests that the sphere is one and the same but it happens to be bi-located (O'Leary-Hawthorne, J. (1995). "The Bundle Theory of Substance and the Identity of Indiscernibles". *Analysis*, 55: 191-6). On the face of it, such a principle which seemed to be necessarily true but on Black's view not quite, according to some other thinkers is not even contingently true. For instance, Steven French (French, S. (1989). "Why the Principle of the Identity of Indiscernibles is not Contingently True Either". *Synthese*, 78: 141-66) urged that according to quantum mechanics the state of a system of n particles of the same kind is one in which there is no possibility of saying which particle is which. See also Forrest, P. (2010). "Identity of Indiscernibles". In *Stanford .Encyclopedia of Philosophy* (ed. Edward N. Zalta), Stanford: Center for the Study of Language and Information; and Hawley, K. (2009). "Identity and Indiscernibility". *Mind*, 118: 101-9.

as Frege[214] and Quine[215] point out. However, what matters is that all the various explanations of the failure of the principle are not counterexamples to Leibniz's Law above, given that they are two distinct principles. Leibniz's Law does not say anything about substitutivity of codesignators.

Having considered the logic of identity, I shall now proceed to devise my argument. A remark which is commonly brought up against Leibniz's Law, as we are well aware by now, regards cases of change through time such as those considered above. Take Heller's formulation of Leibniz's Law: for any objects, *x* and *y*, if *x* and *y* differ in their properties, then *x* and *y* are not identical. An extremely popular way to formally translate that formulation of Leibniz's Law is the following: $(\forall P)(\forall x)(\forall y)((x = y) \rightarrow (Px \leftrightarrow Py))$ whereby *x* and *y* (variables for individuals) range over individuals, and *P* (variable for properties) over properties. This being so, suddenly Leibniz's Law becomes problematic: e.g. consider an object *x* (*x* is self-identical) at time *t* and t_1 ; at *t*, *x* is *F*, whereas at t_1 *x* is no longer *F*, say $\neg F$. According to Heller's formulation of Leibniz's Law, sameness of things gives sameness of properties. But there is no such thing as sameness of properties since it has been established that at *t*, *x* is *F* whereas at t_1 *x* is $\neg F$ with $F \neq \neg F$ therefore it cannot be one and the same object.

The easiest rejoinder which rests upon the fact that the argument actually confuses *numerical* and *qualitative* identity will not do: *x* and *y* are 'one and the same' object so they are numerically *the same*; but the properties of the one are different from those of the other, thus in this sense they are qualitatively *different*. Very recently Wasserman[216] suggested that this line of argument 'underestimates the problem' for 'it ignores the intimate relation between numerical and qualitative identity that is captured by *Leibniz's Law* (LL): For any *x* and *y*, if *x* = *y* then *x* and *y* have all the same properties.' Therefore, the bottom line is that 'Change requires both numerical identity and qualitative difference. Yet numerical identity entails qualitative identity, which precludes qualitative difference.' The failure of Leibniz's Law is also envisaged as a powerful objection levelled against endurance since the whole point of persisting by enduring is for the persisting entity to be numerically identical at which time it exists no

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[214] Frege, G. (1969). "On Sense and Reference". In P. Geach and M. Black (Trans.) *Translations from the philosophical writings of Gottlob Frege*. Oxford: Blackwell, 56-78.

[215] Quine, W.V.O. (1963). "Reference and Modality". In *From a Logical Point of View*, New York: Harper and Row, 139-59.

[216] Wasserman, R. (2006). "The Problem of Change". *Philosophy Compass* 1: 48-57.

matter how much qualitative change the entity underwent.

As we now know, there is a good deal of evidence against the soundness of the argument from Leibniz's Law outlined above. Anyway, what I would like to redirect attention to is that Leibniz's Law is first and foremost a principle of the *logic* of identity as we have seen above.[217] As defined by Leibniz, the principle sounds pretty much like this:

> "Whatever is true of a thing is true of anything identical with that thing, since anything identical with that thing is that very thing itself."[218]

Quite uncontentiously, 'thing' in the phrase above stands for 'entity' in general in a way in which anything *unrestrictedly* could potentially be. With this in mind, let us now recall my formulation of Leibniz's Law: $x = y \rightarrow (\varphi x \leftrightarrow \varphi y)$. What is worth noting is that it seems to adequately express Leibniz's Law as quoted above without any explicit reference to either quantification in general or to the scope of the quantifiers, to wit over what kind of variables the quantifiers range (individuals and properties as in Heller's formulation). The letters in my formulation are mere place holders: *x* and *y* stands for entities in general whereas φ stands for the phrase 'whatever is true of'. Therefore, as a law of the logic of identity, Leibniz's Law is a formula which stresses the intimate relation between entities in general and what is true of them. Unlike Heller's (*et alii*) formalisation of Leibniz's Law in which admittedly it might not be clear how the variables are used (in Classical Logic and mathematical reasoning, variables serve a dual function: sometimes they are used (i) as singular terms to denote specific, but unspecified/arbitrary objects; or (ii) to express generality as in 'For any *x*, there is a *y*, such that...'); in my proposed formulation there is no such ambiguity: *x* and *y* stand for anything whereas φ for anything which could be truly predicated of *them*.

Let us now try to give formal rigour to the case of an object changing intrinsic properties over time, say Heller's Little Markie/Dr. Mark example as well as Sider's Long-Hair/Short-Hair one: as we know, Leibniz's Law formulated as $(\forall P)(\forall x)(\forall y)((x = y) \rightarrow (Px \leftrightarrow Py))$ fails to obtain for the reasons advertised above. Curiously though, if

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[217] By logic, I mean, perhaps less uncontentiously than above, a *formal* as well as *normative* discipline which studies the principles of correct reasoning. Thus, it seems that logic has to do with *how* propositions hang together - those offered as reasons are called *premises*, and the one which the premises are supposed to support are called the *conclusion* - to see if the overall argument (when some premises and a conclusion are combined together) is formally *valid* and *sound*.

[218] Lowe, E.J. (2002). *A Survey of Metaphysics*. Oxford: Oxford University Press, 23.

we instead formalised Heller's and Sider's example according to the formulation of Leibniz's Law I proposed, that is $x = y \rightarrow (\varphi x \leftrightarrow \varphi y)$, which reads 'Whatever is true of a thing is true of anything identical with that thing, since anything identical with that thing is that very thing itself' the outcome is rather the following: whatever is true of a thing, say 'Little Markie who was not bearded' is true of anything identical with that thing, say 'Dr. Mark who is bearded' since anything identical with that thing (Dr. Mark) is that very thing itself (Little Markie).

Now, is this an example in which Leibniz's Law fails? Not quite. Is it perhaps an example which harbours a contradiction? Not really. In both cases, it is perfectly legitimate to predicate truly of Mark Heller that 'Little Markie was not bearded' and that 'Dr. Mark is bearded' because Mark Heller is Little Markie, Mark Heller is Dr. Mark, and Little Markie is Dr. Mark (transitivity of identity). This way, I find it quite difficult to see how Leibniz's Law could generate a puzzle (unless of course we take Heller's Little Markie/Dr. Mark to be *not* numerically identical to start with but that would be question begging as Oderberg points out). In addition, I also find it difficult to see how Lewis' problem of temporary intrinsics could be a problem (apart from the already mentioned line of argument, the one urging upon Lewis' modal view and the metaphysical worry that comes with it) unless we carry on formalising Leibniz's Law as Heller *et alii* have been doing. Is their interpretation the best way to formally render Leibniz's Law? Interestingly, at no point is this methodological question addressed by anyone of them who endorse the interpretation of the principle at stake here. Is the version I proposed somehow better? I believe so, in particular if the aim is to be faithful to Leibniz's original claim: 'Whatever is true of a thing is true of anything identical with that thing, since anything identical with that thing is that very thing itself.' Suppose we stipulate that the concern of being faithful to Leibniz's *dictum* is not pressing, is the version I propose still somehow better? Yes it is, because it is the most parsimonious one, and explanatory parsimony is largely endorsed by philosophers in Lewis' wake. Secondly, it does not produce a puzzle which it then struggles to explain, and lastly it does not make any pronouncement on the scope of the quantifiers allegedly involved in the principle, and on how temporality should be regimented. Actually, the way classical logic address quantification and regiments temporality might partly bring about the

generation of the problem, all the same affecting the solution.[219] As soon as quantification is restricted so that the quantifiers are said to range only over some kinds of things rather than others, as soon as temporality is treated as philosophers in Lewis' wake did, clearly some metaphysical assumptions are smuggled in; assumptions that affect the overall principle which is no longer just a logical principle but it turns into a metaphysical one. A move which, most likely, brings with it a good deal of metaphysical disagreement.[220] [221]

Suppose for the time being that my argument is plausible; the question is then whether quantification for some reason needs to be restricted, and if it does why. I am not sure how to answer this question, perhaps the question has no easy answer. However, what I shall stress is that generally the inclination of a perdurance theorist is

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[219] It all needs to be taken with a grain of salt, in particular in the light of Lowe's distinction between a Semantic and a Metaphysical problem which regards the attribution of temporary intrinsics. See footnote 174 for an overview and references.

[220] Here is what Armstrong says: "Here is an argument for saying that a person today and a person yesterday are not strictly identical: Strict identity is governed by a principle that is called the Indiscernibility of the Identicals. This says that if *a* is strictly identical with *b*, then *a* and *b* have exactly the same properties. Sameness of things gives sameness of properties. It is sometimes called Leibniz's Law. (For those who find it helpful, it can be expressed is symbols: $(\forall P)(\forall x)(\forall y)((x = y) \supset (Px \equiv Py))$, where P ranges over properties, and *x* and *y* range over all entities." Armstrong, D.M. (1989). *Universals. An Opinionated Introduction*. Boulder, CO.: Westview Press, 3. Surely Armstrong talks the talk, and to some extent I agree with what he says, but unfortunately how he then accounts elsewhere for temporal parts and perdurance (See for instance Armstrong, D.M. (1980). "Identity Through Time". In P. van Inwagen (ed.) *Time and Cause: Essays Presented to Richard Taylor*. Dordrech: Reidel, 67-78) betrays that he does not walk the walk after all.

[221] As far as I understand this issue, there might be a further assumption, more or less explicit, that needs to be added to the mix, the fact that seemingly standard first-order logic carves reality at its joints, as it were. See for instance Sider: "My inquiry will be guided by logical conservatorism: for the most part I will not give serious consideration to views that challenge standard logic. [...] A related but more contentious assumption is that modern logic's quantificational apparatus mirrors the structure of reality [...]." Sider, T. (2001). *Four-Dimensionalism. An Ontology of Persistence and Time*. Oxford: Oxford University Press, xvi. See also Lewis, D.K. (1968). "Counterpart Theory and Quantified Modal Logic," *Journal of Philosophy*, 65: 113-26. His attempt to preserve the apparatus of 'all-purpose extensional logic' when it comes to regimenting modal discourse is exemplary. Logical conservatorism has been extremely popular, say, in Quine's wake (and even earlier). I shall address issues related to this as well as my skepticism in the third part of the thesis on existence. For the record, I am not quite sure that standard logic adequately carves reality at its joints; matter-of-factly there are some puzzling situations which I believe cannot be suitably addressed by that apparatus as I shall show later on.

quite permissive when it comes to setting up boundaries to quantification;[222] but then for some reason I fail to grasp why quantification is then restricted so that out of the blue there is a problem of change.

I confess the situation is every bit as suspicious as it looks and I cannot help feeling that something has gone missing although presently I might not be able to point at any particular wrongdoing apart from those above. What I am certain of is that this traditional way of generating the problem of change is not as clear or straightforward as perdurance theorists believe it is. As a perdurance enthusiast, I am convinced that the problem of change as traditionally generated is not a problem unless the aim is to make one up, and then to put forth temporal parts as a solution to it. Further to this, given that the problem of change has been used to show endurance's intuitions about persistence contradictory (or to harbour a contradiction), that line of thought turned out extremely unfair towards endurance since it showed it contradictory on the basis of unreliable and philosophically questionable arguments which I think is an instance of bad philosophy. To conclude, as pointed out above, there are better and even more intuitive ways of motivating perdurance. The notion of temporal parts makes good sense however the whole thing ought to free itself from the ghosts of its recent past in order to move forward.

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[222] The question whether there is unrestricted quantification has recently received much attention, in particular whether it makes sense the idea of a quantification over a domain comprising absolutely everything there is. Quantification, as a ubiquitous feature of our language and thought, is an extremely contentious topic which unavoidably I will touch upon in the third part of the thesis on existence. It is also a complex one since it is intimately related to other quite contentious issues in contemporary metaphysics, namely composition , vagueness, time, persistence, etc. For an overview of the recent debate see Florio, S. (2014). "Unrestricted Quantification". *Philosophy Compass* 9: 441-54. References relevant to the point I sketched above are: Lewis, D.K. (1991). *Parts of Classes*. Oxford: Basil Blackwell; (1998). *Papers in Philosophical Logic*. Cambridge: Cambridge University Press. Sider, T. (2001). *Four-Dimensionalism. An Ontology of Persistence and Time*. Oxford: Clarendon Press, xvi-xxiv; (2009). "Ontological Realism". In D. Chalmers, D. Manley & R. Wasserman (Eds.) *Metametaphysics: New Essays on the Foundations of Ontology*. Oxford: Oxford University Press, 384-423.

1.4 Part I: *Conclusions*

To summarise: I began this first part of the thesis by deploying my terminological commitments, talking about perdurance as the doctrine of temporal parts, whether instantaneous or short-lived. Thus, the expression 'four-dimensionalism' means the view that space and time are somehow alike - the alleged degree of similarity to be investigated in the next chapter - which is neutral regarding the question whether there are temporal parts or whether we shall reject them.

I then started my investigation into the relationships between perdurance and its branching off into theories of time and existence from the *prima facie* evidence that things change. The reason why I decided to frame the investigation looking into persistence at first is because - to reiterate - the fundamental datum that we experience is the fact that things change, and that despite the fact that they change they still continue to exist as the same. In other words, they exist at more than one time notwithstanding the change they go through. This datum cannot be denied on pain of being preposterous and unreasonable.

Upon careful analysis, that evidence seems to be able to ground both accounts of how things persist, perdurance and endurance; and as I pointed out later on in my argument, with some adjustments the playing field seems to be somehow levelled; both views can legitimately draw upon a good amount of intuitions and common sense considerations. The reason why I pursued that line of argument is because I believe that the evidence coming from intuitions and common sense considerations is an adequate (and perhaps the only, at least on my view of metaphysics) starting point if a philosophy is then to be constructed. Secondly, I believe it could be a suitable (if not the one only) way to gather agreement from both parties so that, most importantly, such evidence and agreement could be then communicated, something which the contemporary debate seems to have failed to achieve. If this line of argument is plausible, then it seems that, initially both parties, perdurance and endurance, know what the other is talking about, and that their opponents understand them. From there then, the harsh road of the philosophical regimentation of that discourse, intuitions, and common sense considerations is open; in the case of perdurance, the fact that the attempt to develop a

definition of temporal parts which could be adequately grasped by the opponent turned out to be a failure might just be contingent; perhaps acknowledging what has been remarked above, and surely with more theoretical efforts an adequate definition could be forthcoming. If not, still the rock bottom of the idea of parts in time would still be understandable.[223]

In the subsequent chapter, I looked into what David Lewis called 'the principal and decisive objection against endurance' which in turn seems a decisive argument for perdurance and temporal parts, namely the problem of temporary intrinsics. At the outset, I showed that the problem is an instance of a major as well as long-standing philosophical issue, to wit the traditional problem of change. Looking at Lewis' problem from the perspective of the problem of change enabled me to frame the debate along two distinct, although intimately related, strands: an argument for perdurance which draws upon the problem of the instantiation of incompatible properties, and a second one which relies on Leibniz's Law. In both cases, there seems to be compelling evidence that casts doubt on the established ways to frame and account for the problem. Regrettably, despite my sympathy for perdurance, I found that evidence quite compelling, and I had to acknowledge that that very line of argument could be furthered and strengthened to the conclusion that Leibniz's Law generates a metaphysical problem which in turn requires metaphysical tools in order to be solved (as Lewis, Heller, and Sider claim) insofar as the principle itself is formulated and interpreted metaphysically to begin with. But that could mean overlooking the true essence of the principle which is first and foremost a principle of the logic of the identity.

If this line of argument is plausible then the myth of the problem of change is debunked, at least as set up in that paradigmatic way by perdurance. If there is no such problem then also Lewis' 'principal and decisive objection against endurance' might well fade away. An objection which in the first place boosted the doctrine of temporal parts but which now appears to lack any philosophical ground (or at least it looks as

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[223] Given Lowe & McCalls' definition of endurance which claims that 'An object endures iff (i) it lacks temporal parts, and (ii) it exists at more than one time' I believe that there is a sense in which the definition could make sense only if the endurance theorist has somehow an understanding and appreciation of the notion of temporal parts. Conversely, the cogency of the definition would be certainly weaker without such understanding, something like 'An object endures iff (i) it lacks temporal parts - no matter what they are - and (ii) it exists at more than one time'. Generally, a denial which lacks prior understanding does not look to me fair or promising so I think that my remark that understanding and agreement could be gathered on what is on the background of the notion of temporal parts complies with the gist of a proper definition of endurance as I take it to be Lowe and McCalls'.

though it has been downgraded: from a metaphysical problem to perhaps a semantic one as Lowe points out to Lewis).

To conclude, if we engage in how perdurance advocates have accounted for the theory - namely defining temporal parts as in Sider, and finding support for it in the problem of change - then I believe the scenario does not look particularly promising for perdurance: a case in which it is not clear what temporal parts are (at least in a way in which it can be clearly communicated to the opponents) but also a case in which the principal argument (according to an eminent supporter of perdurance) showing what sort of philosophical work they carry out seems to vanish; so that in addition to the fact that it is not clear what they are, similarly it is less clear what they do.[224] However, even if temporal parts might not be univocally defined, and one of the main arguments in their favour might not be genuine, it is still interesting to note that there are better, more intuitive ways, of motivating perdurantism, as pointed out in chapter 1.3.1.[225]

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[224] Temporal parts are considered to carry out decisive philosophical work in respects other than just the problem of change. Recall for instance McGrath's five points in favour of temporal parts: 1. Arguments from spatial analogy; 2. Arguments from relativistic considerations; 3. Arguments concerning the solution of the puzzles of coincidence; 4. Arguments concerning the explanation of intrinsic change over time; 5. Arguments from considerations of the vagueness of composition. Therefore, my argument against point 5 is not meant to sink temporal parts as a philosophical device, rather to get things back into perspective. For an interesting overview of why/how temporal parts could be useful see Le Poidevin, R. (2000). "Continuants and Continuity". *The Monist* 83: 381-98.

[225] For some reasons that I cannot help, the situation reminds me of Bishop Berkeley's argument against material substance: "The general idea of *being* [first strand to the meaning of material substance] seems to me the most abstract and incomprehensible of all. As for its 'supporting qualities' [second strand to the meaning of material substance]: since it cannot be understood in the ordinary sense of those words [...] it must be taken in some other sense; but we aren't told what the other sense is." and this it looks to me to mirror the criticism of the incomunicability of the notion of temporal parts. In addition, focussing on what philosophical work material substances carry out Berkeley had it that: "'Even though external bodies aren't absolutely needed to explain our sensations,' you might think, 'the course of our experience is easier to explain on the supposition of external bodies that it is without [...] So it is at least probable [that] there are [external bodies]. But this is not tenable either. The materialists admit that they cannot understand how body can act upon spirit, or how it is possible for a body to imprint any idea in a mind; and that is tantamount to admitting that they don't know how our ideas are produced. So the production of ideas or sensations in our minds can't be a reason for supposing the existence of matter or corporeal substances, because it admittedly remains a mystery with or without that supposition." Berkeley, G. (1901). "The Principle of Human Knowledge". In A.C. Fraser (ed.) *Berkeley's Complete Works*. Oxford: Clarendon Press, London: Nelson, 266. Replace, in the first half of the quote 'material substances' with 'temporal parts' whereas in the second what philosophical work material substances are supposed to carry out with the temporal parts' one, and the conclusion will follow: it is not clear what they are; it is not clear what they do, philosophically speaking; therefore why and on what grounds should we posit them in our theory?

1.5 *Perdurance, Endurance, and Stage: towards a novel definition?*

Before moving to the next part of the thesis in which McGrath's first argument for temporal parts will be explored, I shall make some brief considerations about the definitions of the two main contenders as theories of persistence considered so far (for completeness including the stage view) in the light of some notions spelt out in this chapter.

We saw early on how Lewis' definitions of perdurance and endurance were *prima facie* a fair and plausible taxonomy of the debate over persistence at that point in time. The notion of endurance was probably the most contentious one, in particular because of Lewis' reference to the expression 'wholly present', and how he then used it against endurance theorists (who by the way made the mistake of accepting Lewis' definition of their own view). All this was common currency till 2009 when Lowe & McCall decided to re-establish some order crafting a new definition of endurance, as we now know in terms of a lack of temporal parts plus the usual formula of 'existing at more than one time'. They also raised an interesting remark calling into doubt Lewis' definition of persistence as a neutral word 'something persists iff it exists at more than one time' since the expression itself is not univocal: that is, what perdurance and endurance mean by the phrase 'existing at more than one time' is different (see Lewis' 'partly' or 'wholly').

Be this as it may, given all the considerations that have been offered so far, I guess I might attempt to slightly tweak the notions of persistence, perdurance and endurance as to make clearer what they actually mean, first and foremost to me, and perhaps if my understanding is correct, to others interested into the debate as well.

In doing so, I shall take advantage of expressions like 'bearer of properties' which is hopefully uncontentious. I take to stand for 'whatever entity exhibits whatever feature' without any commitment whatsoever to any specific account of the nature of the bearer of properties or the properties. I shall also opt for the expression 'direct' as meaning something along the lines of 'without appealing/depending on/being relative to anything else'. My understanding and use of 'direct' should not be assimilated to the

expression *simpliciter* which is widely as well as wildly used in the literature.[226] Lastly, I shall employ the expression 'discontinuous' in place of 'incompatible' since I think change is generally about things exhibiting different features at different times.

So much so, the following reflects my personal understanding of what the different parties in the debate want to say and defend. I shall begin with Lewis' neutral word:

> *Persistence*: The direct bearer of the discontinuous/incompatible[227] properties persists iff *it* exists at more than one time;[228]
>
> *Perdurance*: The direct bearers of the discontinuous properties perdure iff they are *not* numerically identical at each time it exists (temporal parts or stages) whereas the indirect bearer of discontinuous properties is (worm or aggregate).[229]
>
> *Endurance*: The direct bearer of the discontinuous properties endures iff it is numerically identical at each time it exists.
>
> *Stage Theory (Exdurance)*: The direct bearers of the discontinuous properties (instantaneous temporal parts/stages) exdure iff although they are singly self-identical they are *not* numerically identical one to the others at each time they exist.

As mentioned above, these characterisations summarise my understanding of what's at issue when those expressions - persistence, perdurance, endurance, and stage view - are

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[226] What *simpliciter* means for perdurance (or whether it makes any sense at all) is an interesting question. For instance, Sider considers *simpliciter* and *atemporal* to be synonymous. Sider, T. (2001). *Four-Dimensionalism. An Ontology of Persistence and Time*. Oxford: Oxford University Press, 57.

[227] I this case by 'discontinuous' I primarily mean 'different features at different times'.

[228] I must confess that I am not particularly satisfied by this characterisation of persistence but at the same time I do not know how to pin down my intuitions and common sense considerations other than that. See also footnote 5 in McGrath's piece on the issue whether Lewis' definition of persistence begs the question against stage theory. McGrath, M. (2007). "Temporal Parts". *Philosophy Compass* 2: 744. Also, as I briefly mention in footnote 105, one way to go could be to disentangle the notion of persistence from the one of diachronic identity, if it makes sense at all.

[229] Of course, the statement is vacuously true if by 'numerically identical at each time it exists' is read in terms of self-identity. Surely it is but the question is not about synchronic identity rather it is about how numerical identity is inflected, as it were, in a diachronic context. For the record, the first half of the definition happens to overlap with the definition of exdurance, and I think the overlap is the whole point of Sider's book on four-dimensionalism. For the record, *pace* Lewis I can see very little room to accommodate the idea of temporary intrinsic properties *qua* intrinsic when predicated of the worm or aggregate: Lewis as a worm is straight *in virtue of* having a temporal part which is straight; similarly with his being bent. On my view, this way of putting it falls prey of Lewis' first (wrong) solution to the problem of temporary intrinsics: shapes become relational. If this is plausible, and so is the consideration that shape cannot be relational, then I guess it looks like Lewis might be somehow compelled to revise his non-committal attitude towards the priority of the temporal parts over their aggregates and *vice versa*, a question he never adequately addressed.

brought in. Nothing crucial depends on their being true or not; it was mainly an attempt to try and make clear some of the intuitions and considerations that they try to convey.

Part II: *Time*

The train of thought expounded in chapter 1.2 concluded suggesting that the core in the background of the notion of temporal parts relies on the further and slightly for the moment impalpable assumption that time and space are analogous in some respects, more or less decisive: mainly in respect to having parts but also in terms of the reality of distant objects and the relativity of here and now, as in Sider. Acceptance of this seems to suggest that the analysis of the thesis that space and time are alike (henceforth the similarity thesis) which is seemingly implied by the idea of temporal parts must somehow come before the assessment of the notion of temporal parts itself, of what they are and whether there are any; as the analysis of the premises of an argument or inference precedes the assessment of the conclusion.

Part I looked at a few issues concerning the nature and existence of temporal parts, with a view to shedding some light on the state of the play of the debate in the literature. The import of an exploration of the notion of temporal parts was revealed in its evincing that there is a solid bedrock to the notion consisting of intuitions and common sense considerations. Evidence which in turn seems to entangle the idea that space and time are similar in some respect, in particular relatively to how things take them up by having parts.

Interestingly, in the literature there seems to be a strand of the relatively recent debate that looked into the topic of the similarities between space and time from a similar perspective: from our language and talk about things in space and time - a perspective which touches upon spatial and temporal parthood. Thus, I believe it might be helpful to examine, although briefly, what that debate was initially about, where it came from, and finally, if any, what the outcome was. A closer look could perhaps help to clear up our understanding of the similarity thesis itself, and in turn potentially shed light on the question about the nature as well as the existence of temporal parts.

The investigation into the similarity thesis and how it affects the question about the nature of time will be pursued in this second part of the thesis which is dedicated to *time*. The outcome of the analysis of the debate on the analogies between space and time which began in the early '50s will be found somehow unsettling. Although the main conclusion is still considered common currency nowadays, to wit the idea that time is a continuum, yet the feeling is that in the end, although quite a few interesting issues have been touched upon and uncovered, little theoretical gains have been achieved in the direction of what the similarities are as well as towards a clearer understanding of the nature of space and time.[230] Surely, this does not mean that the exercise itself was in vain; there is a sense in which it furthers the understanding of what was at issue (space, time, and their analogies) but also enlightens the reasons why in the end the reader is left wanting, in particular in the light of some achievements of the best philosophy of the sciences available.

Following from this, since the investigation in some sense turned out wanting from the point of view of understanding and clarifying the similarity thesis, I shall endeavour myself to put forth a proposal. Drawing upon Lowe, and in keeping with Sider's guidelines spelt out above concerning the respects in which space and time are alike, to wit parts, the reality of distant objects, and in terms of the relativity of here and now, I shall argue for a sense in which time *could* be likened to space (in order for things to take it up by having parts in it). Namely, in terms of *co-existence* of entities

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[230] One quick remark I shall bring up throughout this part of the thesis is that *at no point* have philosophers of a certain bent (naturalists and physicalists *a là* Quine and Armstrong) with an interest in these issues pursued an adequate philosophy of space and time. Perhaps they have. Perhaps their requirements for a philosophy of space and time are slightly different from what I think they should be and therefore such asymmetry is what brings about my remark above. However, a common attitude ascertained in the literature is the idea that the best sciences available are, among other things, the ultimative repository of what space and time are. Generally, by the best sciences available it is meant modern physics. (see for example Quine's famous passage about naturalism as "the recognition that it is within science itself, and not in some prior philosophy, that reality is to be identified and described" in Quine, W.V.O. (1981). *Theories and Things*, Cambridge, MA: Harvard University Press, 21. As for Armstrong, for an exceptional discussion to his naturalism and physicalism see Mumford, S. (2007) *David Armstrong*. Stocksfield: Acumen Publishing Ltd, Ch. 1) As I shall point out briefly towards the end of Part II, to consider the best sciences available those in charge of telling us what space and time are could be problematic for two reasons: (i) if the question which investigates the nature of space and time is genuinely metaphysical then an answer which comes straight out of the best sciences available might not be the most appropriate one; it could be if the question were scientific in the first place. And (ii) it is all but clear what time is in modern physics. Conversely, what seems to be clear is that there may be different (and sometimes incompatible) meanings of time according to the different domains in which the scientific investigation is pursued, to wit different physical theories. See for example Rovelli, C. (1995). "Analysis of the Different Meaning of the Concept of Time in Different Physical Theories". *Il Nuovo Cimento* 11: 81-93; Callender, C. (2005). "Time in Physics". In D.M. Borchert (ed.) *Encyclopedia of Philosophy*, 2nd ed., 493-501. Skow, B. (2007). "What Makes Time Different From Space?". *Noûs* 41: 227-252; Callender, C. (2008). "What Makes Time Special". Submission to FQXi essay contest; and "The Differences Between Time and Space", Ch. 4 of Craig's forthcoming book which Craig kindly sent me a preview copy of.

(points, objects, or events) along three directions of space and the one of time (instants, objects, or events) which is in turn what seemingly makes them *dimensions* in which reality extends (although for my overall argument nothing crucially depends on it).[231]

Successively, I shall apply the outcome of my argument which ventures space and time to be alike in terms of co-existence (of points/instants, objects, or events) to the initial intuitions and common sense considerations, those in the background of the notion of temporal parts to see how they hang together. As it stands, they do hang together quite nicely; in particular the latter (the initial intuitions and common sense considerations in the background of the notion of temporal parts) seems to presuppose the former (time considered in terms of co-existence of instants, objects, or event) for things to have parts in time as they do in space. Eventually, for argument's sake, I shall take space and time to be alike in terms of co-existence of points/instants, objects, or events along the three dimensions of space and the one of time.

The next task will be to understand how the ontological implications of this picture of time coheres with those of the traditionally settled views in the philosophy of time, therefore a brief overview of the contemporary debate in philosophy of time will be offered. In addition to merely spelling out the different views which liven up the debate, the focus of the outline will be assigned once again to the intuitions, assumptions as well as ontological implications which the different positions in the debate purport to defend. At the end of the exposition, my understanding of the similarity thesis as developed above (namely, venturing space and time to be alike in terms of co-existence of points/instants, objects, or events) will be applied to the current debate in the philosophy of time (at least to the brief overview that I will give) with a view to discovering which one(s) among the views outlined could suitably be suggested by it. I shall argue for the conclusion that a view of time which is motivated by those requirements is eternalism whereby all entities in time, either instants, objects, or events

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[231] The fact that things in space extend along three dimensions (so that space qualifies somehow as three-dimensional) whereas in time they seemingly extend only along one dimension (so that time qualifies as mono-dimensional) will be taken for granted. The issue I shall attempt to tackle in this part of the thesis concerns *what time could be like for things to have parts in it* and the one which seems to follow from this, that is *in what sense time could be thought of as a dimension*. A question which happens to be quite different from the one wondering about the *dimensionality* of time (and space) which amounts to ask the *number of dimensions* (or directions) along which time (and space) extend(s). In conversation, Craig Callender confessed that he attempted to explore the possibility for time to be bi-dimensional but regrettably 'the resulting physics looked ugly'. Thus, though not just for aesthetic reasons, I shall comply with the conventional approach which takes space as three-dimensional whilst time as mono-dimensional. See also "The Differences Between Time and Space", Ch. 4 of Craig Callender's forthcoming book (see footnote 232).

co-exist. Conversely, if the combination of eternalism and Sider's third respect in which space and time are alike, to wit in terms of the relativity of here and now, gives rise to the B-theory of time as Sider himself claims,[232] then I shall conclude that the view of time that seemingly conforms best with the picture of time which the similarity thesis conveys is the B-theory of time (although I shall show that such a commitment to the B-theory might not be necessary).

To conclude, if the initial intuitions and common sense considerations are taken seriously and to their conclusion, philosophically speaking; then there seems to be a sense in which the original core, to wit the fact that things seem to take up time as they do space, motivates eternalism or the B-theory. In other words, that very core which has been established to bolster the notion of temporal parts and perdurance too (as the doctrine of temporal parts) turns out to branch into the philosophy of time motivating a specific view. So that it is plausible to conclude that assuming the core in the background of the notion of temporal parts, namely the evidence that things have parts in time as they do in space; and the fact that that core seems in turn to presuppose the similarity thesis, according to which space and time are alike in some respects, parts, reality of distant objects, and in terms of the relativity of here and now; perdurance, as the doctrine of temporal parts, motivates an eternalist or B-theoric view of the nature of time. And this is where Part II ends.

Part I began with an ordinary case of a composite object persisting through time undergoing change in parts and/or features; a situation employed in order to point out some intuitions I myself happen to have as well as to make some common sense considerations pertinent to that case. Part II shall not commence by urging upon intuitions or by making more or less common sense considerations: my intuitions about time happen to be quite flimsy, anything but strong and robust as in the case at the outset of the previous part of the thesis. I take the evidence that things change and some persist through it as an undeniable datum in metaphysics (if anything counts as datum in metaphysics). It is a basic experience of which we possess strong intuitions and we can make forceful common sense considerations which *qua talis* demand to be questioned. Conversely though, I do not think the same awareness could be applied to the nature of time.

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[232] Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D.W. Zimmerman (eds.) *Contemporary Debates in Metaphysics*. Blackwell Publishing Ltd, 241-62.

"*Quid est ergo tempus? Si nemo ex me quærat, scio; si quærenti explicare uelim, nescio. Fidenter tamen dico scire me quod, si nihil præteriret, non esset præteritum tempus, et si nihil adueniret, non esset futurum tempus, et si nihil esset, non esset præsens tempus."*[233] As Augustine wondered, my intuitions about time are not as robust as those I have about change. Time is elusive: I believe I know what time is but when one asks me to explain actually I do not. Interestingly though, according to the passage just quoted, there seems to be an intimacy between time and notions like 'passing away' and 'coming to be' which as I point out in this thesis qualify as a variety of change. So time and change are closely tied and between the two change, according to my intuitions, is what seems to be clearer and more powerful.

In any case, there is at least one respect in which I think time is somehow as familiar as change: more often than not it can be *represented* spatially (or better the passage of time can be represented spatially). For instance, take one of those diagrams which purports to show the variation of the velocity of an object over an interval of time (generally a two dimensional diagram, with one axis representing time, the other space, for the sake of simplicity). Actually, there is no need to add complexity drawing upon examples from the sciences; ordinary experience is full of examples which suggest something along the same lines. Take a clock, one of those old fashioned ones usually hanging in train stations; the two hands representing hours and minutes respectively span across the body of the clock (which by the way extends in two dimensions) and in so doing they measure time: "a 'long' time is one which a *slow*-moving body takes to cover a standard distance and a 'short' time is correspondingly one which a *fast*-moving body takes to cover the same distance."[234] Since I believe that my grasp of this feature of time (or of its representation) is quite vivid, I shall keep it at the back of my mind in the following of the investigation but yet time is not as easily intelligible as change is.

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[233] O'Donnell, J.J. (1992). *Augustine. Confessions I: Introduction and Text.* Oxford: Clarendon Press, 154.

[234] Lowe, E.J. (1998). *The Possibility of Metaphysics*. Oxford: Oxford University Press, 86. More on temporal representation in Le Poidevin, R. (2008).*The Images of Time: An Essay on Temporal Representation.* Oxford: Oxford University Press. See also Craig Callender's review of Le Poidevin's book in the *Notre Dame Philosophical Reviews.*

2.0 *The Similarity Thesis*

Space and time have been considered to have striking similarities since the early days of the Analytic enterprise[235], but only in the mid-1950s a significant philosophical debate sparked from two articles by Richard Taylor.[236] The dispute that followed saw well-regarded scholars joining forces for and against Taylor's project.[237] To outline the traditional view on the analogy between space and time, I shall draw upon Richard Taylor's project of 'showing that temporal and spatial relations [...] are radically

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[235] Russell (1903). *Principles of Matematics*. London: Allen & Unwin Ltd, 471; Reichenbach, (1928). *Philosophie der Raum-Zeit-Lehre*. Berlin and Leipzig: De Gruyter. Engl. transl. *The Philosophy of Space and Time* by M. Reichenbach and J. Freund, New York: Dover Publications. 284-98; Goodman, N. (1951). *The Structure of Appearence*. Cambridge, Mass.: Harvard University Press, 296; Williams, D.C. (1951). "The Myth of Passage". *Journal of Philosophy* 48: 457-472.

[236] Taylor, R. (1955). "Spatial and Temporal Analogies and the Concept of Identity". *Journal of Philosophy* 52: 599-612; (1959). "Moving About in Time". *The Philosophical Quarterly* 9: 289-301;

[237] Huggett, W.J. (1960). "Losing One's Way in Time". *The Philosophical Quarterly* 10: 264-7; Mayo, B. (1961). "Objects, Events, and Complementarity". *The Philosophical Review* 70: 340-61; (1976) "Space and Time Re-assimilated". *Mind* 85: 576-80; Dretske, F.I. (1962). "Moving Backward in Time". *The Philosophical Review* 71: 94-8; Thomson, J.J. (1965). "Time, Space, and Objects". *Mind* 74: 1-27; Meiland, J.W. (1966). "Temporal Parts and Spatio-Temporal Analogies". *American Philosophical Quarterly* 3: 64-70; Gale, R.M. (1969). "Here and Now". *The Monist* 53: 396-409; Schlesinger, G. (1975). "The Similarities Between Space and Time". *Mind* 84: 161-76; (1978). "Comparing Space and Time Once More". *Mind* 87: 264-66; Shorter, J.M. (1981). "Space and Time". *Mind* 90: 61-78; Butterfield, J. (1985). "Spatial and Temporal Parts". *The Philosophical Quarterly* 35: 32-44. Slowick, E. (2002). "Spatiotemporal Analogies: Are Space and Time Similar?". *The Southern Journal of Philosophy* 40: 123-34. For convenience sake, I shall look at Taylor's and Schlesinger's papers mainly since they are those which attempt to address the question brought up by the similarity thesis. I shall briefly highlight at the end of the chapter some interesting as well as relevant issues, mainly in the form of objections, offered by others which reveal relevant to the understanding of philosophically decisive notions like the one of 'object', the differences between spatial and temporal parts and their individuation.

alike'[238] in his startling article *Spatial and Temporal Analogies and the Concept of Identity*. The debate flared and although many rejected Taylor's extreme approach, some accepted 'various aspects of Taylor thesis.'[239] The debate gradually faded away without establishing or rejecting Taylor's visionary proposal, and by the beginning of the 1980s it was replaced by new disputes, for example over the status of material beings, and their persistence conditions. However, the idea that space and time are somehow alike lingered on, and curiously the new philosophical trend briefly spelt out above ended up employing the terminological as well as conceptual apparatus of that tradition. Perhaps space and time were not identical in almost every respect but yet not dramatically or fundamentally different: temporal parts were looming large.

For convenience's sake, the analysis of the similarity thesis shall mainly be limited to Taylor and Schlesinger's contributions, although I will highlight interesting points brought up by others insofar as deemed conspicuous and relevant to the purposes of this chapter overall. I shall then begin outlining Taylor's project:

> "Unlike space [...] time has always been regarded [...] as a dark subject of speculation, fundamentally enigmatic, even incomprehensible. [...] I want to

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[238]Taylor, R. (1955). "Spatial and Temporal Analogies and the Concept of Identity". *Journal of Philosophy* 52: 599. It is worth noting that actually the similarity thesis is pursued in terms of the analogy between *spatial* and *temporal relations* rather than in terms of space and time. The reason could depend on Taylor's stance in the dispute between relationalism and substantivalism about space and time. In footnote 5 to his *Moving About in Time*, Taylor gives away a hint to what I believe is his adherence to relationalism: "Neither these nor any other remarks in this discussion are to be taken as implying that space or time are real things, i.e., absolute, eternal or ubiquitous beings. My references to fixed places and times, independently of the relations between objects, are for simplicity and clarity." Taylor, R. (1959). "Moving About in Time". *The Philosophical Quarterly* 9: 293. Thus, if all there is to space and time is just relations then to frame the analysis of the similarity thesis in terms of space and time as looking-like 'entities' would be in a sense self-defeating. Alternatively, and perhaps in a way more adherent with how the debate is set up by the current best sciences available (which again means modern physics) the dispute could be conducted in terms of spatial and temporal *directions*, rather than space and time: "Modern physical theories are formulated in terms of a four-dimensional spacetime, instead of in terms of three-dimensional space and one-dimensional time separately. In some older theories (Newtonian mechanics, in particular) there is a way to identify certain regions of spacetime as points of space and other regions as instants of time. But in more recent theories, especially the general theory of relativity, this cannot always be done." Skow, B. (2007). "What Makes Time Different from Space'". *Noûs* 41: 227-8. Therefore, since the distinction between spatial and temporal directions is more general than the one between space and time, then maybe this is the reason why the analysis of the similarities is so framed.

[239] Slowick, E. (2002). "Spatiotemporal Analogies: Are Space and Time Similar?". *The Southern Journal of Philosophy* 40: 123. For example, Schlesinger who labelled Taylor's thesis as the Doctrine of the Complete Similarity of Space and Time, and claimed it to be flat-out false, nevertheless appreciated that "Taylor is [...] entirely successful in showing in each case that the lack of parallelism is illusory [...]" (Schlesinger, G. (1975). "The Similarities Between Space and Time". *Mind* 84: 161-3). Schlesinger's project was in a sense more modest than Taylor's. Schlesinger claimed that two questions have been left unanswered by Taylor: i) 'which true temporal propositions do have true spatial analogues and which do not', that is 'in what kind of properties space and time are similar to one another and in what kind they are not'; and ii) 'why all those true temporal propositions which do have true spatial counterparts, do have them.' Therefore, he cannot avail Taylor's thesis because 'there are necessarily true temporal propositions which do *not* have true spatial counterparts.'

> remove some of this mysteriousness by showing that temporal and spatial *relations*, contrary to much traditional thought, are radically alike; [...] that (1) terms ordinarily used in a peculiarly temporal sense have spatial counterparts and vice versa, [...] (2) many propositions involving temporal concepts which seem obviously and necessarily true, are just as necessarily but not so obviously true when reformulated in terms of spatial relations; or, if false in terms of spatial concepts, then false in terms of temporal ones too."[240]

This is Taylor's Doctrine of the Complete Similarity of Space and Time (DCSST)[241]. After outlining the basic concepts employed, such as 'place', 'distance', 'being present', 'length' or 'extension', 'part', 'direction', 'physical object' or 'event', with the proviso that all of them can be *either* spatial *or* temporal, the procedure followed is

> "to state, in the form of objections, propositions which are commonly thought to be obviously true, and a radical difference between space and time."

For each proposition, Taylor then claims

> "in the form of a reply, that no such difference is expressed, that is, that no such proposition is, under similar interpretations, true of time and false of space or vice versa."[242]

The objections Taylor deals with are seven: i) 'An object cannot be in two places at once, though it can occupy two or more times at only one place'; ii) 'Time, unlike space, is an essential ingredient of motion and change, of coming to be and passing away'; iii) 'Things can change their spatial positions, but not their temporal ones, these being, once given, fixed eternally'; iv) 'But time is something moving, or flowing, in a fixed direction from future to past and at an unalterable rate; space on the other hand, is everywhere the same and unchanging'; v) 'While time may not then in any clear sense be moving, yet everything in time moves from the future through the present and on into the past'; vi) 'But two things can move closer together or farther apart in space; they cannot do so in time'; vii) 'A thing can move back and forth in space, though it

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[240] Taylor, R. (1955). "Spatial and Temporal Analogies and the Concept of Identity". *Journal of Philosophy* 52: 599.

[241] So named by George Schlesinger. See Schlesinger, G. (1975). "The Similarities Between Space and Time". *Mind* 84: 162.

[242] Taylor, R. (1955). "Spatial and Temporal Analogies and the Concept of Identity". *Journal of Philosophy* 52: 600.

cannot do so in time.' Statements vi) and vii), perhaps the most obvious, and contentious to dispel, receive further clarification a few years later, in 1959, with the article *Moving About In Time*, in which Taylor shows that, as a matter of fact, things can be move about in time as freely as in space.

Intriguing and ambitious, Taylor's plan was doomed. As Schlesinger noticed, the seed of Taylor's failure lies in claim (2) above: he maintains that *many* propositions involving temporal concepts which are true in spite of appearances, have corresponding true propositions involving spatial concepts - but *not all* of them.[243] If *many* but *not all*, then space and time are identical in *many* respects but *not* in *all*; therefore Taylor's project is in peril. Curiously though, Schlesinger believes that Taylor is entirely successful in showing in each case that the lack of parallelism is illusory [...]'; that is, those (and only those) temporal propositions outlined above which are true but whose spatial counterparts do not seem to be so, are indeed true as well but they are not all the propositions that there are.[244]

In a sense, Schlesinger's paper runs with the hare and hunts with the hounds. On one hand, DCSST is claimed not to be exhaustive but he is willing to acknowledge Taylor's achievements; on the other, Schlesinger's paper purports to contend Taylor's thesis that space and time are alike. Let us see how.

Since there are some temporal propositions which fall outside Taylor's complete translations' scheme, it is vital to understand:

> "[at first] *what* criterion are propositions involving temporal concepts divided into the class the members of which remain true when formulated in terms of spatial relations and the class the members of which cease to be true when formulated. [and secondly] *why* all those true temporal propositions which do have true spatial counterparts, do have them."[245]

In other words, what *properties* space and time share, and why the possessing of such properties is sufficient to secure the existence of true spatial counterparts. Such new

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[243] George Schlesinger. See Schlesinger, G. (1975). "The Similarities Between Space and Time". *Mind* 84: 162.

[244] By 'temporal proposition' I shall intend, as a working definition, a statement purporting to say something about time. *Mutatis mutandis*, in the case of a 'spatial proposition', as a working definition I shall take it to be a statement which says something about space.

[245] *Ibid.*

knowledge will allegedly turn out to increase our understanding of the nature of *space* and *time*.

After briefly spelling out what it takes for a given true temporal statement to have a true spatial counterpart, i.e. to change each temporal term in a temporal statement into the corresponding spatial one no more no less than as in Taylor, Schlesinger warns against *three* cases of misfire of the translating procedure:

i) When the terms involved do not seem to refer immediately to temporal or spatial predicates but still they do, via such predicates being somehow built in. Therefore, more true temporal statements which happened to fail to be true in spatial terms, could now easily go through the translating process.[246]

ii) The problem of the best candidate for the translation of a true temporal statement into a true spatial one. The process of replacing temporal terms with spatial one is not an algorithm: some statements must be tweaked heavily in order for the translation to carry through. But once each spatial counterpart is suitably chosen, nothing prevents the resulting spatial statement from being true.

iii) The difference in dimensionality between space and time: the former being three-dimensional while the latter is one-dimensional. For instance, it seems to be quite plausible to say that if an object occupies times t_1 and t_2, it also occupies all the temporal positions in between. In space instead, if a body occupies place p_1 and p_2, it does not necessarily follow that it occupies all the points in between. It occupies only the points on one of the infinitely many lines connecting p_1 and p_2. Thus, Schlesinger claims that for the thesis that space and time are alike to fall through there would need to be a case in which the translation failed even in one-dimensional space.

As far as I can see, what in Taylor and Schlesinger's project seems to truly resist the desired outcome is a difference in the number of dimensions between space and time. Although this may seem to undercut the thesis that space and time are indeed radically alike, Schlesinger triumphantly observes that 'everyone will acknowledge that there is a certain disanalogy between space and time but it is of a *kind* which cannot serve as a counter-example to the thesis that space and time are radically alike.'[247]

To clarify, the three reasons above determine the conditions which, incidentally, could lead the translating process to a breakdown. Once met, the translation may still

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[246] Yet not all of them would be suitable candidates otherwise DCSST would be trivially true.

[247] *Ibid.* 164.

fail to convey a true spatial proposition. The failure, Schlesinger reassures, affects neither the soundness of the translating process nor does it flat-out undermine the thesis that space and time are radically alike (although it is far from being clear, in Schlesinger's argument, the reason why this happens to be the case). So much so, on top of the difference in dimensionality (iii), there seems to be *two* more reasons to deny the analogy, in fact given by Schlesinger as reasons why the translation might mistakenly be thought to fail are:

iv) 'Temporal positions happen to be ordered, therefore time has a direction.' Such a statement can hardly be dismissed as false; however, its spatial counterpart, i.e. spatial positions are ordered, therefore space has a direction, is false. Schlesinger observes that a consideration of this sort is usually bolstered by the fact that what provides time with a direction is somehow connected with some physical facts, for instance the fact that entropy increases. Thus, the opponents of the analogy thesis may well have some room to crack the project. But as Schlesinger puts it, it would be a mistake to take this feature of entropy, i.e. the fact that physical states with increasing amount of entropy are associated with increasingly more advanced position in time, as a feature of the nature of time; 'it is not the case that time as such is different from space but rather that entropy is differently related to time than to space.'[248] This is just one of a number of cases which reveal a difference in how the *laws* of physics operate with respect to time and to space but what really matters is that this difference by no means entails an intrinsic difference between time and space. Again, apart from negligible details, space and time are yet radically alike.

Lastly, v) the difference in the role played by spatial and temporal parts respectively when theoretically a reduction or truncation of either the temporal *duration* or the spatial *extension* of a material being is carried out. Sure enough, in the temporal case the outcome would be nothing but a short-lived piece of that machinery, perfectly functioning as the original but just a bit shorter in time. Also, the temporal remainder, i.e. the temporal portion that by stipulation was chopped off, would not be affected by the reduction, indeed it would still be a proper functioning piece of machinery. By contrast, this may not happen in a spatial case where we try to reduce the amount of space taken up by a table, depriving it of some of its spatial parts. The outcome would surely affect the object as whole as well as the spatial remainder, which would hardly

[248] *Ibid.* 166.

look like and function as the original table. Thus, a profound difference between temporal and spatial parts clearly comes out of this last case. Once more though, Schlesinger points out that 'it seems clear that most people would not interpret this as a manifestation of a fundamental difference in the nature of space and time itself.[249] They would think of the difference as a consequence of the peculiar nature of the composite object; of how the difference affects its parts' hanging together and its relations to time and space.

According to Schlesinger, the reason why the considerations above do not harm the similarity thesis is simple: apparently there are cases exactly conversely asymmetrical with respect to space and time to those advertised above: cases in which removing a number of temporal parts would affect the object in a way in which a reduction in spatial parts would not. The existence of these two kinds of cases is what guarantees the lack of fundamental disanalogy between space and time. Once more, nothing prevents space and time from being radically alike.

So much for what it takes for the translations to go through. The obtaining of true spatial propositions from true temporal ones does not flat-out bolster DCSST though. Simply, *not* all of the true temporal statements have a true spatial translation. Therefore DCSST is false. However, this fact does not imply that DCSST will not be defended by some. Schlesinger in fact offers *three* arguments to defend it, though these all fail to establish their purpose.

vi) The first argument, by analogy with iv), exploits the idea that there are cases in which there is a difference in the relationships that an object bears in respect to time and to space. However, Schlesinger notes, if this argument were employed to defend DCSST, it would render the thesis itself vacuously true: each counter-example to the thesis could be explained away in terms of the relationships the object in question bears to time or space rather than as indicative of some sort of real difference between space and time.

vii) The second argument that Schlesinger offers hinges upon i), to wit the instances of misfire of the translating procedure: instances due to the fact that some terms in a temporal (or spatial) statement have temporal (or spatial) terms built in; such that some instances which count as counter-examples to DCSST are so because they contain terms or expression which covertly refer to time (or space). As we now know

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[249] *Ibid.* 167.

from i), this attempt proves to be a dead-end for even once all the terms in the true temporal statement are indeed replaced with 'terms which are unquestionably free entirely of all temporal reference'[250] this fails to deliver a true spatial statement.

viii) Lastly, the reason why the spatial counterparts (of temporal statements) which are not true do not violate DCSST could be that the thesis refers only to similarities in properties which are *necessarily* possessed by time, rather than properties possessed only *contingently*. According to Schlesinger, then the question becomes the following: are temporal *order* and *direction* necessary properties of time? As pointed out above, entropy does not seem to qualify as a logical law, therefore at some stage it may turn out false or at least conceivably so. This would then imply that a process which is now directed in one way, could be reversed and run the other way round. Although quite plausible in the case of entropy, it may not hold as well for time:

> "it is not easy to say [...] how far we can go on depriving time of properties it has by virtue of the fact that laws of physics happen to be what they are and it would still continue to retain its conceptually *essential* features of temporality. [...] there must be a limit to this process somewhere and if we went on depriving time of too many properties associated with it we would end up with something we would no longer recognise as time. [...] if the law concerning the increase of entropy of closed systems had few exceptions this would not yet drastically transform the nature of time, however, we could not dispense with all those phenomena which endow time with a direction and be left with what would still recognisably be time."[251]

Thus, what seems to be contingent is that particular processes are ordered in time, and their different temporal parts suggest the order the moments they occupy are in. What is necessary is that 'there are phenomena which endow time with order and direction, for otherwise our familiar concept of time would break down.'[252]

Schlesinger claims that in addition to 'order' and 'direction', time seems to possess two other necessary features, although presumably derived from the two above, temporal *relations* like 'before' and 'after'. In turn, somehow depending on 'before' and 'after' there seems to be other notions which play a role in the concept of time, the notions of past, present, and future, and the flow of time, to wit the appearance of the

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[250] *Ibid.* 169.

[251] *Ibid*. 170.

[252] *Ibid.*

present continually shifting. Therefore, the statement that 'Time has an order and direction' is not only to be considered true but also *necessarily* true. The lack of those properties just spelled out would crucially affect the concept of time. A time without order, direction, temporal relations, past, present, and future, and the flow would be no longer recognised as time.

In conclusion, Schlesinger briefly mentions *two* last counter-examples to DCSST: ix) the fact that time is somehow ontologically more fundamental and indispensable than space, and x) that everything in time is temporally related to everything else in time (unity of time). Both seem to count as counter-examples to DCSST since the true statements in which those ideas are expressed once the temporal terms are swapped with the spatial ones do not seem to preserve the truth of the resulting statement. The former is rendered by the fact that there seems to be objects which have temporal position and extension but no spatial position and extension. However, the spatial counterpart of it does not seem to be as plausible, i.e. things that have spatial positions and extension without temporal position and extension. As for the latter, the idea that everything else that is in time is temporally related to everything else in time seems to be a true statement. If so, its spatial translation does not.

Therefore, as Schlesinger finally but reluctantly admits at the beginning of section IV, 'on a proper understanding of the matters it becomes fully evident [...] that, with the exception of certain respects, time and space should differ from one another in indefinitely many ways.'[253] Although this may indeed turn out to be the case, the truth is that such dissimilarities are outweighed by a striking resemblance which makes space and time radically alike. Thus, what are the *properties* space and time share, responsible for such conspicuous similarities? And, why must there be such a class of properties with respect to which space and time cannot fail to be fully analogous? As Schlesinger triumphantly claims:

> "Space and time are both *continua* [my italic] and possess therefore all the properties continua in general possess [...] Any statement which is true about an occupant of a pair of [general] continua X and Y must be translatable into a pair of true statements (and not just into a single true statement since X and Y are interchangeable) specifically referring to space and time. [...] if there is a true statement asserting that an occupant which has a specified relation R to any continuum X which it occupies must have a specified relation S to any second

[253] *Ibid.* 172.

> continuum Y which it also occupies, then it must be the case that it is true of some occupant of space-time that if it has relation R to time then it has relation S to space and also true of some occupant that if it has relation R to space then it has relation S to time."[254]

Which amounts to saying that a true temporal statement is true, if true at all, not in virtue of any peculiar time-like property of time or similarly by virtue of some space-like property of space, rather by those *features* of time and space which they possess, *necessarily*, since each one of them constitutes a continuum, and therefore it must have a spatial counterpart for both space and time are continua to equal degree.

However, in addition to these shared properties, recalling what Schlesinger only reluctantly acknowledged a few lines above, time and space possess an 'indeterminate number of extra properties', in virtue of which space and time are specifically space and time and *not* just instances of a continuum. Therefore, insofar as:

> "we are dealing with continuum properties, we are dealing with what constitute a common denominator of space and time and hence we shall find space strictly resembling to time. But as soon as we consider the time-like properties of time, i.e. properties which are not imposed upon time simply because it is a continuum but are those by virtue of which time becomes the unique continuum it is, and as soon as we consider the space-like properties of space, there is no reason whatever why there should be, and consequently we should not expect at all to find, similarities between the two."[255]

In the light of the above, to test if any true temporal statement whatsoever could have a true spatial counterpart would not be particularly challenging: firstly, to reformulate the original statement in pure continuum terms, a universal statement about any continuum if the statement is about time alone, or any pair of continua if it refers to space and time. To achieve this, temporal terms like 'duration' amount to 'extension'; 'to occur at *t*' to 'to be at point *t*'; 'to be simultaneous with' to 'to be at t the same point as', and so on. Secondly, when all the terms are translated, then we would need to see if the continuum statement is necessarily true of all continua. If it is then the true temporal statement has, necessarily, a true spatial counterpart; if it is not then it does not.

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[254] *Ibid.* 174.

[255] *Ibid.* 175.

Therefore, following Schlesinger, we can conclude that space and time are fundamentally alike insofar as both are continua.[256] In all of the other respects, they are trivially not. Thus, the analogy thesis remains unscathed, space and time necessarily alike (as long as they are instances of a continuum).[257]

[256] But they might not be, in particular if the theory of loop quantum gravity (LQG) is correct. For an instructive overview see Smolin, L. "Atoms of Space and Time". *Scientific American. January 2004*: 66-75.

[257] The debate about the analogies between space and time lingered wearily for more than thirty years, and so the issues covered are surely wider than just those highlighted in chapter 2.0. Curiously, some of the most interesting contributions made did not regard the topic of the analogies between space and time; rather they ended up shedding light on the notion of temporal parts, their individuation, as well as the concept of object. See for example Thomson, J.J. (1965). "Time, Space, and Objects". *Mind* 74: 1-27; Meiland, J.W. (1966). "Temporal Parts and Spatio-Temporal Analogies". *American Philosophical Quarterly* 3: 64-70; and Butterfield, J. (1985). "Spatial and Temporal Parts". *The Philosophical Quarterly* 35: 32-44.

2.1 *What Time Would Be Like If It Were Extended: A Proposal*

The aim of the previous chapter was to look at a strand in the contemporary debate in analytic philosophy which investigated the similarity thesis with a view to understanding what the analogies between space and time looked like as well as making sense of perdurance's alleged commitment to a picture of reality which claims space and time to be similar in some respects.

The idea that space and time are alike comes hand in hand with the claim that time, like space, is somehow extended, and for some reasons that will be clearer later on qualifies as a dimension; the fourth, in which reality is in turn extended. It goes without saying that such a case may well require an analysis of space and time which singles out space's features against time's ones in a way which could help to accommodate Sider's claim that space and time are alike in three respects: in respect to parts, to the reality of distant objects and in terms of the relativity of here and now. The investigation pursued in the previous chapter shed some light on a few issues underlying the debate about the similarity thesis which could have interesting bearings on the notion of temporal parts. However, it did not fully address the question about what time would be like if it had to be alike space in the three respects just mentioned.

Therefore, in this chapter I shall endeavour to address that question - what would time look like if it had to be analogous to space in respect to parts, the reality of distant objects, and the relativity of here and now? For my argument, I shall assume Sider's formulation of the similarity thesis in his 2008 piece quoted quite a few times early on,

and see how it hangs together with an argument Lowe devised to show in what sense time could be considered a dimension in which reality is extended.[258]

By now, we are familiar with how Sider formulated the similarity thesis thus I shall begin briefly recalling his points before outlining Lowe's argument. The first clue regards *parts*:

> "Temporal parts theory is the claim that time is like space in one particular respect, namely, with respect to *parts*. First think about parts in space. A spatially extended object [...] has spatial *parts* [...] Likewise [...] a temporally extended object has *temporal parts*."[259]

For example, a bike generally has a frame, two wheels, a saddle, and other components each one of which legitimately qualifies as one of its spatial parts. Take the same bike, suppose it was put together before the 1998 Tour of Italy, it was then ridden during the same race, and in four weeks time eventually employed to ride the Tour de France. There is then a part of that bike limited to the three weeks of the Tour of Italy, another one when the bike sat in a warehouse for the following four weeks, and lastly a third part twenty one days long during which the bike starred at the Tour de France. Each one of which legitimately qualifies as one of the bike's parts in time. The second clue concerns the *reality of distant objects*:

> "The existence of temporal parts is just one way that I believe time to be like space. Here are two others [...] 1. Time is like space regarding the *reality of distant objects*. Spatially distant objects, such as objects on Mars, are just as real as objects here on Earth. The fact that Mars is far away doesn't make it any less real [...] Likewise [...] temporally distant objects, such as dinosaurs, are just as real as

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[258] Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D.W. Zimmerman (eds.) *Contemporary Debates in Metaphysics*. Blackwell Publishing Ltd, 241-62. See also Conee, E. & Sider, T. (2007). *Riddles of Existence : A Guided Tour of Metaphysics*. Oxford: Clarendon Press, Ch. 3. Lowe, E.J. (2006). "Endurantism Versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 713-27. Of course Lowe at no point would endorse that view of time. In fact, he challanges it suggesting that: "The implication is that things that exist at different times need not in any sense co-exist. There is no sense , for example, in which I co-exist with Julius Caesar. This, at bottom, is why I deny that time is a dimansion of reality, in the way that the spatial dimensions are: for if entities are differently located along some real dimension, they must stand in certain real (external) relations to one another, which they can do only if they are in some sense co-existent. For a real relation can obtain only between entities all of which exist together." Lowe, E.J. (2006). "How Real is Substantial Change". *The Monist* 89: 275-93. However, his formulation turned out quite promising for the purposes of my argument, and this is why I decided to take advantage of it.

[259] Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D.W. Zimmerman (eds.) *Contemporary Debates in Metaphysics*. Blackwell Publishing Ltd, 241-62.

> objects we experience now. The fact that a dinosaur is far away in time doesn't make it any less real."[260]

Sider's example is instructive enough without me adding any further gloss to it. I believe what he is appealing to by claiming that spatially and temporally distant objects 'are just as real' as objects here on Earth and those we experience now is simply that they both exist as those existing on Earth. So that the former exist in the same way as the latter do whether close or further away in space or in time. Lastly, the third clue for the similarity thesis:

> 2. Time is like space regarding the *relativity of here and now*. When speaking to my brother in Chicago, if I say "here it is sunny" and he says "here it is raining", we do not really disagree. What is called "here" changes depending on who is speaking [...] There is no one true *here* [...] the word 'now' works analogously [...] There is no one true *now*. What is called "now" changes depending on who is speaking."[261]

Again, the last clue is fairly self-explanatory so I believe it does not require any further addition on my part. Anywhere is 'here' and anytime is 'now' from some perspective. Thus, supposing the clues to be fairly clear, and the image that they yield to understandable, it is fair to say that no massive theoretical gap needs to be closed in order for this picture to be intelligible.

What has to be done now is to draw an account and develop it of what time would look like if it had to incorporate those clues; and in doing so I shall take advantage of the argument Lowe constructed to show in what sense time could be considered a dimension in which reality is extended.[262] First things first, looking for a suitable instance of 'dimension' Lowe notes that:

> "Our obvious and indeed only paradigm for a dimension in this sense is provided by the three dimensions of space [...] The 'three-dimensionalist' of space does not consist in there being three distinct spatial dimensions, each distinguished from the others by some intrinsic features [...] space and its material contents are three-dimensional inasmuch as they are extended in three independent, if exactly similar,

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[260] *Ibid.* 243.

[261] *Ibid.* 244.

[262] Lowe, E.J. (2006). "Endurantism Versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 713-27.

> ways - and these 'ways' of being extended we can call the three different dimensions of space."[263]

Thus, what Lowe claims is that when it comes to speculating around the notion of dimension in regards to time, it is legitimate to draw upon space as a guideline, for space is the 'obvious and indeed the only paradigm for a dimension in this sense.' A second, but not less important hint that we can take from Lowe's passage is the link between 'dimension' and 'being extended': a dimension is a way of being extended. Surely we need more but for the time being let us just keep it at the back of our mind.

Lowe notes that time is commonly represented spatially (see the example of the two-dimensional diagram cited in the first chapter of Part II) but some other things could be as well (for instance, the evolution of a gas in terms of its pressure and temperature). Lowe's point is that although they may appear similar situations (all the temperature and pressure's values are lined up in a continuum, each being assignable in principle a real number as in the velocity graph), in the latter case when we say that the gas is at temperature T_1 and pressure P_1 what we actually mean is not that temperature and pressure are strictly speaking dimensions as in the other case. When we say that the gas is at temperature T_1 and pressure P_1 we mean that 'the word *at* here is not to be thought of as assigning the object a *location* along some dimension.' To be at a greater temperature (or pressure) is not like to be at a greater distance.

So much so, what we still need to figure out is in what sense then 'to be at a greater distance' is somehow peculiar; in other words, 'what it is that qualifies some feature of reality as a dimension, in the same sense in which the three dimensions of space do.' Lowe's proposal is as follows:

> "A set of relations [spatial or temporal] serve to distribute the entities related by them along one or more dimensions only if there is a sense in which entities standing in those relations must coexist."[264]

In the case of space, for instance considering relations of distance (Lowe includes direction and betweenness too but for simplicity I shall limit the example to distance) the idea is that:

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[263] *Ibid*. 716.

[264] *Ibid.* 718.

> "one object or event can be, in a direct or non-derivative sense[265], at a certain distance from another [...] only if the objects or events in question coexist in time."[266]

The reason why 'to be at a greater distance' is somehow different from 'to be at a certain temperature/pressure' is the following:

> "According to my proposal, the reason is that objects need not coexist in order to differ in temperature [or pressure]."

Briefly, the metaphysical reason in the background of the difference between relations of distance and those of temperature/pressure is that the former is an instance of an *external* relation whereas the latter a case of *internal* ones[267] and 'it is *at most* only external relations that require the coexistence of their relata.'

Thus to say that Durham is 17.000 km distant from Sydney implies that both Durham and Sydney coexist: there are two points/regions of space 17.000 km apart one of which is called Durham whereas the other one Sydney.[268] Suppose, that the city of Sydney does not exist (arguably a case in which we will have to amend the world map). Would it still be intelligible to claim that Durham and Sydney *are* at a certain distance from one another, say 17.000 km?[269] Apart from a sort of manner of speech sense (we commonly talk about non-existing things in a way which sounds perfectly fine; and we are also able to achieve practical purposes with it) I think it would make little sense

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[265] As Lowe notes, if space is absolute, namely consisting of points always standing in the same spatial relations to one another then there is an *indirect* sense in which two objects or events not coexistent in time could be at a certain distance from one another since both coexisted in time with a certain absolute position in space and these two positions have always stood at a certain distance one another. *Mutatis mutandis*, the same applies even if space is not absolute but there are objects since an object could function as a frame of reference. For instance, if an object *o* coexisted with e_1 at t_1 and with e_2 at t_2 then there might be an *indirect* sense in which relative to *o*'s frame of reference e_1 and e_2 are at a certain distance.

[266] *Ibid.*

[267] Roughly speaking, by internal relation it is usually meant one which supervenes upon intrinsic features of its relata whereas by external relation one which does not. See Armstrong, D.M. (1978). *Universals and Scientific Realism: A Theory of Universals Vol. II.* Cambridge: Cambridge University Press, 84-90; and (1997). *A World of States of Affairs.* Cambridge: Cambridge University Press, Ch. 2.

[268] Objects or events would do too.

[269] Either tenseless or a present tense *are*, my feeling is that it will not matter to the outcome.

since it would amount to saying that Durham is 17.000 km far from something that does not exist.[270]

Along the same lines, it seems plausible to claim that coexistence in time looks like a plausible condition for relations of (temporal) distance to obtain. Likewise, exploiting Lowe's example, to say that the event of my birth is in a certain temporal relation with the death of Julius Caesar, roughly 2021 years distant from one another (which is pretty much the same as saying that the event of my birth is later than the event of Julius Caesar's death) means that both the relata of the putative external relation must coexist. Conversely, supposing that my birth and Julius Caesar's death do not coexist, say the latter does not exist; this would amount to saying that one of the relata of the temporal relation is lacking. My birth would then be 2012 years distant from nowhere (or that the event of my birth is later than nothing). Again, Lowe's point sounds plausible to me.[271]

Of course, as Lowe notes, a twist has to be added to this already intricate scenario: the putative likelihood of this scenario (whether or not temporal relations serve to distribute the entities related by them along a dimension of time and whether their relata must coexist) is surely affected by a certain debate in the philosophy of time (which will be tackled in the next chapter). The question whether two temporally distant events must coexist for the supposition of their being one later than the other to be intelligible can have two different answers depending on our understanding of time (whether static or dynamic[272]):

> "[...] the dynamic theorist will, or at least should, say that the answer to this question is 'No'. Clearly, [the two events] do not coexist *in time*, because, by hypothesis, the time at which [one] exists is earlier than the time at which [the other] exists. [...] Such theorist should therefore say that [one] has ceased to exist

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[270] Surely, in terms of spatial points/regions there is a sense in which the two are still 17.000 km apart but that would either imply that space is absolute or that is not but there are objects; namely, the two situations outlined above by Lowe in which two objects not coexistent in time could be distant from one another, a sense of being distant which is *indirect*. See footnote 269.

[271] I spoke of coexistence at the same time in the spatial case but not in the temporal one; if time were a dimension requiring coexistence, then there would be coexistence between temporally and spatially distant objects. However, this does not vitiate what I just said about space, it merely points out how the notion of coexistence could be expanded if one adopted eternalism.

[272] See Gale's distinction between *static* and *dynamic temporal*. Gale, R.M. (1968). *The Philosophy of Time.* London: Lowe & Brydone, Ch. 2.

> *simpliciter* by the time at which [the other] exists. For such a theorist, there is no totality of coexisting entities which includes both [events]"[273]

Whereas,

> "[...] for the static theorist, there *is* a sense in which [both events] coexist, even though they do not exist at the same time. For such a theorist, there is a totality of coexisting entities which includes both [events], namely, the totality of all events spatiotemporally related to either [one] or [the other]. If we want a term to characterise this sense of coexistence, we could say that [...] all these events coexist *in actuality*, or are *coactual*."[274]

To conclude, for the static theorist there *is* (tenselessly) a totality of all existing events which includes the event of my birth and the event of Julius Caesar's death. Those events are all somehow lined up or distributed in one direction, to wit along a dimension, the supposed fourth dimension of time. For this very reason, we can then sensibly say that the former *is* later than the other (which is a roundabout way of saying that they *are* 2021 years distant from one another).

I shall employ this picture of time devised by Lowe, for the purposes of my argument which, as I shall briefly recall, purports to find a link between what has been previously claimed in the thesis and the current debate in the philosophy of time, with a view to seeing which one, if any, of the different positions in the philosophy of time could best accommodate the picture of time which comes out of Lowe's argument. (The relevant previous claims of the thesis being: the fact that a core of intuitions and common sense considerations about things and their parts in space and time seems to lie in the background of the notion of temporal parts; if this evidence is plausible then it seems to call for an analogy between space and time; and if the analogy is fully explored then it seems to suggest a view of time as extended and as a dimension in which reality is extended, in the sense disentangled just above). The feeling is that that picture of time could be best accommodated within an eternalistic or the B-theoretic view of time.

However, before highlighting the different views in the contemporary debate in the philosophy of time, what still needs to be done is to see if Lowe's picture of time

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[273] Lowe, E.J. (2006). "Endurantism Versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 719.

[274] *Ibid.*

can accommodate Sider's three respects in which time is said to be similar to space: in respect to parts, reality of distant objects, and the relativity of here and now; as well as the one that came out from the investigation into the similarity thesis: to wit the thought of time as a continuum.

Could Lowe's picture of time qualify as an instance of a continuum? Lowe himself gave us a clue when comparing a bi-dimensional diagram which represents the evolution of the velocity of a body ($v=s/t$) with a graph representing the relations between temperature and pressure in a gas. Temperature and pressure can indeed be represented in the same way as space and time are since 'the possible values of pressure or temperature belong to a continuum, each being assignable in principle a real number given some suitable choice of a unit of measurement.' Or more perspicuously, and with some additional technicality:

> "Time, we ordinarily suppose, is not composed of discrete moments, each having both a unique predecessor and a unique successor. Rather, between any two moments there is always a third. That is what it is for time to be *dense*. Now, arguably at least, time is not merely dense but *continuous*. That is, the series of instantaneous temporal moments is isomorphic to the real-number series.[275]

Formally,

> "A cut *S*, *S'* in the time series is the division of the series at some point to yield two series, *S* and *S'*, such that any moment is in either *S* or *S'* but not both. Time is continuous if, and only if, for any cut *S*, *S'*, there is *either* a last moment of *S* but no first moment of *S' or* a first moment of of *S'* but no last moment of *S*."[276]

To conclude:

> "It is standardly assumed that time is continuous, rather than dense and non-continuous."[277]

Going back to Lowe's picture of time, there is clearly nothing which hinders it from being continuous; therefore, it seems plausible to say that it complies with the requirement which resulted from the analysis of the similarity thesis.

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[275] Le Poidevin, R. (2000). "Continuants and Continuity". *The Monist* 83: 381-98.

[276] *Ibid. 3*84. As Le Poidevin points out, if time were just dense then there would be a cut such that there would be neither a last moment of *S* nor a first moment of *S'*.

[277] *Ibid.*

Further to this, Lowe's picture of time seems consistent with Sider's three respects in which space and time are alike: parts, reality of distant objects, and in terms of the relativity of here and now. First, in terms of parts: a spatially extended object has spatial parts likewise a temporally extended object has temporal parts, as Sider put it. Lowe's picture assures that time is extended as well as a dimension in which temporally extended objects extend. A temporally extended object has parts in time thus it seems plausible to conclude that Lowe's picture of time complies with Sider's first respect in which space and time are alike.[278]

As for the second respect, the reality of distant objects, spatially distant objects, say the planet Mars, are just as real as objects here on Earth. 'The fact that Mars is far away doesn't make it any less real'. Likewise 'temporally distant objects, such as dinosaurs, are just as real as objects we experience now.' 'The fact that they are far away in time doesn't make them less real.' As Lowe puts it, instants, objects, or events in time are all coexistent; they all exist in the same fashion, none of them is less real then another. For example, past and future instants, objects, or events are as real as present ones. Future outposts on Mars coexist with dinosaurs and the chair I am now sitting on, they all exist in the very same way; they just happen to be located at different times. This being so, it looks plausible to conclude that Sider's second respect in which space and time are alike fits nicely within Lowe's picture of time.

Lastly, space and time are alike in respect to the relativity of here and now. 'if I say 'here it is sunny' and he says 'here it is raining', we do not really disagree. What is called "here" changes depending on who is speaking'. Which means that 'there is no one true *here*.' More importantly, 'the word "now" works analogously.' 'What is called 'now' changes depending on who is speaking.' so that again 'there is no one true *now*.' In other words, if all there is to time is this continuum made up by coexisting entities, there is a sense in which anywhere is here (or that anywhere has a good deal of claim to count as 'here') and anytime is now (or similarly that anytime has a perfectly good

[278]To clarify, 'extended' and 'simple' are not opposite. Simple means lacking parts. Allegedly, it seems possible to have a simple which is extended: an entity which lacks parts but is extended. Conversely, I find it quite difficult to think of something non-extended which has nonetheless parts. For an overview on the debate see Markosian, N. (1998). "Simples". *The Australasian Journal of Philosophy* 76: 213-29. Parsons, J. (2000). "Must a four dimensionalist believe in temporal parts?". *The Monist* 83: 399-418. Markosian, N. (2004). "Simples, stuff and simple people". *The Monist* 87: 405-21. Simons, P. (2004). "Extended simples: a third way between atoms and gunk". *The Monist* 87: 371-85. Braddon-Mitchel, D. & Miller, K. (2006). "*The Physics of Extended Simples*". *Analysis* 33: 222-26. McDaniel, K. (2007). "Extended Simples". *Philosophical Studies* 133: 131-41.

claim to be considered ‘now’), according to some perspective.[279] Therefore, Lowe’s picture of time seems to comply with Sider’s third respect too.

If this is the case, then what we have here is an account of what time would be like so that things could take it up by having parts in it, for temporally distant objects to be real in it, and lastly for an indexical term like now to be relative in it. In addition, as we saw early on, this picture seems to fit quite nicely with the outcome of the analysis of the similarity thesis, namely the fact that time is an instance of a continuum.

So much so, the next thing I shall attempt to do is to see which one, if any, of the views that have been animating the current debate in the philosophy of time is able to best accommodate such a picture. Before doing so, a brief overview of the state of play of the debate in the philosophy of time seems to be required.[280]

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[279] In a more refined way, I suppose we could say that as no point in space has a priviledged status, no point in the time series does either.

[280] Inevitably, the overview will have to be coincise. It will be well beyond the remit of this work to give a thorough exposition of the state of the play of the current debate in the philosophy of time. Nevertheless, the presentation of the issues brought up will be driven by the relevance to the overall aims of the thesis which once again will focus on the element of intuitions and common sense considerations that a view of time more or less covertedly endeavours to defend. In addition, once such assumptions have been untangled, the next task shall be to show whether and how different views could be nonetheless intertwined at that level of understanding.

2.2 *Metaphysics of Time: The Current State of Play*

This chapter presents an overview of the most common views in the philosophy of time, focussing, as usual, on the intuitions they endeavour to defend as well as the interplay, if any, between different theories. I shall emphasise that the same approach deployed in the first part of the thesis will be used again here: at no point will the task be to adjudicate among different theories; preferably, the aim will be to unveil the assumptions, interrelations, and commitments lurking in the background of different theories with a view to seeing whether and in what respects theories seemingly at odds may actually share a common ground. As pointed out at the outset, this survey will be concise (but hopefully rigorous), since a thorough presentation and disentanglement of the many issues in contemporary philosophy of time would exceed the remit and the purposes of this work.

First, some preliminary remarks. Despite being different in several respects, all the views presented shortly ultimately concern what exists. They all attempt to unravel and establish the temporal as well as the ontic structure of the world.[281] The fact that time and temporality are defended in various ways (sometimes at odds with one another) does not amount to undermining such a basic ontological awareness. Secondly, it shall be noted that often in the literature when presentism, eternalism, and the like, are introduced, the definition goes, tentatively, along with expressions like *roughly speaking* which in a sense seems to give the pulse of the situation: it may be controversial whether such views *could* be exhaustively defined at all. Whether or not, the general consensus seems to be that the different names devised to classify the various views are labels to some extent ambivalent: there may be no one view that epithets like 'presentism' or 'eternalism' reliably single out. Ideally, they should be perhaps seen as umbrella terms under which a cluster of views variously nuanced

[281] See for example Crisp, T.M. (2003). "Presentism". In M.J. Loux & D.W. Zimmerman (eds.) *The Oxford Handbook of Metaphysics.* Oxford: Oxford University Press: 211-45; and Rea, M.C. (2009). "Four-Dimensionalism". In M.J. Loux & D.W. Zimmerman (eds.) *The Oxford Handbook of Metaphysics.* Oxford: Oxford University Press: 246-80. Although Rea's *four-dimensionalism* amounts to my *eternalism*.

falls.[282] With this in mind, I shall proceed to introduce the first group of terms: *Presentism*, *Eternalism*, *Growing Blockism*, and *The Moving Spotlight* theory.

Presentism is generally defined as the thesis that only the present moment, objects, or events exist. Which instant, object, or event is present changes from one moment to another.[283] Thus, presentism so defined consists of two theses: one *ontological*, concerning what exists, namely the present moment, objects, or events; and a *dynamical* one, which claims that the totality of what exists changes over time.[284] A different moment, set of objects or events take over as a new *present* moment comes into existence, whereas the previous moment, set of objects or events goes out of existence as soon as that moment ceases to be the *present*. Provisionally, it seems

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[282] The situation is comparable to the aftermath of Lewis' definition of *perdurance* and *endurance*. For instance, Jonathan Lowe who was a keen endurantist adversed Lewis' definition in terms of *wholly present*. As we know, he indeed produced a definition of endurance which did away with that phrase which was guilty of being exceedingly obscure. In respect to the philosophy of time, it may be instructive to see what Lowe himself claims regarding his alleged presentism: "Some may merely want to claim for the present and presently existing things some kind of ontological distinctiveness which is still consistent with acknowledging the reality of the past and perhaps of the future. This, indeed, is the only variety of 'presentism' that I would be prepared to subscribe myself." Lowe, E.J. (2006). "Endurantism Versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 713-27. For the record, Lowe had to slightly revise his commitment to presentism in the aftermath of *The Four-Category Ontology* as a consequence of his new view of existence and change according to which all change is existential change. See Lowe, E.J. (2004). *The Four-Category Ontology*. Oxford: Oxford University Press, Ch. 12.

[283] For an exposition of presentism from a presentist point of view (which includes objections and answers) see Crisp, T.M. (2003). "Presentism". In M.J. Loux & D.W. Zimmerman (eds.) *The Oxford Handbook of Metaphysics.* Oxford: Oxford University Press: 211-45. See also Lowe, E.J. (2011). "Presentism and Relativity: No Conflict". In R. Ciuni, K. Miller & G. Torrengo (eds.) *New Papers on the Present*. Philosophia Verlag. McKinnon, N. (2011). "Characterising Presentism". In R. Ciuni, K. Miller & G. Torrengo (eds.) *New Papers on the Present*. Philosophia Verlag. Bourne, C. (2006). *A Future for Presentism*. Oxford: Clarendon Press. Markosian, N. (2006). A Defense of Presentism". In S. Haslanger & R.M. Kurtz (eds.) *Persistence: Contemporary Readings*. Cambridge, Mass.: The MIT Press: 307-42. Le Poidevin, R. (2005). "Presentism". In E. Craig (ed.) *Routledge Encyclopedia of Philosophy*. London: Routledge. Merricks, T. (1999). "Persistence, Parts and Presentism". *Noûs* 33: 421-38; and (1995). "On the Incompatibility of Enduring and Perduring Entities". *Mind* 104: 523-31. For a critical analysis see Le Poidevin, R. (1991). *Change, Cause and Contradiction.* New York: St Martin Press, 36. Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time.* Oxford: Oxford University Press, Ch. 2. On the modal/temporal analogy see Lowe, E.J. (2006). "Endurantism Versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 719. Craig, W.L. (2002). "Presentism: A Defense". In Q. Smith & A. Jokic (eds.) *Time, Tense and Reference.* Cambridge, MA: MIT Press, 391-408. Lowe, E.J. (2001). *A Survey of Metaphysics.* Oxford: Oxford University Press, 42-3 & 131-3. Lewis, D.K. (1986). *On the Plurality of Worlds.* Oxford: Blackwell. Adams, R.M. (1974). "Theories of Actuality". *Noûs* 8: 211-31. Reprinted in M.J. Loux (ed.) *The Possible and the Actual: Readings in the Metaphysics od Modality*. Ithaca, NY: Cornell University Press, 190-209. On the alleged clash between presentism and SRT see Putnam, H. (1967). "Time and Physical Geometry". *Journal of Philosophy* 64: 240-7. Godfrey-Smith, W. (1979). "Special Relativity and the Present". *Philosophical Studies* 36: 233-44. Hinchliff, M. (2000). "A Defense of Presentism in a Relativistic Setting". *Philosophy of Science* 67: 575-86. Savitt, S. (2000). "There's no Time Like the Present (in Minkowsky Spacetime)". *Philosophy of Science* 67: 563-74. For a new perspective on presentism (and whether it squares with the A-theory) see Tallant, J. (2013). "Defining Existence Presentism". *Erkenntnis* 79: 479-501; and (2012). "(Existence) Presentism and the A-theory". *Analysis* 72: 673-81.

[284] See Baron, S. & Miller, K. (2013). "Characterising Eternalism". In R. Ciuni, K. Miller & G. Torrengo (eds.) *New Papers on the Present*. Philosophia Verlag: 31-67. Miller, K (2013) "The Growing Block, Presentism and Eternalism". In H. Dyke & A. Bardon (eds.) *A Companion to the Philosophy of Time.* Wiley-Blackwell: 345-365.

plausible to say that the picture just outlined looks as though it complies quite nicely with our common sense understanding of time and what exists: our world dynamically changes over time, new things come to be whilst old ones pass away.[285]

On the other end of the spectrum, *eternalism* claims that past, present, and future moments, objects, or events exist.[286] Eternalists often go on and add that what exists or occurs at one time is analogous to what exists or occurs at another place, space and time being similar under this respect.[287] Thus, eternalism consists of two theses: an *ontological* thesis, according to which all moments, objects, or events - past, present, and future - exist or occur in a four dimensional block of space-time; and a *static* thesis, in which the present moment does not move since there is no turnover of entities, as it were. Which moment is the present moment does not change.[288] Interestingly, according to eternalism, dinosaurs and future Mars outposts exist as much as I do right now whilst writing this chapter up. Also the general consensus is that it gets on quite well with what the best sciences currently available claim, to wit modern physics. Lastly, and curiously enough, it seems to accord with a peculiar feature of our common sense representation of time, namely the fact that more often than not we happen to measure or represent time spatially, e.g. analog clocks or sundials.

The two remaining theories of time, *the moving spotlight* and *growing blockism* (or *the growing block theory)*, may fit in between the two ends of the virtual spectrum: the former holding that past, present, and future moments, objects, or events exist and that there is an objective property - presentness - which moves across the block universe

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[285] This does not mean to say that presentism fits the bill with common sense, period. Arguably, presentism does not seem to fit nicely with common sense insofar as we believe, as we ordinarily do, the past and the future seem to have a distinct status - i.e. the past is gone forever, it cannot be affected or modified by the present; whereas the future is the realm of possibility, open and to a certain extent likely to be affected by what happens in the present - which is something that presentism seems to force us to deny. Past and future do not exist, as simple as that. See also footnote 286.

[286] Miller, K (2013) "The Growing Block, Presentism and Eternalism". In H. Dyke & A. Bardon (eds.) *A Companion to the Philosophy of Time.* Wiley-Blackwell: 345-365. For the possibility to disentangle eternalism from the B-theory see Baron, S. & Miller, K. (2013). "Characterising Eternalism". In R. Ciuni, K. Miller & G. Torrengo (eds.) *New Papers on the Present*. Philosophia Verlag: 31-67. Dyke, H. (2011). "Metaphysics of Time". In E. Craig (ed.) *Routledge Encyclopedia of Philosophy*. London: Routledge. Tallant, J. (2008). "What is it to 'B' a relation?". *Synthese* 162: 117-32; (2007). "What is B-time?". *Analysis* 67: 147-56.

[287] Miller, K (2013) "The Growing Block, Presentism and Eternalism". In H. Dyke & A. Bardon (eds.) *A Companion to the Philosophy of Time.* Wiley-Blackwell: 345-365.

[288] *Ibid.*

lighting up different times, objects, or events.[289] By contrast, the latter claims that past and present moments, objects, or events exist but future do not. The present moves so that what moment is the present moment changes and the past grows.

It is now interesting to note that the moving spotlight and growing blockism to some extent square with presentism and eternalism. It looks as though the moving spotlight would happily accept the Eternalism Ontological Thesis[290] combined with the Presentism Dynamic Thesis[291]. If so, a world in which the moving spotlight were true would be one in which all moments, objects, or events - past, present, and future - exist (or are located) in a four dimensional block of space-time; a space-time in which there is objective becoming though: namely, which moments, objects or events would be present changes from one moment to another.[292] By contrast, although growing blockism seems to reject flat-out both presentism as well as the eternalist's ontological committments nevertheless it seems to comply with some of the two theories' more elementary beliefs. Like presentism, the growing block theory takes it that present moments, objects, or events do exist whilst future moments do not, but alike eternalism it holds that past as well as present moments, objects, or events exist. A growing blockist world would be one in which every moment, object, or event on the four dimensional block would be located in the past except for those occurring on the three dimensional slice at the very end of the growing block which would be in the objective present. Adding a new slice would push the one previously at the very end of the block off the objective present so that it becomes part of the objective past, but unlike presentism without passing out of existence.

Suppose we would want to visually represent these four views, for example lining them up along a spectrum with presentism at the far left and eternalism at the

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[289] See for example Skow, B. (2009). "Relativity and the Moving Spotlight". *Journal of Philosophy* 106: 666-78. See also Merricks, T. (2006). "Good-Bye Growing Block". In D. Zimmerman (ed.) *Oxford Studies in Metaphysics*. Oxford: Oxford University Press: 103-11.

[290] All moments, objects, or events, past, present, and future, exist or occur in a four dimensional block of space-time.

[291] The totality of what exists changes over time, and a different moment, set of objects or events take over as a new present moment comes into existence. Conversely, the previous moment, set of objects or events goes out of existence as soon as it ceases to be the present.

[292] If Presentist Dynamic Thesis is defined as above as the claim that the totality of what exists changes over time, then there is a clear sense in which the moving spotlight would not agree with it. The Eternalism Ontological Thesis requires that the totality of what exists is fixed since past, present, and future moments, objects or events all exist (or coexist). Therefore, the Presentism Dynamic Thesis must be restricted to what *presently* exists.

opposite end. Surely, there might not be an easy answer as to say where and why the moving spotlight view and growing blockism should be placed. Tentatively, I shall venture that the moving spotlight would fit nicely by eternalism for its full committment to the Eternalism Ontological Thesis, in addition to taking on board a presently-restricted version of the Presentism Dynamic Thesis. Growing blockism would instead sit by presentism for it accepts a concoction of elements from the Presentism Ontological Thesis and the Eternalism Ontological Thesis , in addition to the Presentism Dynamic Thesis. Interestingly, three out of four views, presentism, the moving spotlight, and growing blockism, preserve the idea of objective becoming as a real and distinctive features of time (perhaps one of the most distinguishing features): namely, the fact that the present moment changes from one moment to another and the totality of moments, objects, or events that presently exist changes accordingly.

So much for the four most popular accounts of time.[293] Before bringing forward and looking into a couple of more crucial terms in the metaphysics of time - i.e. A-theory and B-theory - I shall briefly pause and take stock on the existential commitments of the theories outlined above. As I made clear in the Introduction, existence as a philosophical notion is a decisive part of this research project therefore it may be convenient to spend some time in advance looking at a few issues which could turn out relevant for the next part of the thesis. (The next part of the thesis will in fact be devoted to singling out how what has been achieved up to the end the second part of the thesis hangs together with the philosophical debate about the notion of existence).

As mentioned at the outset, what all these views have in common is that they are ultimately theories about what exists: they all endeavour to untangle the temporal as well as the ontic structure of the world. For this reason, presentism, eternalism, growing blockism and the moving spotlight generally consist of an ontological claim plus another one which tells if the theory accepts a dynamic view of the present. Let us stick to the ontological claims. Briefly, existence is generally rendered in the language of the first-order quantified logic by the existential quantifier ∃. A first crucial question

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[293] In conversation, Dr. Francis Pearson called my attention to the fact that there actually are more ontological possibilities than those advertised in the main text: (i) past, present, and future (instants, objects, or events) exist (eternalism, the moving spotlight); (ii) only past (instants, objects, or events) exists; (iii) only present (instants, objects, or events) exists (presentism); (iv) only future (instants, objects, or events) exists; (v) just past and present (instants, objects, or events) exist (growing blockism); (vi) just present and future (instants, objects, or events) exist; and lastly (vii) only past and future (instants, objects, or events) exist. However, the key point is that the only satisfactory views for accommodating the picture of time devised above seem to be those which have an ontology where past, present, and future (instants, objects, or events) all exist.

concerns the scope of such a quantifier, that is what are the entities we can legitimately quantify over and say that they exist. However, a second one and allegedly more difficult regards how the truth of such existentially quantified statements is affected by the context in which the statements are made. Suppose that a presentist and an eternalist utter the following negative existential claims:[294] (i) 'There are no dinosaurs', (ii) 'There are no outposts on Mars', and (iii) 'There is no cake'. Suppose also that when they utter such claims both are in an assembly room during a meet and greet event to welcome new students for the 2014 academic year. When they utter (i), (ii) and (iii) they are clearly saying something true; in fact in 2014, (i') dinosaurs no longer exist (they are extinct); (ii') Mars' outposts belong to fiction's books and movies, and (iii') regrettably, during the welcome party for the new students all the cake stored in the assembly room ran out. To recap, in 2014 (time) and in the assembly room (place), for both presentists and eternalists (i), (ii), and (iii) would all be true. By contrast, suppose the presentist and eternalist claim the very same negative existentials but without the emphasis on *when* and *where*: (i) 'there are no dinosaurs', (ii) 'there are no Mars' outposts', and (iii) 'there is no cake' at all *anywhere* and *anytime*. Arguably, from the point of view of the presentist nothing would change: (i') dinosaurs are extinct, (ii') Mars' outposts belong to fiction and, (iii') at the meet and greet party cake ran out. Curiously, the situation would be slightly different in the eternalist's case. For an eternalist, presumably (i), (ii), and (iii) would be all clearly false: if past, present, and future moments, objects, or events all exist then there is a time (located in the past) where dinosaurs exist; there is a time (located in the future) where Mars' outposts exist; and there is a place (somewhere in space-time) where there is plenty of cake, given the eternalist's persuasion that space and time are alike such that what exists or occurs at one time is analogous to what exists or occurs at another place.[295]

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[294] Dinosaurs, Mars' outposts, Santa Claus, etc. are all recurrent examples in the relevant literature as well as in ordinary life of things which generally do not exist. Of course, dinosaurs did (at least according to what paleontologists say). Perhaps, outposts on Mars will. Arguably, Santa Claus never did, does, or will.

[295] In conversation, Dr. Pearson called my attention to the following: if I drop the restriction to the assembly room (negative existential (iii)) as I do discussing eternalism, then by analogy I should drop it when discussing presentism given that there is likely cake somewhere else in the world at the time of the meeting; in which case (iii) seems to come out false for the presentist too. To address Dr. Pearson's objection, I will have to amend the last sentence as follows: 'and there is a place - which given eternalism would be equivalent to 'there is an instant' - (somewhere in space-time) where there is plenty of cake. Of course, 'space' in the expression 'somewhere in space-time' will have to be restricted to the the assembly room, so that in the same place (the assembly room) but at another time (earlier or later) the sentence 'There is no cake' is false.

So much for presentism and eternalism. How about the moving spotlight theory and growing blockism? As in the first case scenario (with spatio-temporal restrictions, say in 2014 and in the assembly room), the moving spotlight theory and growing blockism's upshots would somehow square with presentism and eternalism. Unrestrictedly instead (anywhere and anytime), according to the moving spotlight theory, (i), (ii), and (iii) would all be false because the theory shares the Eternalism Ontological Thesis. As for the growing block, (i), (ii), and (iii) would be false but only (i) and (iii) for eternalist's reasons; whereas (ii) would be so because of the theory's commitment to the non-existence of future moments, objects, or events. To recap: there are some statements whose natural reading tacitly restricts the domain of quantification; something we experience on a daily basis, for instance when we claim that 'All the students passed the exams'. Surely, what we mean is not that all the students anywhere anytime passed all the exams anywhere anytime. Instead, we mean a relevant subset of the set of all the students as well as a relevant subset of the set of all exams. However, there are others which do not: for example, 'There is no Santa Claus', anywhere or *simpliciter*.[296]

Thus, when quantification is suitably restricted presentism, eternalism, growing blockism, and moving spotlight agree that it is true that (i), (ii), and (iii), when it is not then the disagreement exacerbates. This seemingly bizarre outcome has led some interpreters to wonder whether presentism and eternalism (setting aside growing blockism and the moving spotlight for what holds for presentism and eternalism generally holds for them as well as they share some important ontological features, as argued for above are just employing 'exists' in a different fashion and thereby are not

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[296] See Hirsch on quantifier *variance* versus quantifier *restriction*: "Lewis points out that if, looking into the refrigerator, I assert, "There is no beer", I am restricting the quantifier to (the domain of) what is in the refrigerator. The unrestricted quantifier, by contrast, says what exists 'strictly' or '*simpliciter'*. That the quantifier is often contextually restricted in the way that Lewis says may be granted by all. The question of quantifier variance, however, pertains to the unrestricted quantifier, to our concept of 'existence simpliciter'". Hirsh, E. (2002). "Quantifier Variance and Realism". *Philosophical Issues* 12: 51-63. See also Hirsh, E. (2002). "Comments on Theodore Sider's *Four-Dimensionalism*". *Philosophy and Phenomenological Research* 68: 658-64; and Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press, xxi-xxiv. Sider argued that some quantifier meanings are more natural than others thereby cutting reality better at its joints. For the record, Hirsh's contention that the dispute is at the end of the day verbal applies *mutatis mutandis* to the perdurance versus endurance controversy. See Hirsh, E. (2005). "Physical-Object Ontology, Verbal Disputes, and Common Sense". *Philosophy and Phenomenological Research* 70: 67-97; and (1982). *The Concept of Identity.* New York: Oxford University Press, 188-92.

really disagreeing but just talking about different subjects, whilst believing that they are talking about the same thing).[297]

A concise and perhaps a bit too quick overview of the discussion is as follows: presentism and eternalism agree about the totality of moments, objects, and events that exist*ed*, *exist* and *will* exist. Eternalists use 'exists' as to quantify over past, present, and future moments, objects, or events. Presentists refuse to quantify over past and future moments, objects, or events (on their view it would amount to quantify over non-existing entities) since there are no such things. Thus, presentists speak truly when they claim that only present moments, objects, or events exist whereas eternalists speak truly when they say that past and future moments, objects, or events exist. What do we make of this? Following from the distinction between restricted and unrestricted domains, one option may be to say that they both mean the same by 'exists' but one party - presentists - is restricting the domain while the other - eternalists - is not. They agree when they speak restrictedly, they do not when they speak unrestrictedly. However, presentists, given the definition of presentism, would not be so inclined to accept that they are tacitly restricting the domain; their domain is indeed unrestricted, there is only 'the present' and within it there is no restriction at all. Therefore, back to the drawing board. A second option would be to maintain that presentist's and eternalist's domains of quantification are the same but 'exists' is used in different *senses*; namely doing away with extensionality and pointing at intensionality. Arguably, if 'exists' can have different meanings, it does so in presentism and eternalism - though it is hard to believe it given the understanding of 'existence' outlined above whereby an ambiguity in the meaning has to be discarded.[298]

A further issue closely related to the previous one is the suggestion that no matter how the predicate 'exists' is interpreted, it will always end up rendering presentism and eternalism equivalent or the former trivially false. Presentism has it that only present moments, objects, or events exist. One possible interpretation of this existential claim could be that only *present* things exist *now*. But this is no big deal and

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[297] See footnote 300. For a different way to frame the dispute between eternalism and presentism and thereby argue for the lack of a genuine disagreement see Craig Callender's example of a four-dimensional manifold of point events each one of which carrying a lightbulb. Callender, C. (2000). "Shedding Light on Time". *Philosophy of Science* 67: 587-599.

[298] Sider, T. (2009)."Ontological Realism". In D. J. Chalmers, D. Manley & R. Wasserman (eds.) *Metametaphysics: New Essays on the Foundations of Ontology*. Oxford: Oxford University Press: 384-423; and (1999). "Presentism and Ontological Commitment". *Journal of Philosophy* 96: 325-47.

consistent with eternalism. A second interpretation could be that only *presently* existing moments, objects, or events *exist*, *existed* and *will exist*. But this is false since it implies, *contra* presentism, that only one set of objects and/or events is all that ever exists.

Before moving to the next two theories of time included in the current overview, I shall address a remark, raised in conversation by Robin Le Poidevin, according to which my understanding of eternalism is 'not-standard' since it includes the view that time does not pass which is a distinctive element of the B-theory rather than eternalism. Le Poidevin has it that standardly eternalism is taken to be the assertion that all (instants of) time(s) (objects, and events) are equally real. If what Le Poidevin means by 'real' is what I mean by 'exist' then this amounts to what I called the Eternalism Ontological Thesis. For argument's sake, suppose that Le Poidevin means this (he could not have done otherwise as I shall point out shortly). As advertised above, and as Le Poidevin adamantly stressed in conversation, there is a sense in which eternalism is an element of the moving spotlight view which in addition includes an element of the A-theory of time as we shall shortly see. If this is the case then, he concludes, there are two separate debates here: (i) one over whether *all* times are real, only *some*, or *just one* (which is what has been pursued so far in this chapter); and (ii) a second one over whether time passes.

In pointing this out, Le Poidevin accepts what I named the Eternalism Ontological Thesis but at the same time he rejects the Eternalism Static one according to which the present moment does not move, which moment is the present moment does not change since it would entail the thesis that time does not pass which is the whole point of Le Poidevin's objection. Now, what I think needs to be clarified in order to see if eternalism does or not entail a denial of the passage of time is, at first, what the phrase 'passage of time' means. Recall what the moving spotlight theory claims: exactly one time has the intrinsic property presentness, presentness is the 'spotlight' that shines on just one time. Which time is present or has presentness changes. Some time has it now, later times will have it, and earlier times have had it. The spotlight moves along the series of times and it is this continual change in which time has presentness that constitutes the passage of time, or 'objective becoming' (when a B-theorist denies that the passage of time is a real phenomenon what she means is to refute that there is such a moving property that is instantiated first by earlier and then by later times).

Suppose this is what the passage of time consists in; the question is now whether eternalism does exclude it or not. Eternalism, as claimed above maintains that past, present, and future moments, objects, or events exist which plausibly corresponds to Le Poidevin's assertion that all times (objects, and events) are equally real. It does correspond since the expression 'all times (objects, and events)' could only mean 'past, present, and future moments, objects, or events' whereas by 'real' we stipulated that it amounts to 'exist'. I shall take it as my working hypothesis. There seems to be passage of time because instants, objects, and events which were once future are now present and later on will be past. What does this mean? One way to put it could be the following: e.g. an A-theorist (and only an A-theorist could since the thesis that time passes is genuinely A-theoretic), as we shall shortly see, will probably say that pastness, presentness, and futurity are monadic properties which are instantiated by instants, objects, or events. In addition to this, and this is the interesting point, an A-theorist will also likely claim that those distinct properties denote crucial ontological differences between past, present, and future: e.g. the future is open, somehow changeable, the realm of possibilities whereas the past is closed, immutable. Conversely, the present includes what is actual, namely a sort of limit between the two. If she does not express it in this way, it would then be sufficient to point out that those properties of pastness, presentness, and futurity are themselves subject to the eternalism ontological thesis.

If this is the case, then it seems that for the passage of time to be what is supposed to be, it somehow implies a change in which instants, objects, or events are present or instantiate the property of presentness: some instants (objects, or events) has it now, later instants (objects, or events) will have it, and earlier instants (objects, or events) have had it. This idea, a genuine element of the A-theory as Le Poidevin noted, in turn implies that such a difference in pastness, presentness, and futurity brings about decisive ontological differences between past, present, and future. One way to see what the ontological differences are could be in terms of Le Poidevin's 'being real': what is past is no longer real, what is present is what is real whereas what is future will be real. Thus, the passage of time seemingly implies that there are differences in the reality of instants, objects, or events *which curiously is what eternalism denies*. Another way to put it could be in terms of 'existence': what is past is what no longer exists, what is present is what exists, whereas what is future is what presumably will exist. Once again, it seems that the passage of time somehow implies there are differences in term of

'existence' (ontological differences) between past, present, and future instants, objects, or events *which is what eternalism denies*. Therefore, whether we take eternalism to be the thesis according to which all times (objects, or events) are real or that past, present, and future moments, objects, or events exist there is a sense in which it *clashes* with the ontological implications of the thesis that the time passes.

To conclude, a proper understanding of the A-theory is that there is an ontological difference between the past, present and future in the sense that what is future, and only what is future has the property of being open and changeable. If this is the case, then we do get a conflict with eternalism, specifically because there is a conflict between eternalism and the idea that some things are open or changeable in the sense just mentioned. In short, the moving spotlight theory, if it is an A-theory, says that some things are open/changeable. Eternalism denies that any things are open/ changeable, therefore, eternalism is incompatible with the moving spotlight theory.

If this line of argument is plausible, then eternalism seemingly *include* the idea that there is no passage of time in the sense that some ontological consequences of the thesis that time passes contravene the core of eternalism. This being so then, *contra* Le Poidevin, it is legitimate to claim that eternalism consists of two theses, one ontological which claims that all times, objects, or events are real or exist; and a static one according to which the present moment does not move, which moment is the present moment does not change. Whether this conclusion highlights as a consequence a potential clash between the two distinctive features of the moving spotlight theory, that is the acceptance of the Eternalism Ontological Thesis and the Presentism Dynamic Thesis is something I shall not pursue further in the thesis.

So much for presentism and eternalism's existential issues. For the time being, I shall leave it like that but more light will be shed in Part III of the thesis on existence. Perhaps, to clarify further what is going on here we may have to introduce few additional concepts such as the *A-theory* and the *B-theory* of time.

A familiar point in philosophy of time has it that eternalism, rejecting the Presentism Dynamic Thesis, usually endorses the *B-theory*. According to the B-theory, the world is a static block of moments, objects, or events, ordered by the *earlier than*, *later than,* and *simultaneous with* relations (*B-type relations*, or *B-relations*). Which moment is the present moment does not change, past, present, and future do not pick out special features of the world, they are all on a par and expressions like 'now' and

'present' are indexical terms, like 'here' and 'there' in spatial cases. Presentism is instead usually coupled with the *A-theory*. According to the A-theory, *in addition to* B-type relations there are monadic properties like *pastness*, *presentness*, and *futurity* (*A-type properties*, or *A-properties*) which are held by different sets of moments, objects, or events at different times. [299] [300] Unlike B-type relations, A-type properties single out specific metaphysical features of the world. To recap: presentists tend to endorse the A-theory for they claim that it is a genuine feature of a presentist world which moment is present and this fact changes over time to the extent that different moments, objects, or events are present at different times. To say that presentism endorses the A-theory is to say once more that it endorses the dynamical thesis.[301]

A better understanding of the A- and B-theory is found in McTaggart's famous argument for the unreality of time. Reference to McTaggart will also turn out useful in showing how the A- and B-theory relate to two other popular disputes in the philosophy of time, the dynamic versus static view of time as well as the tensed versus tenseless view of time. McTaggart's famous paradox, first published in 1908[302], is a prominent feature of the contemporary debate about time for almost all the thinkers with an

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[299] By the phrase 'which are held by different sets of moments, objects, or events at different times' I mean the A-theory's idea that a-properties change; to wit the possession of a-properties change. For an attempt to an eternalist A-theory see Zimmerman, D.W. (2005). "The A-theory of Time, The B-theory of Time, and 'Taking Tense Seriously'". *Dialectica* 59: 401-57. See also Lowe, E.J. (1998). *The Possibility of Metaphysics: Substance, Identity and Time.* Oxford: Oxford University Press, Ch.4.

[300] This last statement might not sound strictly true. One might be an A-theorist without believing in monadic properties. I must confess, unhelpfully however, that I do not know a good alternative characterisation. Perhaps, a distinction between the A- and the B-theory (as I shall argue later on) could be made by saying that the tensed language captures something about the world not captured by tenseless language. In any case, I am fully aware that the distinction might not be exhaustive; for example Michael Tooley seems to fall in neither camp, but still I believe my characterisation does capture important views and is arguably sufficient for the purposes of my argument.

[301] There may be a sense in which presentism and the A-theory actually clash: given the definition of presentism, it may be difficult to say which moment, object, or event would be the one exhibiting the A-type properties of pastness or futurity. As there are no other moments, objects, or events apart from those presently existing, arguably if they exhibit any of the monadic properties (pastness, presentness, and futurity) the one must be the property of being present since by definition only what is present exists. I find it hard to think of something which is present (and so it exists) and at the same time it exhibits the property of being past (or future).

[302] McTaggart, J.E. (1908)."The Unreality of Time". *Mind* 17: 457-74; (1927). *The Nature of Existence*, Vol. II. Cambridge: Cambridge University Press, Ch. XXXIII. Hereon, I shall refer to the 1927 version of the argument. See also Le Poidevin, R. (1998). "The Past, Present, and Future of the Debate about Tense". In R. Le Poidevin (ed.) *Questions of Time and Tense*. Oxford: Clarendon Press: 13-42.

interest in time have to come to terms with it. As Gale[303] put it, arguably fallacious, McTaggart's argument is so, if at all:

> "in such a deep and basic way that an adequate answer to it must supply a rather extensive analysis of the concept of time, along with a host of neighbouring concepts that are themselves of philosophical interest, such as change, substance, event, proposition, truth, and others."[304]

Setting aside the alleged fallaciousness of the argument[305] the interesting issue here is what Gale labelled time's 'neighbouring concepts': *change*, *substance*, *event*, *proposition*, *truth*, and others, perhaps the likes of existence (and to some extent identity); and the need to look into them. To stress it once more, this is what the whole project is about: the need to explore basic concepts of our ordinary experience such as persistence, change, existence, and time in this case with a view to understanding how, if at all, they square and hang together.

So much so, let us begin distinguishing between two different although intimately related ways we ordinarily talk and thereby conceive of time. The first one by means of the distinction of past, present, and future emphasises the change, flux and transiency. Future instants, objects and events, those which are not yet, become less future towards their happening; they then come into existence in the present, and when they cease to occur they become past, and progressively more and more past. Such a feature is rendered in our language by means of the tenses such as, in modern English (in the simple or progressive form), past perfect, simple past, present perfect, simple present, simple future, future perfect. This view of time relies on the notion of *temporal becoming* and embodies a feature of some views of time that has been previously named

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[303] Hereon, I shall draw upon Gale's Introduction to Ch. II 'The Static Versus the Dynamic Temporal' (Gale, R.M. (1968). *The Philosophy of Time*. London: Macmillan.) since I believe it is still these days one of the most perspicuous accounts in the literature of the dispute between the dynamic and the static view of time although it may not be particularly up-to-date. Even so, I shall keep it as a reference point throughout this chapter and revise it whenever required.

[304] Gale, R.M. (1968). *The Philosophy of Time*. London: Macmillan.

[305] I shall not pronounce myself on the validity and soundness of McTaggart's argument. The literature is immense already without me adding any further gloss to it. Personally, I believe that the argument is somehow valid but unsound but I will not defend my claim further. For an overview of the discussion, in addition to the references in footnote 306, see Lowe, E.J. (1987*a*). "The Indexical Fallacy in McTaggart's Proof of the Unreality of Time". *Mind* 96: 62-70. Le Poidevin, R. & Mellor, D.H. (1987). "Time, Change and the 'Indexical Fallacy'". *Mind* 96: 534-8. Lowe, E.J. (1987*b*). "Reply to Le Poidevin and Mellor". *Mind* 96: 539-42. Le Poidevin, R. (1991). *Change, Cause and Contradiction: A Defence of the Tenseless Theory of Time.* London: Macmillan. Lowe, E.J. (1993). "McTaggart's Paradox Revisited". *Mind* 101: 323-6. Le Poidevin, R. (1993) "Lowe on McTaggart". *Mind* 102: 163-70. Mellor, D.H. (1998). *Real Time II.* London & New York: Routledge, Ch.7.

the *dynamic* or *tensed* view (which is supposedly grasped by the Presentism Dynamic Thesis). By contrast, the second one has it that instants, objects, or events are laid out in a permanent/static order governed by 'earlier than/later than/simultaneous with' relations. Such order does not admit of any temporal becoming, they are given all at once in a *nunc stans*. For instance, Bradley Wiggins' 2012 Tour de France win and Marco Pantani's 1998 stand in such a relation that it is always the case (and it is never going to be otherwise) that the former is later than the latter, and the latter is earlier than the former. Curiously though, these two apparently opposite views of time seem somehow to cross paths: there is a cogent sense in which the static view is implied by the dynamic one, as McTaggart rightly points out in his infamous argument, and as we shall see. Although unproblematically (at this level) related, these two radically different ways of talking and thinking of time become a problem when we try to work them out philosophically.

Following Gale's analysis, McTaggart's argument for the unreality of time may be condensed into two theses: one *positive* (i) which offers the correct analysis of the concept of time, and a *negative* one (ii) which claims that such an analysis of time harbours a contradiction. In general, contradictions are never true of reality therefore if time is contradictory then time is unreal.

Thesis (i) is unpacked in the following fashion: McTaggart's analysis of the concept of time appeals to two different types of temporal facts: (i_α) temporal facts about precedence and subsequence between events (B-facts recalling the definition of the B-theory above), and (i_β) facts about past, present, and future (A-facts recalling the definition of the A-theory given above).

Events are ordered according to different series with respect to (i_α) and (i_β): an ordering of events (McTaggart's B-series) running from earlier to later altogether with the generating relations of 'being earlier/later than' and 'simultaneous with' corresponds to (i_α); whereas an ordering of events (McTaggart's *A-series*) which runs from the past, through the present, to the future corresponds to (i_β). The relations generating the B-series ('earlier/later than' and 'simultaneous with') are often named *B-relations*, whereas the monadic properties of pastness, presentness, and futurity are known as *A-determinations*.

As touched upon above, the only series which allows for a change in an events' position within the series is the A-series: what was future becomes present and it will be

at some point further down the line past. By contrast, events cannot change their respective positions in the B-series: Wiggo is the first British cyclist to have won *La Grande Boucle* thus the event of any other British rider winning that competition will always be later than Wiggo's. In turn, Wiggo's win will always be earlier than any other Brit's winning.

Apparently, according to McTaggart, although the only correct analysis of the concept of time (McTaggart's positive thesis above) involves both the series, nevertheless the A-series (and the A-determinations) is actually more basic than the B-series for the B-relations (and the B-series accordingly) can be easily reduced to A-determinations but not *vice versa*; in fact, as McTaggart remarks, without the A-series, the B-series will not be a temporal series at all. The reason for this conclusion is that change is crucial to time, and the B-series without the A-series does not involve genuine change since the events in time themselves do not change, and the positions in the B-series are fixed once and forever,[306] whereas the positions in the A-series are constantly changing, as pointed out early on. Thus, *if* the A-series is contradictory *then ipso facto* time is contradictory and thereby unreal.

So much for the positive thesis. The negative thesis' aim is to demonstrate the conditional statement above. The reason for the alleged contradiction in the A-series lies in the fact that each event in the A-series has the three A-determinations: pastness, presentness, and futurity which are mutually incompatible.[307] When put to the test, the objection goes, McTaggart's does not really seem to be the case for the A-determinations are had by each event *only* successively: for example, Wiggo's Tour the France win was once future, then in the summer of 2012 became present, and finally in 2014 it belongs to the past, and it will be more and more past as time goes by. Although quite plausible, this line of reasoning does not seem to cut it, in fact McTaggart rejoins claiming that what the objection really says is that an event "is present at a moment of present time, past at some moment of future time, and future at some moment of past

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[306] It is not just the fixidity of the B-positions but also the idea that the events in those positions cannot change either: The death of Elizabeth was and always will be the death of a Queen and this event cannot have changed any of its characteristics as it went from future to past. Otherwise it would not have been the same event.

[307] "And this exclusiveness is essential to change, and therefore to time." McTaggart, J.E. (1927). *The Nature of Existence*, Vol. II. Cambridge: Cambridge University Press, 20.

time."[308]; something which clearly leads into an infinite regress that, according to McTaggart is vicious.[309]

The contradiction is allegedly waved off by appealing to a second-order time series: if each event in the first-order time series possessing all the three A-determinations has them successively rather than all at once, it has them successively at moments of time only in relation to a second-order time series. But since the second-order time series is by definition a time series then its members must form an A-series, so the contradiction rises back up again. Thus, in order to rid it from the second-order time series we would have to appeal to (or to posit) a third-order A-series. Iterating such a pattern of explanation, the contradiction never resolves, it merely transfers to a further A-series.[310]

In a nutshell, this is what I believe of McTaggart's argument is relevant to my purposes. In the following of the chapter, I shall outline two strands of reply which might help to characterise the A- and B-theory of time. Although at odds, there is something that both the A- and the B-theory share: the belief that regardless of the validity of McTaggart's argument, it is somehow unsound. Therefore time is all but unreal. There must be something which is time after all. Despite this initial agreement, what both theories clearly do is to explain such evidence in radically distinct ways. The B-theory of time claims that McTaggart's B-series alone is sufficient to render an adequate account of time. Denying what Gale named McTaggart's positive thesis, such a view denies that the A-series is by any means necessary for the reality of time.

For completeness' sake, in the endeavour to articulate the B-theoretic answer to McTaggart's argument, I shall present two versions of the theory, the *Old*, and the *New* B-theory of time. The differences reside in what theses an Old B-theorist and a New B-theorist of time are inclined to accept.

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[308] *Ibid.* 21. McTaggart's question is: "But what is meant by 'has been' and 'will be'[as in 'the event *M will be* past, and *has been* future']? And what is meant by 'is' [as in 'the event *M is* present'], when, as here, it is used with a temporal meaning, and not simply for predication?"

[309] *Ibid.* 22. "The attribution of the characteristics past, present, and future to the terms of any series leads to a contradiction, unless it is specified that they have them in relation to terms specified as past, present, and future. These again, to avoid the contradiction, must in turn be specified as past, present, and future. And since this continues infinitely, the first set of terms never escapes from contradiction at all."

[310] See footnote 313.

Gale had it that the Old B-theory[311] of time can be easily epitomised with the following three theses:

> *The Reducibility Thesis* which consists of two claims:
>
> (α) *The Linguistic Reduction*: the A-series is reducible to the B-series in virtue of the fact that the A-determinations can be analysed in terms of B-relations;
>
> (β) *The Psychological Reduction*: the A-determinations involve a B-relation to a perceiver therefore temporal becoming is psychological;
>
> *The Objectivity Thesis*: the B-series is objective, all events in the series are equally real;
>
> *The Nature of Change Thesis*: Change is analysable in terms of B-relations between qualitatively different states of one single thing.

(α) *The linguistic reduction* thesis claims that an event is not intrinsically past, present, or future. Rather, it bears a B-relation to a given event, generally a linguistic one such as an utterance of a tensed statement about the event at stake: for instance, 'Wiggo's Tour de France win is past' means that the occurrence of the event of Wiggins' Tour the France win is earlier than the utterance (or the token) of that sentence. A-statements or tensed statements are somehow *perspectival* in revealing the speaker's temporal relation to the event reported by their statement. A-statements are *token-reflexive* (or self-referring), they bring out "the linguocentricity and therefore the subjectivity of the A-determinations."[312] Tenses are hence disguised B-relations between the event reported by the statement and the occurrence of the tensed sentence token reporting the event. Similarly, A-statements are subject to *change in* their *truth value*: 'Wiggo's Tour de France win is present' if uttered on July, 22nd, 2012 is true but before or after that date is false.[313]

One very popular way to transform a tensed statement into a tenseless one would be to ascribe a date: it is always true that 'Wiggo wins (tenselessly) the Tour de France

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[311] For the record, what Gale addressed as the B-theory of time is what nowadays is known as the Old B-theory of time. The New B-theory of time was yet to come when Gale's book was published (1968). For a more recent characterisation of the Old B-theory of time see Smith, Q. (1994). "Introduction: The Old and New Tenseless Theories of Time". In Oaklander, N.L. & Smith, Q. (eds.) *The New Theory of Time.* London, New Haven: Yale University Press, 17-22.

[312] Gale, R.M. (1968). *The Philosophy of Time*. London: Macmillan, 296.

[313] By contrast, B-statements being tenseless are not subject to such variations in truth value; which incidentally sounds like a very good reason to think that the two are not inter-translatable: something cannot be translated by something which has a different truth-value to it.

on the 22nd of July 2012'. It appears that the language of logic, mathematics, and physics is tenseless therefore, arguably, it seems that such B-theoretic translations of A-statements comply impeccably with the best sciences available (in a way so that such a compliance is considered a clear advantage for the B-theory). Such linguistic reduction, if feasible, has to square with a couple of more or less tacit assumptions which, in all fairness, may call for further explanations: the first one has it that however A-statements are translated into B-statements, the procedure is legitimate since *detensing* can be easily achieved *without* any loss of meaning. Secondly, because the language of the best sciences available seems to speak tenselessly then, arguably, what is good for them must be good for other disciplines too (for example metaphysics).

(β) *The psychological reduction* strengthens and supplements what the linguistic reduction has achieved, if anything. A-determinations are situational, they depend on and express the peculiar state of belief of the utterer.[314] In a world without utterers or perceiving beings, seemingly, there would be no A-determinations. But there is a further twist to this: temporal becoming depends on A-determinations (recall McTaggart's argument above); since A-determinations depend on the psychological states of a perceiver - as the psychological reduction seems to have established - then the temporal becoming may well be analysable in psychological terms as well, to the conclusion that there is no such thing as temporal becoming (or if there appears to be then it is illusory). The bottom line of the twofold reduction is that the A-series is not an objective element of the furniture of reality: regrettably, A-determinations cross-refer either to a language user or to a perceiver. Had there not been any language users or perceivers, there wouldn't have been any A-determinations, and any A-series at all. However, still there would have been a B-series since all the events would yet hold on their mutual positions cashed out in terms of B-relations.

As a natural consequence, *the objective thesis* seemingly follows from the twofold reduction. A-determinations are not objectively part of the furniture of reality, they are indeed relative to somebody's perspective (temporal) therefore there might be a sense in which they qualify as subjective. Whereas B-relations, not involving such perspectival reference, would still hold in a world devoid of perceiving subjects or

[314] For example, when I believe that Wiggo won, this is a matter of my belief about Wiggo coming later than his winning.

language users. In such world there would still be a wealth of objective relations (B-relations) between events.

Finally, the thesis concerning *the nature of change*. Let us recall the distinction between change *of* time, and change *in* time. Arguably, the former refers to changes in the events' A-determinations and so does it convey the idea of temporal becoming; whereas the latter specifies the qualitative and quantitative changes of things. The B-theory claims that the B-series is sufficient to account for both kinds of change. As for change of time, since there is no authentic temporal becoming then any change in the A-determinations is perfectly reducible to B-relations talk without loss of meaning (Linguistic Reduction). Qualitative and quantitative change is likewise analysed in terms of B-relations: a concrete thing is reducible to a series of successive events (something along the lines of a process taking up time), being the events composing the series reciprocally interconnected by spatial and causal relations in a way in which any two members belonging to any two different series are not. Thus, change in time amounts to the turnover of B-relations between events within the series (the series which represents a sequence of B-ordered events taken as events of one thing, to wit the history of that single thing) without appealing to any further notion of temporal becoming.

So much for the old B-theory of time. Hereon, by the expression 'B-theory' I shall mean the new B-theory of time.[315] As Smith claims, the old B-theory of time has been abandoned as a consequence 'of advancements in the philosophy of language'[316], in particular by abandoning what Gale named the linguistic reduction. One of the cornerstones of the old B-theory of time was, as we know, the firm belief that detensing was an absolutely safe procedure to put in place since it preserved the meaning of a tensed sentence when translated into a tenseless one. Regrettably, it was successively

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[315] For a formulation of the New B-theory of Time see Smart, J.J.C. (1980). "Time and Becoming". *Philosophical Studies* 19: 3-15. Mellor, D.H. (1981). *Real Time.* Cambridge: Cambridge University Press, Ch. 5. Oaklander, N.L. (1984). *Temporal Relations and Temporal Becoming.* Lanham, MD.: University Press of America, Ch. 4.

[316] Namely, following from the development of the the New Theory of Reference initiated by Ruth Barcan Marcus and applied to indexicals by David Kaplan. See Barcan Marcus, R. (1961). "Modalities and Intensional Languages". *Synthese* 13: 303-22; and Kaplan, D. (1989). "Demonstratives". In J. Almog, J. Perry & H. Wettstein (eds.) *Themes from Kaplan*. Oxford: Oxford University Press: 481–563. However, various B-theorists ended up drawing upon different theories, for example Donald Davidson's, Castañeda's, so on and so forth.

shown that when the procedure is applied to sentences containing indexical terms like 'now' the corresponding tenseless sentence failed to preserve the meaning, so that:

> "This idea lies at the basis of the new tenseless theory of time, namely, that tensed sentences (as uttered on some occasions) are untranslatable by tenseless sentences, but that it is nonetheless the case that tensed sentences ascribe no temporal determinations not ascribed by tenseless sentences."[317]

The contention that tensed sentences' import is negligible when it comes to the ascription of temporal properties is then cashed out variously by different philosophers.[318] [319] To conclude, what allegedly discriminates between the old and the new B-theory of time is the rejection of one of the two claims of which the reducibility thesis consists in, to wit the linguistic reduction. Thus, whether tensed language is needed, it is so insofar without having any crucial import to the ontology of time, tenseless talk is all there is (and needs to be) to it.

As for the psychological reduction, the objectivity, and the nature of change theses, it looks as if the new B-theory would fit in quite comfortably with all of them. Tensed language seems to play a *sui generis* role at the level of ordinary language (which is tensed) thereby bringing up the logical connections among ordinary language tensed sentences. This picture is indeed nothing more than a picture since it does not mirror the underling nature of time: the B-series is objective, all instants, objects or events in the series are equally real, B-facts are all there needs to be to account for the

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[317] Smith, Q. (1994). "Introduction: The Old and New Tenseless Theories of Time". In N.L. Oaklander & Q. Smith (eds.) *The New Theory of Time.* London, New Haven: Yale University Press, 17-22.

[318] For example, the indexical 'now' is believed to refer directly to the time of the utterance without any ascription of the property of presentness. In a sentence containing 'now', say, Wiggins says 'it is now time to go out for a quick spin' the indexical refers directly to the time of utterance, say 22nd of July 2012 but the whole translation procedure which characterised the old version of the B-theory fails. To be translated, Kaplan argues it will require sameness of meaning and semantic content, the meaning being the rule of use of the sentence. Because 'it is now time to go out for a quick spin' and '3.02 pm the 22nd of July 2012 is time to go out for a quick spin' have different rules of use and thereby meanings then one cannot be translated into the other. However, if 'now' refers directly then the 'now' in 'it is now time to go out for a quick spin' directly refers to 'the 22nd of July at 3.02 pm' without ascribing any additional temporal property to reality (additional in the sense that they are not already ascribed by the relevant tenseless sentence) then the work carried out by tenseless sentences is enough to account for that evidence.

[319] For instance, Hugh Mellor believes that tensed talk is indeed not translatable into tenseless language without a loss of meaning; however, when it comes to the truth conditions of tensed sentences, they can easily be given in a tenseless language so that these tenseless truth-conditions sentences are all that is needed to account for the nature of time. See Mellor, D. H. (1994). "The Need for Tense". In N.L. Oaklander & Q. Smith (eds.) *The New Theory of Time.* London, New Haven: Yale University Press, 23-37. Nathan Oaklander instead distinguishes between a language suitable for analysing ordinary language which happens to be tensed and calls it 'logical language', and an 'ontologically adequate language', a tenseless language which accounts for time only in terms of B-relations. See Oaklander, N.L. (1991). "A Defense of the New Tenseless Theory of Time". *The Philosophical Quarterly* 41: 26-38.

nature of time; a thing's change is the result of different B-relations entertained by qualitatively different states of it. Lastly, since there is no real procession from the future through the present and to the past (tensed sentences do not ascribe temporal determinations) then temporal becoming has no objective ground, objective in the sense of being rooted in the way time is, therefore if there is anything complying with those features it must be as a result illusory.

So much for the distinction between the old and the new B-theory of time. To conclude, the B-theoretic answer to McTaggart's paradox should be clearer now. McTaggart positively claims the A-series to be necessary for time and for change. In a world in which the B-series were the only one temporal series change would be impossible. Therefore, the only possible change is a change in the A-determinations. The B-theorist objects that McTaggart is mainly concerned with *change in events* overlooking *changes in things*. Because of the B-theorist's thesis of the nature of change, change in things (change in time) requires the B-series only. Thus, the reality of time does not require the existence of the A-series.

Curiously, the B-theory of time, although it denies the objectivity of the A-series, still it cannot support McTaggart's negative thesis according to which the A-series is contradictory. In fact, as B-theorists claim, the A-series is analysable in B-theoretical terms and thereby reducible to the B-series. Had the A-series been contradictory, the B-reduction would have been hardly feasible. The reduction can be accomplished for the A-determinations are just disguised B-relations. The risk of contradiction is avoided. There would be a contradiction if an event had at least two of the B-relations to one and the same event but McTaggart never showed this to be a possibility (for instance, Wiggo's Tour de France win being earlier than and later than Pantani's, but this hardly makes any sense). Therefore, there is a sense in which the B-theory should deny McTaggart's argument as a whole, the positive thesis as well as the negative one.

In addition to the approach spelt out above, the relevant literature on time offers an alternative, devised once more to address and contain McTaggart's argument: the A-theory of time. Alike the B-theory, a cluster of ideas fall under the label of the A-theory of time. The A-theoretic approach may then be summarised in the following three theses:

The Reducibility Thesis: the B-series is reducible to the A-series since B-relations can be analysed in terms of A-determinations;

The Objectivity Thesis: (γ) The A-series is objective, temporal becoming is intrinsic to all events, and therefore (δ) there are significant ontological differences among past, present, and future;

The Nature of Change Thesis: Change requires the A-series (change *of* time).[320] [321]

Let us begin from the A-theory's Reducibility Thesis. A-theorists agree with McTaggart's positive thesis that the A-series is both necessary and fundamental to time since, as Broad claims[322], what makes the B-series a temporal series (or B-relations temporal relations) is that its members form an A-series (or their relata have A-determinations) and change in respect to them. In developing this argument, Broad claims that: (i) a temporal series differs from a non-temporal one for although both have an intrinsic order, only the former has an intrinsic direction or sense; a claim which can be easily granted by the B-theorists (direction is guaranteed by B-relations); and (ii) that the direction or intrinsic sense of a temporal series is due to the fact that its members undergo temporal becoming; a claim that no B-theorist would be likely to subscribe to.

(i) The reason why a linear, unidimensional spatial series has an intrinsic order is quite simple: given any three members of this series (points/positions in space, etc.), one will always appear to be between the other two irrespective of the angle they are

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[320] A-theorists include Broad, C.D. (1923). *Scientific Thought*. London: Routledge & Kegan Paul. Prior, A. (1957). *Time and Modality*. Oxford: Clarendon Press; (1967). *Past, Present and Future.* Oxford: Clarendon Press; Gale, R. (1968). *The Language of Time*. London: Routledge & Kegan Paul (Gale has since repudiated the A-theory). Prior, A. (1968). *Papers on Time and Tense*. London: Oxford University Press. Schlesinger, G. (1980). *Aspects of Time*. Indianapolis: Hackett Publishing Co. Smith, Q. (1993). Language and Time. New York: Oxford University Press. McCall, S. (1994). *A Model of the Universe.* Oxford: Clarendon Press. Bigelow, J. (1996). "Presentism and Properties". In J. Tomberlin (ed.) *Philosophical Perspectives: Vol. 10.* Malden, MA: Blackwell, 35-52. Zimmerman, D. W. (1996). "Persistence and Presentism". *Philosophical Papers* 25: 115-26. Lowe, E.J. (1998). *The Possibility of Metaphysics: Substance, Identity and Time.* Oxford: Oxford University Press. Zimmerman, D.W. (1998). "Temporary Intrinsics and Presentism". In P. van Inwagen & D.W. Zimmerman (eds.) *Metaphysics: The Big Questions.* Malden, MA.: Blackwell, 206-19. Merricks, T. (1999). "Persistence, Parts and Presentism". *Noûs* 33: 421-38. Craig, W.L. (2000). *The Tensed Theory of Time.* Dordrecht: Kluwer. Markosian, N. (2004). "A Defense of Presentism". In D.W. Zimmerman (ed.) *Oxford Studies in Metaphysics: Vol. I.* Oxford: Oxford University Press, 347-403. Zimmerman, D.W. (2005). "The A-theory of Time, The B-Theory of Time, and 'Taking Tense Seriously'". *Dialectica* 59: 401-57.

[321] In Gale's formulation, the three theses are meant to reflect the layout of the B-theory above so that each tenet is either the contradictory or contrary of the corresponding B-theoretic thesis. I am inclined to disagree with Gale since to my understanding there is no clear one-one mapping between the two groups; rather it seems that some overlapoing between different tenets. For instance, the A-theoretic Objectivity Thesis is allegedly the contradictory or contrary of the corresponding B-theoretic one but not only: the objectivity of the A-series also denies part of what the B-theoretic Reducibility Thesis claims, to wit the Psychological Reduction.

[322] Broad, C.D. (1938). *Examination of McTaggat's Philosophy*: Vol. II, Part I. Cambridge: Cambridge University Press.

viewed from (for this reason spatial betweenness is fundamental whilst temporal betweenness is not as we shall see). However, this spatial series will not have any intrinsic direction since to decide which member is to the right or left to another one is instead a matter of the position from which the members are viewed. Therefore, its order is extrinsic to the series. To recap: spatial relations like 'to the right of' or 'to the left of' are three-place: they include a third relatum, a point/position in space, an angle, etc. from which one member is to the right or to the left of another. Such series has no asymmetric dyadic relation intrinsic to it.

Along the same lines, in addition to having an intrinsic order, a temporal series has an intrinsic direction or sense for each of the generating relations 'earlier than' and 'later than' do not involve any reference to some third term; they are asymmetric dyadic relations. If Marco Pantani's 1998 Tour de France win occurs earlier than Bradley Wiggins' 2012 win, then there is no need to say from which alleged third position or angle such wins are considered; they stand in such a relation so that it is always the case (and it is not going to be otherwise) that the happening of the former is earlier than the latter, and that the occurring of the latter is later than the former.

(ii) The claim that the direction or intrinsic sense of a temporal series depends on its members undergoing temporal becoming is more controversial. Broad secures time to becoming in a way that without becoming or what he calls the 'transitory aspect of temporal facts', a temporal series would not have an intrinsic direction and so would be indistinguishable from a spatial one. Insofar as the members of a B-series undergo temporal becoming, then the series in question is temporal and can be distinguished from a non-temporal one. Curiously, the reason for this commitment seems to lie in what characterises the B-theory generative relations of 'earlier than' and 'later than; to wit their logical properties of irreflexivity, asymmetry, and transitivity which as they stand, may well characterise non-temporal relations as well notwithstanding the difference that actually it looks like we seem to know quite well that a non-temporal series is essentially different from a temporal one. Thus, on Broad's view, what sanctions the distinction or the breaking down of the analogies between space and time is indeed temporal becoming. In short, if the B-series has an intrinsic direction, as it does, it can only be because of the temporal becoming for if a direction has to be introduced into a one-dimension ordered spatial series, it has to be done extrinsically.

No B-theorist would perhaps find (ii) attractive in the slightest, for it links a genuine time series to temporal becoming in a way that without the latter the former would not be temporal. Clearly, any B-theorist would consider any B-series temporal without having to subscribe to temporal becoming. She would agree that the generating B-relations 'earlier than' and 'later than' are indeed dyadic and that a B-series is temporal but she would deny their dependence upon temporal becoming. What confers direction or sense to a series, replacing *ipso facto* the need to postulate the temporal becoming, are instead certain physical facts to be found as intrinsic to the B-series of physical events.[323]

In addition to what has been said so far, there is another way available to the A-theorist to argue against the B-theoretic Reducibility Thesis, one which hinges upon language. Turning on its head the B-theory's Linguistic Reduction Thesis (α), the A-theorists claim that not only is the A-series necessary but it also happens to be *fundamental since*, at rock bottom, the B-series is reducible to the A-series. Take a tenseless statement like 'Marco Pantani's Tour de France win is earlier than Bradley Wiggins''; from an A-theoretic point of view the meaning of the statement would be something like this: 'When Marco Pantani's win is present, Wiggo's win is future, and when Wiggo's win is present, Marco Pantani's win is past'. Since B-relations are analysable in terms of A-determinations (and thereby reducible), then, *contra* (α), A-statements cannot be adequately translated into B-statements without any loss of meaning. And the reason seems to be that what the B-statement does not assert is the fact that the reported event is past, present, or future as the A-statement evidently does. Arguably, there is a loss of meaning in the translation and more to the point an asymmetry in the information conveyed between an A- and a B-statement. When we say that Marco Pantani's win is present while Wiggo's win is future we automatically claim

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[323] Or as Nancy Cartwright objected in conversation: "the eternalist can claim that the generative relations just are different from other ordering relations like 'larger than'. And it is the fact that these are temporal relations that makes the series temporal." I am not sure but I think there might be a sense in which Nancy's point sounds somehow circular. The problem seems to be what makes a temporal series temporal, to wit why a temporal series has a direction. Therefore the analyses offered by Broad and by the a B-theorist purport to account for what makes this the case. In both cases, the account consists in breaking down the temporal series as to pick out what could be a good canditate to discriminate between a temporal series and one which is not. To claim that this happens in virtue of the B-theoretic generative relations which are in principle temporal and for that very same reason the overall series results temporal sounds like postulating what should instead be demonstrated. In addition, there is the question whether the B-theoretic generative relations can actually be temporal in their own right, namely if they are able to confer a direction to a series making it *ipso facto* temporal. And as Broad remarks, looking at their logical properties (irreflexivity, asymmetry, and transitivity) they may not be unique to temporal relations. Actually, they happen to characterise non-temporal relations as well we seem to know quite well that a non-temporal series is different from a temporal one.

that the former comes earlier than the latter, but when it is said that Marco Pantani's win is earlier than Wiggo's nothing is said of their status in terms of past, present, and future. Detensing the language fails.[324] Ordinary language is tensed, and referring expressions are among the elements of it; elements that only a tensed language can suitably render. When we speak, we are the centre of orientation both of space and time so that the question whether the object of our attention and awareness exists is always crucial. For this reason, the attempt to assimilate tensed existential statements to the tenseless framework of existential quantification employed in logic and mathematics seemingly falls through.

At last, another aspect of the B-theoretic Linguistic Reduction which could be attacked by the A-theorist is the token-reflexivity, or the alleged self-referring of A-statements.[325] Even though A-statements were token-reflexive[326], Broad claims, this would not eliminate a reference to any event's A-determinations: suppose on the 22nd of July 2012 we utter 'Wiggo's Tour the France win is present', this would likely be translated into 'Wiggo's Tour the France win is simultaneous with this utterance'. However, it is clear that the translation leaves something behind: there is still a reference to an A-determination of the event since the expression 'this utterance'

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[324] In the light of what has been pointed out above about the differences between the old and the new B-theory of time, I shall assume the statement in the main text as uncontentious. Perhaps, after the new B-theory of time distanced itself from the language reduction, the remark made by the A-theorists may sound petty. However, in the hindsight of how the dispute unwound, the A-theorists were urging on quite a good point.

[325] "A token-reflexive expression is one like 'I', 'here', 'now', whose essential occurrence in a sentence renders that sentence capable of bearing different truth-values according to the circumstances of its utterance - by whom, when, and where it is uttered, to whom it is addressed, with what gestures it is accompanied, and so forth." Dummet, M. (1978). *Truth and Other Enigmas.* Cambridge, Mass.: Harvard University Press, 353. For a quick overview of the dispute see Mellor, D.H. (1981). *Real Time*. Cambridge: Cambridge University Press, 101. Lowe, E.J. (1998). *The Possibility of Metaphysics: Substance, Identity and Time.* Oxford: Oxford University Press, 89-96.

[326] Which does not seem to be a big deal: "there is no inconsistency in adhering to a tensed view of time while also endorsing a token-reflexive account of the truth-conditions of tensed sentences. There would only threaten to be an inconsistency here if one were to suppose that tensed sentences can be given *tenseless* token-reflexive truth-conditions. [...] if one *uses* tenses in giving the truth-conditions of tensed sentences, there is a sense in which such an account of their truth-conditions cannot be fully explanatory of their meaning. But this is a familiar feature of truth-conditional semantics quite generally: for instance, quantifier phrases are standardly *used* in giving the truth-conditions of quantified sentences, on both objectual and substitutional accounts of the semantics of quantifiers. [...] We have to live with the fact that certain notions are so fundamental that no reductive account of them can be supplied: the notions of existence and identity are plausible candidates, but so too, I would urge, are the notions of past, present, and future. I take this irreducibility claim to be part of what the tensed view of time is committed to." Lowe, E.J. (1998). *The Possibility of Metaphysics: Substance, Identity and Time.* Oxford: Oxford University Press, 91.

means[327] 'the utterance we are presently making (or making at present)'. If tensed utterances are intrinsically tensed (past, present, or future) then events bearing B-relations to these utterances are clearly intrinsically tensed.

It is worthwhile to note that the Objectivity Thesis consists of two strands: (γ) the objectivity of the A-series and temporal becoming; and (δ) the fact that there are important ontological differences among past, present, and future.

(γ) From the A-theoretic reduction thesis it follows that the A-series is objective for it does not depend upon a language user or a perceiver. Another objection which can easily be levelled against the B-theoretic psychological reduction (and consequently against the reduction of A-determinations to B-relations) is that the series of somebody's mental events that runs in conjunction with the series of her physical events forms an A-series. Mental states evolve over time, if for this reason they are intrinsically past, present, and future, then the corresponding objects of these states which are concurrent with them must be past, present, and future as well. If temporal becoming is intrinsic to the former, as it doubtlessly, then it must be likewise intrinsic in the latter.

(δ) From the objectivity of the A-series and temporal becoming, generally A-theorists claim that there are crucial ontological differences between past, present, and future. The future is open, somehow changeable, the realm of possibilities *par excellence* whereas the past is closed, immutable. The present is a sort of limit between the two. These ontological differences reflect logical and semantic ones: for instance, in their logical form, while statements about the future must be general, those about the past can be singular; and whilst all statements about the past are either true or false, some about the future are neither true nor false.[328]

Finally, the nature of change thesis. The A-theory challenges the B-theoretic analysis of change *in* time as a change in the B-relations between events or states belonging to the history of a single thing. Given the A-theoretic reduction thesis, B-relations are dependent upon A-determinations; thus, A-theorists agree with B-theorists

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[327] This might not be accepted by all, and some, following Kaplan, might think that the content and the character of a demonstrative can be given tenselessly.

[328] See footnote 289. Identifying the A-theory with presentism (or the idea that they overlap to a great extent) is misleading. The A-Theory claims that past, present, and future have crucial ontological differences. Presentism claims that only the present is real which implies that the past and the future do not. If so, then there is a sense in which there is a crucial difference between the present, and the past and the future, as the A-theory wants to claim. The former exists, the latters do not. However, this attitude denies the difference in the ontological status between the past and the future which reflects the logical and semantical differences.

that change in time necessarily involves B-relations between events, however they disagree on which ones are fundamental. From this it follows that there cannot be change in time without the A-series. Consequently, the attempt to reduce or represent change *of* time (temporal becoming) as change in time is doomed. If temporal becoming is represented by analogy with some sort of motion along a line or a one-dimensional, ordered, spatial series then it may well be reduced to change in time. But it is argued that the manoeuvre would be somehow vicious: if the present is considered a spotlight moving along a line this would imply the further question of how fast the spotlight moves. Therefore, all representations of temporal becoming in terms of some kind of change in time would fall afoul since motion presupposes becoming.

To conclude, the A-theory agrees with McTaggart's positive thesis: the A-series is necessary and fundamental to time, but it disagrees with his negative thesis: the A-series involves a contradiction. McTaggart's failure to combine the B- with the A-series and the static with the dynamic view exemplified by the two series is caused by McTaggart's substantialisation of the events in the B-series which in turn caused him to think of temporal becoming as a sort of motion, the A-series moving up the B-series. The cause of McTaggart's mistaken substantialisation is that he thought of the events in the B-series as if they must always coexist due to the timeless nature of the B-relations. Such B-theoretical events are treated as existing before as well as after their quick lighting up in the present of the spotlight. But this brings about several problems as in the attempt to reduce change of time (temporal becoming) to change in time. For an A-theorist, at rock bottom, there is no incompatibility between temporal becoming and the permanent nature of B-relations.

As for the inherent contradiction that each event has all three mutually exclusive A-determinations, clearly the A-theory could not employ the B-theoretic approach appealing to the reducibility of A-determinations to B-relations. Rather, the A-theory claims that because change of time is intrinsic to all events, there is indeed no contradiction that requires to be explained away. There would be a contradiction only if in a single utterance an event would be said to have two or more A-determinations, as in 'Wiggo's tour the France win is present and future' but there is no evidence in our experience that this can be significant.

A-determinations are primitive and not further analysable. The meaning of 'Wiggo's win is present' can entail 'Wiggo's win is present at a moment which is

present' without meaning it. Therefore McTaggart's alleged infinite regress, if there is one, is not vicious: a regress of entailing not meaning. There is no need to recur to a second-order A-series to explain an event having A-determinations.

So much for this quick fly-by over some issues which have been heating the contemporary debate about time. On pain of repeating myself, the overview is far from being exhaustive or systematic; admittedly, at no point completeness or a systematic investigation have been among the desiderata to be achieved in the chapter. On the contrary, the attempt has been to tease out, quite broadly, some of the issues which have kept philosophers of time busy in the recent years (issues relevant to the purposes of the argument I have been trying to devise in this thesis) but at the same time enough fine-grained to actually see if and where in the current debate about theories of time, a view of time like the one ventured in chapter 2.2 could fit in.

This analysis of the different views of time has been pursued with an emphasis on fleshing out what intuitions and assumptions were lurking in the background as well as what implications and commitments they happen to have. This was done in a manner in keeping with Lowe's claim quoted in the chapter mentioned above (the distinction between a static and a dynamic view of time and how Lowe's hypothesis of time as extended and a dimension in which reality is extended would then be evaluated from the two perspectives).

Apart from the mere recognition that intuitions and common sense considerations turned out to be a *leimotiv* all along the thesis, the reason for such an attentive approach is basically to see how far the intuitions I happen to have as well as some common sense considerations I happen to make, which led to the account of time built in chapter 2.2, square or hang together with those that different theories of time allegedly try to preserve. This is also why the brief outline of theories of time above has been framed drawing upon Baron & Miller's way of presenting the debate[329], to wit parting ontological theses from others which urge on different elements of time, e.g. static versus dynamic aspects.

My personal feeling is that, if we weight the account of time envisaged in chapter 2.2 in the light of the ontological theses outlined above as well as the static and

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[329] Baron, S. & Miller, K. (2013). "Characterising Eternalism". In R. Ciuni, K. Miller & G. Torrengo (eds.) *New Papers on the Present*. Philosophia Verlag: 31-67. See also Miller, K (2013) "The Growing Block, Presentism and Eternalism". In H. Dyke & A. Bardon (eds.) *A Companion to the Philosophy of Time*. Wiley-Blackwell: 345-365.

dynamic theses that the contemporary theories of time seem to be committed to then it seems that that account of time would fit quite nicely with an eternalistic view of time whereby past, present, and future moments, objects, or events all exist; or as Sider claims,[330] if such an eternalistic account of time is combined with a 'reductionist account of tense' then perhaps the view of time which could at best accommodate the account of time developed in chapter 2.2 could be the B-theory of time.[331]

[330] Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time.* Oxford: Oxford University Press, 14. Although Sider himself employs the expression 'reductionism about tense', still there may be a sense in which the phrase could sound clashing with how I framed the distinction between the old and the new B-theory of time; namely, the fact that the new B-theory of time refutes the linguistic reductionist thesis. If this is the case, then either Sider has in mind the old B-theory of time which would sound a bit preposterous at that point in time, or he is simply referring to the fact that although the old way of the translation of tensed sentences into tenseless fails, still at rock bottom tensed sentences do not carry out any additional philosophical work to what tenseless sentences already provide. Therefore, in this sense the B-theory of time could be reductionist.

[331] To summarise: we have seen that the idea that time is a dimension can be made use of through the idea that different times coexist. There is a wide variety of different views in the literature as I tried to point out, some of which share this ontological thesis, and some which do not. It appears that eternalism and the moving spotlight do share it, whilst presentism and growing blockism do not. Further, it seems that eternalism is accommodated by the B-theory, but not by the A-theory. In short, we can make sense of time as perdurance would require it, and such a view of time can be found in eternalism and the B-theory. For the record, there are another couple of views which do not neatly map into my distinction; for example, McCall's *Shrinking Block* according to which there is a tree of possible futures which loses branches as time progresses (McCall, S. (1994). *A Model of the Universe: Space-Time, Probability, and Decision.* Oxford: Oxford University Press.); and Michael Tooley's idea that reality consists merely of tenseless facts, the future is unreal whereas past and present are real (a somehow intermediate position between the tenseless and the tensed theory of time. See Tooley, M. (1997). *Time, Tense & Causation.* New York: Oxford University Press.). However, what matters is that both do not comply with the ontological thesis; since they do not then they are not compatible with perdurance.

2.3 Part II: *Conclusions*

Let us begin recalling the issue that this second part of the thesis on time was supposed to address. The aim was to test the initial core of intuitions and common sense considerations which seem to sit in the background of the notion of temporal parts, to wit the evidence that things seem to have parts in time as they do in space; and to see how it influenced the philosophy of time, through moving us to consider space and time as similar in some respects. To that extent, in chapter 2.2 I ventured a picture of time which, drawing upon Sider's three respects in which space and time are alike and Lowe's account of time as extended (and considered as a dimension in which reality is extended), could comply with that core of intuitions and common sense considerations. The presumption is that such an initial core, if developed as in Part I and II of the thesis, could motivate a view of time the likes of eternalism and/or the B-theory.

Admittedly, in order to reach this stage the argument turned out quite laborious. Starting with the analysis of the similarity thesis which the core of intuitions and common sense considerations above mentioned seem to yield to (chapter 2.1). Followed by the attempt to sketch a picture of time which could in turn comply with the similarity thesis on the one hand, and the core of intuitions and common sense considerations itself on the other (chapter 2.2). Finally, giving a brief overview of the state of the play of the current debate in philosophy of time of which only a few issues have been singled out; that is, those somehow relevant to the aims of my argument (chapter 2.3).

If the three previous chapters focussed, say, on analysis (of the similarity thesis, of how time would look if things were to take it up by having parts in it, and of some issues in the current debate in philosophy of time); the aim of this last one would be ideally to synthetise, indicating whether and how a view of time like the one tentatively developed in chapter 2.2 would fit within the plethora of views about the nature of time. In the light of the conclusions of the previous chapters, there seems to me a robust sense in which the picture of time in question motivates an eternalist and/or B-theoric view of time. I shall show why I think this to be the case in the following of this chapter.

First things first, I shall recall the conclusion of chapter 2.2, namely what time would be like if things were to take it up by having parts in it (as they do in space): (i) it

would have to be extended, somehow qualifying as a dimension;[332] (ii) it would be a continuum[333] (although nothing crucial depends on it for the conclusion of my argument); (iii) all the instants, objects, or events past, present, and future must coexist;[334] and lastly which follows from (iii), (iv) anytime in the series could be 'now' (from some perspective, as anywhere is here).

Let us now ask, given this picture of time, what theory of time among those highlighted in the previous chapter would be suggested by such a view. To answer this question, I believe it would be best to recall the distinction between the ontological on one hand, and the static/dynamic theses on the other, illustrated in the chapter above: the Eternalism Ontological Thesis[335], the Presentism Ontological Thesis[336], the Eternalism Static Thesis[337], and the Presentism Dynamic Thesis[338]. Since all the instants objects, or events past, present, and future must coexist as in (iii), then clearly this picture of time would hang together with the Eternalism Ontological Thesis quite nicely. For the same reason, it would not fulfil the conditions posited by the Presentism Ontological Thesis; it is true that the present moment, objects, or events exist however, they are *not* the only things to exist. Past and future instants, objects, or events exist as much as the present ones. If compliance with the Eternalism Ontological Thesis sounds plausible, then we will have to decide which one would be the best candidate between eternalism and the moving spotlight theory since both, as we established, endorse the Eternalism

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[332] "A set of relations [spatial or temporal] serve to distribute the entities related by them along one or more dimensions only if there is a sense in which entities standing in those relations must coexist." Lowe, E.J. (2006). "Endurantism Versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 719.

[333] "we are dealing with continuum properties, we are dealing with what constitute a common denominator of space and time and hence we shall find space strictly resembling to time." George Schlesinger. See Schlesinger, G. (1975). "The Similarities Between Space and Time". *Mind* 84: 162.

[334] "There is a totality of coexisting entities [...], namely, the totality of all events spatiotemporally related [...] If we want a term to characterise this sense of coexistence, we could say that [...] all these events coexist *in actuality*, or are *coactual*." Lowe, E.J. (2006). "Endurantism Versus Perdurantism and the Nature of Time". *Rivista di Filosofia Neoscolastica* 4: 719.

[335] The eternalism ontological thesis claims that all moments, objects, or events - past, present, and future - exist or occur in a four dimensional block of space-time.

[336] The presentism ontological thesis claims that *only* the present moment, objects, or events exist.

[337] The eternalism static thesis claims that the present moment does not move since all the entities - them being instants, objects, or events - coexist, which implies that there is no turnover of entities. Which moment is the present moment does not change.

[338] The presentism dynamic thesis claims that the totality of what exists changes over time. A different moment, set of objects, or events take over as a new *present* moment comes into existence, whereas the previous moment, set of objects or events goes out of existence as soon as that moment ceases to be the *present*.

Ontological Thesis. In fact, the moving spotlight theory holds that in addition to what the Eternalism Ontological Thesis expresses, there is an objective property, presentness, which moves across the block universe lighting up different times, objects, or events. Following from this, clearly the picture of time drafted in chapter 2.2 cannot suggest a view of time like the growing block theory since according to the latter past and present moments, objects, or events exist but future do not. Also, the present moves so that what moment is the present moment changes.

Thus, if the evidence suggests dismissing both presentism and the growing block theory (for the reasons offered above) then it all seems to come down to eternalism and the moving spotlight theory[339]. As soon as we redirect our attention away from the ontological theses and towards the dispute between the static versus dynamic ones then the balance may well tip for one or the other. Between the Eternalism Static Thesis and the Presentism Dynamic Thesis, the one which seems to represent at best the ontological implications of the picture of time ventured in chapter 2.2 is the former, according to which the present moment does not move, which moment is the present moment does not change; whereas, what the Presentism Dynamic Thesis claims is that a different moment, set of objects or events take over as a new *present* moment comes into existence, whereas the previous moment, set of objects or events goes out of existence as soon as that moment ceases to be the *present*.[340] Therefore, it can be concluded that between the two, eternalism and the moving spotlight theory, the one

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[339] A world in which the moving spotlight were true would be one in which all moments, objects, or events - past, present, and future - exist (or are located) in a four dimensional block of space-time; a space-time in which there is objective becoming though: namely, which moments, objects or events would be present changes from one moment to another.

[340] See Baron, S. & Miller, K. (2013). "Characterising Eternalism". In R. Ciuni, K. Miller & G. Torrengo (eds.) *New Papers on the Present*. Philosophia Verlag: 31-67. Miller, K (2013) "The Growing Block, Presentism and Eternalism". In H. Dyke & A. Bardon (eds.) *A Companion to the Philosophy of Time.* Wiley-Blackwell: 345-365. In conversation, Dr. Pearson called my attention to the fact that the moving spotlight theory may not actually claim what all that the Presentism Dynamic Thesis entails. Rather, what it requires is merely the property of presentness to move; in which case there is no clash with the idea that all moments coexist. I take the point, and perhaps I should amend the Presentism Dynamic Thesis in terms of presentness rather than existence (but of course from a presentist point of view they tend to coincide). What is at stake is that the moving spotlight theory fails to comply with Sider's third respect in which space and time are alike, namely in terms of the relativity of here and now (everywhere is here, anytime is now). Arguably, a moving property of presentness seems to yield a difference in the status of instants, objects, or events which are present compared to those which are not such that 'now' is not 'anytime' but rather 'now' is whatever instant which is currently lit by the property of present. The same instant will cease to be present and thereby 'now' as soon as the properties of presentness moves on.

which is motivated by that picture of time elaborated above is the former rather than the latter.[341]

Unfortunately, it appears that we cannot rest content with this answer alone. There might well be a further question lurking underneath, in particular in the light of the distinction between the A- and the B-theory of time raised above, altogether with what Sider claims to be the third respect in which space and time are alike, i.e. the relativity of here and now, and lastly considering Sider's comment that this latter element, together with eternalism yields the B-theory of time.[342] If Sider is right, then apparently the theory of time whichis motivated by the picture drafted above is the B-theory.

Sider may well be right, however it seems to me that there might be a sense in which we could do away with committing to the B-theory.[343] For example, given that the Eternalism Ontological Thesis and the Eternalism Static Thesis is all there is to eternalism, there seems to be a sense in which the thesis of the relativity of here and now as broadly put forth by Sider is somehow included in both (likewise the thesis that time does not pass, as argued above). If all the instants, objects, and events (say past, present, and future) coexist (the Eternalism Ontological Thesis), and the present moment does not move, change, or light up different times, objects, or events (Eternalism Static Thesis); then it seems to me that there is a sense in which any point whatsoever in the series is here and any time is now. As there is no privileged point in space to be considered the 'here', so there is no privileged instant of time to be considered as the 'now'.

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[341] The reasons which motivate the rejection of the Moving Spotlight theory are elaborated in detail on p. 159-61.

[342] "[...] if I say "here it is sunny" and [my brother in Chigago] says "here it is raining", we do not really disagree. What is called "here" changes depending on who is speaking: I mean New Jersey, he means Chicago. There is no one true *here*. [...] the word 'now' works analogously. Imagine [a] dinosaur [...] saying "It is now the Jurassic Period". I, on the other hand, say "It is now 2006". According to the relativity of 'now', the dinosaur and I do not really disagree. There is no one true *now*. What is called "now" changes depending on who is speaking: I mean 2006, the dinosaur means the Jurassic Period. *The combination of this theory of the function of 'now' and eternalism is often called the "B-theory of time* [my italic]". Sider, T. (2008). "Temporal Parts". In T. Sider, J. Hawthorne & D.W. Zimmerman (eds.) *Contemporary Debates in Metaphysics*. Blackwell Publishing Ltd, 241-62.

[343] The B-theory comes with a whole lot of additional commitments the likes of The Psychological Reduction (the A-determinations involve a B-relation to a perceiver therefore temporal becoming is psychological); The Objectivity Thesis: (the B-series is objective, all events in the series are equally real); and The Nature of Change Thesis: (Change is analysable in terms of B-relations between qualitatively different states of one single thing); and perhaps, we might not be so willing to take them onboard. Also, eternalism might well be liable of an A-theoretic reading as in Zimmerman, D.W. (2005). "The A-theory of Time, The B-theory of Time, and 'Taking Tense Seriously'". *Dialectica* 59: 401-57.

Thsi being so, then we may well conclude that according to the picture of time tentatively formulated in chapter 2.2 (as a result of the previous investigation of what lies in the background of the notion of temporal parts, namely the evidence that things have parts in time as they uncontentiously do in space) the view of time in the contemporary debate in philosophy of time which is motivated by it is, minimally in the sense of avoiding unneeded commitments, eternalism.

Granting the conclusion just stated above, what seems to be interesting is to see if this commitment to eternalism can in turn result in a further commitment to a specific view of existence. As remarked above, the dispute among different theories of time is first and foremost a controversy about what exists; they all attempt to unravel and establish the temporal as well as the ontic structure of the world. If this is the case, it then seems to me fairly plausible to suppose or speculate that perhaps a combination of a view of persistence like perdurance and a view of time like the one elaborated above might motivate a specific view of existence. And this is exactly what shall be investigated in the third and last part of this thesis.

Part III: *Existence*

As mentioned in the Introduction, existence appears to be crucial and conducive to a correct understanding of persistence, in Lewisian terms. Recalling his definition, 'something persists iff, somehow or other, it *exists* at various times': clearly, an entity must exist at all for it to exist at one time, and then, allegedly, at others. Existence appears also to play a decisive role when it comes to the correct understanding of some decisive issues in the philosophy of time, as pointed out in chapter 2.2. Therefore, following from the evidence spelt out early on in the thesis, it seems legitimate to conclude that existence deserves to be investigated.

Thus, I shall start off this chapter with a brief overview of some issues, relevant to my purposes, which have been characterising the philosophical debate about existence, at least in more recent times. For considerations similar to those advertised in Part I on the topic of persistence, and in Part II regarding time, I will not attempt a full exposition of the topic. Instead I will highlight various themes, most of which tracing back to Aristotle, Kant, Frege, Russell, Quine. For example: existence as a first-order vs. second-order predicate; the claim that being is the same as existence and so existence is univocal; the fact that such a univocality is at best captured by the existential quantifier of the standard quantificational logic; and finally that the objectual is the most adequate interpretation of quantification. The aim of the brief overview will be to point at a view of existence which is motivated by the combined outcome of the investigations pursued in Part I and II: as for the former, the evidence that the notion of temporal parts rests on a solid basis of intuitions and common sense considerations, namely the fact that things seem to take up time as they take up space by having parts in it, which in turn appears to convey the idea that space and time are alike in some respects. As for the latter, the fact that the theory of time which seems to comply with the picture of time ventured drawing upon Sider's three respects in which space and

time are alike, and Lowe's argument to the conclusion that time is extended (and a dimension in which reality is extended) only if instants, objects, or events in time coexist. The view that I have in mind which can be motivated by this is a view of existence *a là* Quine. In other words, the question is, given a certain view of persistence and time, perdurance and eternalism, which view of existence is suggested by them or less cautiously which view of existence are we committed to?

Further to this, I shall also flag *en passant* a related issue: whether the apparatus of standard first-order predicate logic is seemingly the best suited tool to carve reality at its joints (such a view has been called into question earlier on at the end of chapter 1.3.4). I shall again call this view into question presenting some contentious implications of some features of the contemporary Quinean second-order predicate view of existence, and secondly pointing out their philosophical, semantic, and common sense entailments.

As in Part I (and contrary to Part II), in Part III my overall attitude and approach will perhaps appear overly critical. This is the consequence of my strong intuitions about change as advertised at the outset of Part I: change is a pervasive feature of reality, a metaphysical datum, which can hardly be downplayed. Similarly, existence, given its intimacy with persistence (and thereby change) as argued at the outset of this chapter as well as in the Introduction, seems so too. Things change, some things go out of existence, some others come into existence: if I run over a banana with my bike, what is left smashed on the ground is no longer a banana. Some things carry on existing despite the turnover in some of the features that they exhibit: a banana is green but then it becomes yellow when it ripens. Something about that banana which was green is no longer so (perhaps it went out of existence) but something else took over (perhaps coming into existence) so that the banana turned yellow.

This awareness will affect the following exposition of existence as it affected the presentation and discussion of temporal parts. If it was not so much of an influence on the investigation in Part II, this was surely because my intuitions about time are less vivid and robust than those I have about change and existence. Hopefully, the critical attitude will yield to a constructive investigation of existence with a view to teasing out some of the commitments of Quine's view, those which, I believe, could potentially end up clashing with the original and undeniable metaphysical datum according to which things change which moved the whole investigation in the first place.

3.0 *The Notion of Existence*

The statement that existence is a predicate (and a property)[344] is quite uncontentious in the philosophical literature, however as soon as we attempt to qualify it further - asking e.g. what kind of property existence is, and if a property at all, what are the bearers of such a property, or if there are entities that lack it - then the debate becomes heated. Before tackling the issue whether existence is a first- or second-order predicate, I shall briefly outline in what sense existence *could* be seen as a property. Take the uncontentious sentence 'Mars is red'. The planet Mars exhibits the property of being red. Mars is allegedly an individual substance[345] which instantiates the property 'being red' although it (Mars) is not itself instantiated by anything else.[346] Take now the as much uncontentious sentence 'Mars exists'. Let us say that in this case the planet Marts instantiates the property 'existing'. If so, then an interesting question to ask would be whether existence is a property similar to redness (and 'exists' a predicate like 'is red'), and whether or not it can be instantiated by individuals like the planet Mars. Perhaps, a sound assessment of such a questions would presuppose a preliminary appreciation of a more intricate issue, to wit a theory or conception of properties; an issue which in turn may well affect the logic of sentences like 'Mars exists': e.g. whether the logical form of such a sentence is really subject-predicate as we ordinary believe, and thereby if 'exists' is really a predicate of individuals. I shall attempt to make clearer some, although not all, of these issues and their interrelations in the following of this chapter.

There is a distinguished and quite elaborated line of thought which, drawing upon Aristotle's contention that there seems to be nothing more to existence than

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[344] Perhaps it is the word 'existence' which is a predicate whereas existence itself (what the word indicates) is a property.

[345] I take quite uncontentiously the expressions 'individual substance' and 'bearer of properties' to be synonymous; in the sense that they are characterised by properties but not themselves characterising.

[346] I shall remain metaphysically neutral about what an individual substance is.

essence[347] - a position questioned later on by Saint Thomas Aquinas[348]- denies that existence is a property of individual substances. Such denial can be motivated in two distinct ways: the first one (i) draws upon Kant and the question of what existence would add to an object. The status of *existence* as a predicate, as in "Mars exists", was exemplary called into doubt when the philosopher from Konigsberg remarkably stated (while arguing for the fallacy of the infamous Ontological Argument) that 'existence is not a *real* predicate'; that is, the concept of existence does not add anything to the concept of the subject in a subject-predicate sentence. There is no difference in content between 100 thalers and 100 *existing* thalers.[349] In Kant's words:

> "[W]hen I think a thing, through which ever and however many predicates I like [...] not the least bit gets added to the thing when I posit in addition that thing is. For otherwise what would exist would not be the same as what I had thought in my concept, but more than that, and I could not say that the very object of my concept exists."[350]

In order to be red, Mars must exist, for only existing things can instantiate properties: existence is conceptually prior to predication.

The second way (ii) hinges upon the problem of negative existentials. Frege[351] and Russell[352], as a development of Kant's objection, claimed that existence is a *second-level* predicate and property (a property of concepts, for Frege; and a property of propositional functions, for Russell): 'exists' is used to predicate a certain property (existence) of another property, no longer a property of an object (to figure this out, it

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[347] See Aristotle's *τὸ τί ἦν εἶναι*: *Metaphysics*, Z, 4-5. See Locke's "the very being of any thing, whereby it is, what it is." Locke, J. (1975). *An Essay Concerning Human Understanding*. In P.H. Nidditch (ed.) Oxford: Clarendon Press, III, III, 15. See also Lowe, E.J. (2008). "Two Notions of Being: Entity and Essence". *Royal Institute of Philosophy Institute Supplement*, 62, 23-48.

[348] Existence is something additional to essence. Existence is a separate property since it may not be part of an object's nature, and therefore such object may be thought of as separate from its existence. See Aquinas, T. (1968). *On Being and Essence*. A. Maurer (Trans.). Toronoto: Pontifical Institute Medieval Studies.

[349] Kant, I. (1929). *Critique of Pure Reason*. In N. Kemp-Smith (ed.). London: Macmillan.

[350] *Ibid.* A600/B628.

[351] Frege, G. (1884). *Die Grundlagen der Arithmetik*. English translation: J.L. Austin, *The Foundations of Arithmetic*, Oxford: Blackwell, second revised edition 1974; and (1892). "Über Sinn und Bedeutung," *Zeitschrift für Philosophie und philosophische Kritik*, 100: 25–50; translated by M. Black in P.T. Geach & M. Black (eds.), *Translations from the Philosophical Writings of Gottlob Frege*, Oxford: Blackwell, 1980, 56–78.

[352] Russell, B. (1903). *Principles of Mathematics*, Cambridge: Cambridge University Press; (1904), "Meinong's Theory of Complexes and Assumptions (I)," *Mind* 13: 204-19; and (1905*a*). "On Denoting". *Mind* 14: 479-93.

may be useful to note the difference in terms of syllogistic logic and subject-predicate sentences in Kant and the new developments of logic in Frege and Russell). In "Mars is red" the predicate 'is red' is first-level which is used to predicate the property of 'being red' to a certain object, Mars. By contrast, in 'Mars exists', 'exists' is used to predicate the property of 'having an instance of' to the property of 'being Mars'. 'Mars exists' amounts to 'The property of being Mars has the property of having an instance': ∃*x*(*x*=Mars). '*x*=Mars' is the first-level property whilst '∃*x*...*x*' is the second-level property. So a subject-predicate sentence as in Kant (and previously in Aristotle) is just a sentence constructed out of two predicates of two different levels (so that it is no longer a subject-predicate sentence).

Regardless of Kant's considerations, the truly persuasive argument for embracing such a second-order view of existence came from Russell[353] who claimed that denying existence as a first-order property is the only way to avoid the extremely unwelcome consequence that there are non-existing things (also known as the problem of negative existentials[354]), as well as the distinction between being and existence. Russell articulated this thesis as a response to Alexius Meinong's contention that there are things which do not exist.[355] On Meinong's view, existence is a genuine property of individuals, although not universally had. Take the presumably true sentence 'Pegasus does not exist'; in order to be true, the subject, 'Pegasus' must designate an entity which does not exist or of which non-existence is truly predicated. This being so, there are things, those designated by some singular terms, that do not exist. But this would fly in the face of Russell's robust sense of reality, according to which everything exists (see also Quine in the following).[356] Therefore, we should refrain from claiming that existence is a property of what subject terms designate in existential sentences.

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[353] Russell, B. (1905*b*). "Review of: A. Meinong, *Untersuchungen zur Gegenstandtheorie und Psychologie*". *Mind* 14: 530-38; and (1907). "Review of: A. Meinong, 'Über die Stellung der Gegenstandstheorie im System der Wissenschaften'," *Mind* 16: 436-39.

[354] More on this in: Kneale, W. & Moore, G.E. (1936). "Is Existence a Predicate?". *Proceedings of the Aristotelian Society. Supplementary Volumes*. 15: 154-88; Geach, P. & Stoothoff, R.H. (1968). "What Actually Exists". *Proceedings of the Aristotelian Society. Supplementary Volumes*. 42: 7-30; Griffiths, D.A. (1975). "D.F. Pears On 'Is Existence a Predicate?". *Mind* 84, 431-5; Miller, B. (1975). "In Defence of the Predicate 'Exists'". *Mind* 84: 338-54; Mackie, J.L. & Bednarowski, W. (1976). "The Riddle of Existence". *Proceedings of the Aristotelian Society. Supplementary Volumes*. 60: 247-65 & 267-89.

[355] Meinong, A. (1960). "On Object Theory". In R. Chisholm (ed.) *Realism and the Background of Phenomenology*. Glencoe: The Free Press. Translation of "Uber Gegenstandstheorie", in *Untersuchungen zur Gegenstandstheorie und Psychologie,* A. Meinong (ed.), Leipzig: Barth, 1904.

[356] It also gives rise to contradictions such as the round-square (and something like the existent present king of France both existing and not existing). See Russell, B. (1905*a*). "On Denoting". *Mind* 14: 479-93.

As briefly advertised in (ii), one way to get around this unwanted conclusion would be to claim that 'Pegasus' is not a genuine singular term, and that all negative existentials are ascribable to a general form: they assert the non-instantiation of a property. Take the sentence 'Some tame tigers exist'; the standard regimentation of the sentence in the language of the first-order quantificational logic is $\exists x(T_i x \ \& \ T_a x)$ where T_i is the translation for 'is a tiger' and T_a for 'is tame'. General kind terms like 'is a tiger' do not designate individuals, they instead designate properties so that a simple subject-predicate sentence like "Mars exists" is claimed to have a truer logical form like $\exists x(x=\text{Mars})$ (or $\exists x Fx$ where F is the property of being identical to Mars). Suddenly, negative existentials become unproblematic: the sentence 'Pegasus does not exist' becomes $\neg\exists x(x=\text{Pegasus})$ (or $\neg\exists x Fx$ where F is the property of being identical to Pegasus). If we take the *most inclusive domain of what there is* (all that exists), nothing (no matter what it is) in that realm of entities has the property of 'being Pegasus'. Thus, what this view comes down to is the idea that singular existentials as well as negative existentials are treated ultimatively as general existential claims.[357]

To conclude, the view according to which 'exists' is a second-level predicate and thereby existence a second-level property, as laid down by Russell, clearly depends upon two assumptions: firstly, in negative existentials, the negation takes wide scope; it never applies to the predicate alone. When we say that "Pegasus does not exist" what we really do is not to ascribe the predicate 'is non-existent' to the subject 'Pegasus', rather what we do is to place the phrase 'It is not the case that' on top of the sentence "Pegasus exists". Secondly, 'Pegasus' is not a referring expression; and what the predicate 'exists' means is just 'is instantiated'.[358]

However convenient (to get around the problem of non-existing things) the position just highlighted may sound, a small minority still want to believe that existence truly is not a second-level predicate. Take for instance the uncontentiously true sentence

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[357] Proper names, according to Russell, are disguised definite descriptions which are not genuine referring terms. They are, by contrast, quantificational expressions. The logical form of such expressions is quantificational in structure rather than subject-predicate. Therefore, supposing that the definite description associated with 'Mars' is 'the red planet which minimum distance from the Earth is 54.6 million kilometers', the standard regimentation of a sentence like 'Mars is thus-and-so' would be 'There is a unique red planet which minimum distance from the Earth is 54.6 million kilometers such that thus-and-so'. Individuals neither enter into the proposition expressed by the original sentence nor are part of the sentence's truth conditions.

[358] Clearly, Russell's view is an instance of a descriptivist theory of reference which matter-of-factly faces a number of objections. See Kripke's Semantic Argument and Modal Objection in Kripke, S. (1972). *Naming and Necessity*. Oxford: Blackwell.

‘Some things do not exist’. Uncontentiously true since we do usually take that some things like Pegasus, the Golden Mountain, Santa Claus, so on and so forth, do not exist. In the light of Frege and Russell’s account of existence as a second-level predicate, a sound regimentation, in formal language, of the sentence above would be $\exists x \neg \exists y(x=y)$ which sounds something like ‘There is something, *x*, such that there is nothing, *y*, so that *x* and *y* are identical’. That something is identical with nothing is clearly contradictory, thus despite the original sentence ‘Some things do not exist’ is true for the reasons offered above, yet its formal translation comes out self-contradictory. Therefore, if ‘Some things do not exist’ is really true, then the translation that Frege and Russell offer cannot be the most suitable one. Thus, in addition to taking issue with some features (and their consequences) of existence as a second-level predicate, what this last remark tacitly does call into question is a basic assumption of such a view (an assumption which is generally widely shared as I pointed out early on, see for example at the end of chapter 1.3.4), namely the belief that standard extensional logic carves reality at its joints. If it does, then seemingly in some cases as in ‘Some things do not exist’ it may not carve reality as deeply as it should (or conversely it may carve reality too deeply).

At this point, what rests to be done is to look at how Quine managed to implement this view of existence and how the implementation could have bearings which turn out to be important for my overall argument.

3.1 *Quine on Existence*

So much for Frege and Russell. I shall now move on to looking at how Quine managed to perfect that notion of existence, and how the philosophical work that he carried out could yield curious ontological consequences which could be interesting and useful for my purposes. In his 1948 ground-breaking work[359], the ontological problem can be stated in three words: 'What is there?' Accordingly, it would take one word only to answer: 'Everything', and everyone would accept it as true. I am myself undecided whether Quine can have such an easy win on this, therefore I shall play the devil's advocate and attempt to explain why there seems to be good reasons that *not* everyone would accept his answer as true.

Let us begin by looking at some plausible evidence. Suppose we go out there and haphazardly ask folk 'What is there?'. Suppose that they understand what I am asking, I am not so sure that they would reply with a *desertic* 'Everything'. Perhaps they will not. Presumably, they would say that there are things that exist (perhaps giving examples) and things that do not (again giving examples). The reason would be as simple as Quine's 'Everything': almost anyone even without a robust philosophical appreciation of the ontological problem, somehow intuitively distinguish between *existing* and *non-existing* things. Answering 'Everything' fails to recognise such a feature of our talking and thinking about the world.

Suppose instead, as it seems to me quite plausible (it is what I would answer), that they answer Quine's simple question with this simple answer: 'Everything *that exists*'. Would the two answers be equivalent? Clearly they would not, however on Quine's view they would. Leaving aside for now the further question of 'What are we asking when we ask 'What is there?'' - or the meta-ontological question, as in van Inwagen[360] - I shall briefly touch upon a case where the equivalence is defended quite strenuously[361]. As bizarre as it gets, the author of an introductory piece about ontology

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[359] Quine, W.V.O. (1948). "On What There Is" *Review of Metaphysics* 2: 21–38. Reprinted in his *From a Logical Point of View*, Cambridge, MA: Harvard University Press, 1953.

[360] van Inwagen, P. (1998). "Meta-Ontology". *Erkenntnis* 48: 233-50.

[361] See Lando, G. (2010). *Ontologia. Un'introduzione*. Roma: Carocci, 7-13.

as a discipline, endorsing a broad Quinean ontology, compares the ontological question "'What is there?' with a non-ontological one such as 'What did you eat today?'. In the former case, as the author argues, Quine's answer 'Everything' and my proposed amendment 'Everything *that exists*' would be synonymous, whereas in the latter they would not. Although I am inclined to agree with the author on the latter, at the same time I am inclined to disagree on the former: I cannot see a good reason why in the first case it should be the case whereas in the second it should not. Perhaps, a hint in that direction would be that what we take to exist is what we include by default within 'Everything', so that it is never possible to draw a line somewhere within the domain of 'Everything', restricting it to 'Everything *that exists*'.

As plausible as it sounds, this conclusion may actually be a bit too quick. We do restrict 'Everything' to 'Everything *that exists*'; we do this all the time and in various contexts (recall the examples given in the previous chapter about how allegedly presentists and eternalists would agree or disagree about what exists, and the related issue about restricting the domain of quantification); but to simply reduce it to a semantic or pragmatic pattern of behaviour would seem a lack of analysis.

Therefore, drawing upon some examples employed in Part II of this thesis, let us contrast Quine's question on what there is (and the two answers offered early on: 'Everything' and 'Everything that exist') with the question 'Do dinosaurs or Mars outposts exist?' Suppose we did not restrict the domain of quantification, how could an ontologist in Quine's wake explain people's bafflement and firm answer 'No, they don't'?[362] If folk's 'No, they don't' sounds plausible then the negative answer flags the fact that there is something going on and thereby the fact that it is not so trivial that 'Everything' and 'Everything *that exists*' are equivalent. To claim that they are is a *substantive philosophical thesis* which requires a good deal of philosophical work in order to persuade.

The issue advertised above ties intimately into a second one. At some point in *On What There Is*, Quine claims that as soon as the *univocality* of existence is called into question then a separation with common sense is put into place; and although we are aware of this peril, we anyway embark ourselves along a deceiving and dangerous path, to wit distinguishing between *being* and *existence*. If 'Everything' and 'Everything

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[362] I take it to be quite uncontentious that dinosaurs and Mars' outposts do not exist. Surely the former did, and possibly the latter will. In other words, dinosaurs once did but then they ceased to do so whereas Mars outposts have not yet come into existence.

that exists' do not perfectly overlap then this seems to suggest the possibility for there being some things which do not exist but still *are* something (or *are* not nothing). Perhaps, although they do not exist, yet they have *being*. First of all, this issue has been lingering around for quite a long time, therefore the idea of coming up with something unbelievably original may not be forthcoming after all. However something interesting may still be brought up against Quine's attitude, thereby venturing a revival of a traditional metaphysical view: Aristotle's idea that 'Being is said in many ways[363]. 'Existence' is univocal and thus no room is left for subsistence or any other lesser kind of existence; whereas 'being' is equivocal: there is a 'being' of *existence* as in "Mars *is*, a 'being' of *identity* as in "Mars *is* Mars", and a 'being' of *predication* as in "Mars *is* red".

In any case, it is still quite telling to scrutinise why Quine believes that in giving up the univocality of existence we gave up on common sense. As touched upon early on, it seems that both in ordinary life, language, and philosophy we customarily come across things which do not exist. As we know, the story goes then on saying that if statements like 'Pegasus does not exist' are true - and seemingly they are - then we are talking about something which is clearly not part of the realm of what exists, and there is no way for it to be amongst the existents for it just does not exist. But since both Pegasus and Santa Claus are entities - even though non-existing entities - then they must be included somewhere within 'Everything'. Therefore, this seems to compel us to somehow distinguish between 'Everything' and 'Everything that exists', for example considering them as having *being* without having *existence*.

Admittedly, this seems a perilous move also for those who think in terms of 'Being is said in many ways', therefore we should be cautious before giving in. But suppose, for argument's sake, that we embrace a view according to which 'Everything' and 'Everything that exists' are *not* synonyms: Pegasus and Santa Claus do not exist, in fact they are not included within 'Everything that exists' (but it would be perfectly acceptable and meaningful to assert that 'Pegasus is Pegasus' and that 'Pegasus is a winged horse'). However, following Quine's argument, such a view would likely yield to a crucial drawback: as briefly advertised above, given the distinction between being and existence, we would then be forced into a corner, one filled with a large amount of non-existing *beings*, or *possibilia*, which offend the aesthetic sense of philosophers who

[363] Ross, W. D. (1924). *Aristotle's Metaphysics*, Oxford: Clarendon Press.

have a taste for 'desert landscapes'. Quine's examples of the 'Possible fat man or the possible bald man in the doorway'[364] are paramount: to wit whether they are the same possible man or two distinct men, and how we are to decide which one is which. In short, what is usually subsumed under the slogan 'no entity without identity' (which will be looked at towards the end of the chapter).

I shall not follow Quine down this slippery slope since it would somehow force me to embrace his peculiar view on existence, his interpretation of quantifiers, and his criterion of ontological commitment; all of which I am still unsure if I would be entirely comfortable with. (Quine's apparatus may still turn out useful for deliberating what entities different philosophical theories include in their ontologies, but it is double-edged since it presupposes Quine's deflationary stance on ontology.) What strikes me apart from the mere acknowledgement of odd *possibilia* is again Quine's appeal to a *univocal* or single sense of existence[365]: the claim that as we fail to pin down the identity of such *possibilia* then existence has to be univocal (so they would not get in the way): once more, no entity without identity. It seems to me a case in which the medicine is worse than the disease.

Lastly, a further ingredient to Quine's concoction which seemingly follows from the single sense of existence is the belief that existence is suitably expressed by the existential quantifier of standard quantificational logic (in other words, there is nothing else to existence than what the existential quantifier expresses).[366] Despite some thinkers offering good reasons against that thesis[367], the equivalence between existence and the existential quantifier is a point taken.[368] Suppose for argument's sake that we agree with Quine that existence is suitably expressed by the existential quantifier. A further issue which we met briefly in chapter 1.3.4 regards the scope or range of such an existential quantifier: to wit what entities and in which contexts we are allowed to quantify over. Consider modal contexts: paramount is David Lewis' modal realism

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[364] Quine, W.V.O. (1948). "On What There Is" *Review of Metaphysics* 2: 23-4.

[365] van Inwagen, P. (1998). "Meta-Ontology". *Erkenntnis* 48: 233-50.

[366] Quine, W.V.O. (1969). *Ontological Relativity and Other Essays*. New York: Columbia University Press, 91-112.

[367] Orenstein, A. (1990) "Is Existence What Existential Quantification Expresses?". In *Philosophical Perspectives on Quine*, Barrett & Gibson (eds), Oxford: Blackwell.

[368] See for instance van Inwagen, P. (1998). "Meta-Ontology". *Erkenntnis* 48: 237.

according to which possible worlds exist just as our actual world does[369]. Since they are all parts of reality, namely actual,[370] there is no problem whatsoever when it comes to quantifying over them. Against Modal Realism, it has been argued that all that exists exists in this world, the actual one, the one we happen to live in.[371] Another context in which we register a shift in what philosophers take to exist is, as we saw in Part II, the temporal one. Recall presentists' claim that only presently existing objects exist while eternalists say that past and future things exist as well, not now but they do exist - being located - at other times.

Another question, once more concerning the domain of quantification is whether Quine's 'Everything' amounts to a completely unrestricted domain or whether a line has to be drawn somewhere; and consequently if such a notion of an absolutely unrestricted domain makes any sense at all.[372] Suppose we have a vague idea of a complete unrestricted domain, something like an absolute totality without restriction, or the most inclusive domain of what there is, does this thought really make sense? I must admit I find myself in a predicament, likely because I fail to have the relevant intuition. However, I am somehow inclined to say that an unrestricted domain makes little sense for it would look like an indeterminate slum, along the lines of Wyman's breeding ground for disorderly elements[373], perhaps infinitely extensible. Arguably, a picture which clearly offends the aesthetic sense of those who have a taste for desert landscapes.

Let us put Quine's speculation to one side and go back to the evidence. The ordinary meaning and use of the term 'existence' corresponds to what Quine names 'Wyman's *restriction* of existence to actuality'. Wyman's effort though is ill-conceived: on one hand, he grants the non-existence of Pegasus, while on the other he insists that Pegasus somehow *is*. 'Existence is one thing, he [Wyman] says, and subsistence is another.' I have always struggled myself trying to grasp what subsistence is supposedly

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[369] Lewis, D. (1986). *On The Plurality of Worlds*. Oxford: Blackwell Publishing Ltd.

[370] This could be potentially misleading since Lewis takes 'actual' to be an indexical expression, indexed to the world it is spoken in. So when you or I talk about the actual things, we merely talk about things in our world, whilst when our counterparts in world *w* talk about the actual things, they talk about the things in world *w*. See Lewis, D.K. (1986). *On the Plurality of Worlds.* Oxford: Basil Blackwell, Ch. 1.9.

[371] Plantinga, A. (1976), "Actualism and Possible Worlds". *Theoria* 42: 139-60.

[372] See footnote 224.

[373] Quine, W.V.O. (1948). "On What There Is" *Review of Metaphysics* 2: 23.

about - although a bunch of enthusiasts are willing to embrace it.[374] As I pointed out above, I think we may easily have both, the truth of the sentence claiming that 'Pegasus does not exist' and the fact that Pegasus is not. What's at stake here is another particular feature of quantification, which similarly to existence is not as univocal as Quine's 'To be is to be the value of a bound variable'[375] wants us to believe. The question concerns how quantifiers are interpreted.

Two distinct interpretations of quantification have been put forth, objectual versus substitutional[376]. The former has it that the truth-conditions of a sentence of the form $\exists xFx$ are set out by a statement like the following: '$\exists xFx$' is true iff the domain of quantification over which the bound variable '*x*' ranges includes at least *one object* that has the property of being *F*'. The latter instead claims that ''$\exists xFx$' is true iff there is some true *substitution instance* of '*Fx*''. By the phrase 'substitution instance of *Fx*' is meant a sentence in which the bound variable '*x*' is substituted with an individual constant, say *a*, in '*Fx*'. Thus, the statement 'Pegasus exists', logically amounts to '$\exists x$ (*x*=Pegasus)', and it is true because "*x*=Pegasus" has a true substitution instance, e.g. Pegasus=Pegasus (reflexivity of identity). According to Quine's view, the substitutional interpretation commits us to the existence of Pegasus. However, if 'Pegasus' is considered simply as an empty name (a name without any referent), then Quine's charge tends to water down. I believe that the lesson to be learned is that Quine's univocal notion of existence supplemented with his criterion of ontological commitment are the two faces of the same coin: the single sense of existence and the tenability of the criterion depend entirely on the objectual interpretation of quantifiers being the correct one, which may turn out not to be the case.[377]

One more feature of Quine's univocal view of existence which perhaps renders it

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[374] See van Inwagen, P. (2003). "Existence, Ontological Commitment, and Fictional Entities". In M.J. Loux & D.W. Zimmerman (eds.) *The Oxford Handbook of Metaphysics*. Oxford: Oxford University Press, 131-57.

[375] Quine, W.V.O. (1948). "On What There Is" *Review of Metaphysics* 2: 34-5.

[376] Barcan Marcus, R. (1962). "Interpreting quantification". *Inquiry* 5: 252-9; and (1965). "Modalities and Intensional Languages". In M.W. Wartofsky (ed.) *Boston Studies in the Philosophy of Science*. Dordrecht: Holland, 77-96. Beth, E.W. (1965). *The Foundation of Mathematics*. Amsterdam, 263-267. Henkin, L. (1949). "The Completeness of the First Order Functional Calculus". *Journal of Symbolic Logic* 14: 159-66. For a criticism see van Inwagen, P. (1981). "Why I Don't Understand Substitutional Quantification". *Philosophical Studies* 39: 281-5.

[377] I must admit that the substitutional interpretation of the quantifiers does not strike me as right. Nor Quine's objectual though. I somehow appreciate the pros and cons of both but ultimately I remain in two minds. Perhaps the truth lies in the middle.

more suspicious and less univocal is that often in contemporary analytic philosophy we register a distinction distiction between existence *simpliciter* and existence *at-a-time*.[378] Recall what an eternalist world would look like: past and future things exist as present things do but not now, they do at some other location in time. The last statement is supposed to pick out the very essence of the distinction. The issue that could be hard to be grasped is how something can exist *simpliciter* (which is a roundabout term for atemporally or timelessly) and at the same time exist *at-some-time*? There is a sense in which the former conveys the idea that something which exists *simpliciter* just does it no matter how, when or where. And this is what an eternalist, *prima facie*, claims. The further fact that a second 'sense' of existence, existence *at-a-time*, is introduced to explain why past and future things exist as present ones do but not now mirrors to some extent the distinction between existence and subsistence or between being and existence: in fact, the problem was to explain how non-existing things were something, say beings, without having to exist. By analogy, everything exists, past, present, and future instants, objects, or events. They all do but not all of them now, therefore to prevent objections, the official version says that they do so at-a-time. I might have been misled but the whole thing sounds a bit unclear and suspicious.

There is a sense though in which it all makes good sense: the eternalist needs a device to somehow explain away the counter-intuitivity of some of the consequences of her own view; for instance, the fact that dinosaurs and Mars outposts do not exist. The eternalist says that they do with a proviso, that is they exist but are located at other times (in some cases far away in time), the reason why incorrectly we take them as non-existing. Thus, the viability of Quine's univocal notion of existence seems to rely heavily on a robust ontological view about time, called eternalism, which allows for many more entities than we ordinarily are inclined to include in our world (the number of the extra entities does not matter, what does matter is the fact that they all exist in the same way as those that we commonly take to exist). Further to this, in arguing for the distinction between existence *simpliciter* and at-a-time, Quine's view of existence seems to be committed to the similarity thesis; a thesis which, as pointed out in chapter 2.1, seems to yield a specific view of time: eternalism.

Lastly, it seems plausible to say that the existence of an entity we are acquainted

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[378] See for instance Sider, T. (2001). *Four-Dimensionalism: An Ontology of Persistence and Time.* Oxford: Oxford University Press, Ch. 2.

with is intimately related with its coming to be and ceasing to be however vague its existential boundaries could be. My grandmother was born in 1921 and unfortunately passed away in 2006. Suppose now in 2013 I am asked whether she exists or not (*simpliciter*). It seems to me a bit preposterous to answer that she certainly does, being located somewhere else in time. Instead, my best guess would be that she no longer exists since she passed away at the end of 2006. The same happens if I am asked if she existed before 1921. Again my reply would be that she did not since she came into existence only in the late spring of 1921. Only between such two such ends, is something said to exist; outside of such a span it is customarily said that something has yet to come to exist or it does not exist any longer.

To make it easier, let us replace people with artefacts. Take a car engine, when all the parts making up a car engine are separately stored in a warehouse, it seems quite plausible to me to say that there is no outstanding car engine. By contrast, when they are properly put together then it seems plausible to claim that something which previously did not exist now does, to wit a car engine. And similarly when all the parts of the car engine are successively taken apart, it is plausible enough to say that the car engine ceased to exist. In other words, this notion of existence parallels the concept of actuality. Despite many influential philosophers' attempts to diminish the theoretical value of actuality[379], by reducing experience to what logic expresses by the existential quantifier, or by lessening its scope claiming that everything exists all along and therefore actuality becomes redundant, I think it would make sense to recognize, that in the ordinary use of such terms (existence and actuality), their harmless conflation without reducing one to the other.

To sum up: Quine's univocal notion of existence is twisted by several unstated premises which makes it contentious as shown above. Some of the strands that I attempted to unveil are, following van Inwagen[380]: (i) being is not an activity, (ii) being is the same as existence, (iii) existence is univocal, (iv) such a single sense is adequately captured by the existential quantifier, and (v) the adequate interpretation of quantification is the objectual one. A further assumption is that standard first-order logic carves reality at its joints. I shall not argue against (i) since I fail to grasp what exactly

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[379] See Quine, W.V.O. (1948). "On What There Is" *Review of Metaphysics* 2: 34-5. Lewis, D. (1986). *On The Plurality of Worlds*. Oxford: Blackwell Publishing Ltd.

[380] van Inwagen, P. (1998). "Meta-Ontology". *Erkenntnis* 48: 233-50.

existentialism and phenomenology say about it, however I am suspicious about (ii), (iii), (iv), (v) and that the apparatus of logic adequately grasps our world for a number of considerations that I raised above.

To conclude the chapter, I would like to touch upon Quine's slogans 'To be is to be the value of a variable' and 'No entity without identity' both briefly advertised above. In the very same paper mentioned at the outset[381] of this chapter, Quine sketches what is commonly known as the criterion of ontological commitment which the former of the two statements quoted above expresses at best. Apparently, with such a slogan Quine claims what it is for something to be or exists, assuming, as in (iv), that existence is suitably expressed by the existential quantifier. However, what he is really trying to get at is a suitable device to figure out what entities a theory takes to exist. To that end, such a theory must be formalised using the language of quantificational logic, secondly we have to pick out those sentences of the theory (given that a theory is a set of sentences considered true and useful from an explanatory point of view) which begin with at least one existential quantifier. This way, we end up determining which entities must be included in the domain of quantification (the set of entities over which the bound variables range) of such sentences if the theory is considered true. Following Quine's criterion, although our theory *T* is committed to the existence of some entities, say *a*, *b*, and *c*; still there is something that such criterion blatantly fails to say: what *a*,*b* and *c* are or *could* be.

However, following from 'To be is to be the value of a variable', in 'No entity without identity' Quine warns us of the threat of postulating entities (those over which the bound variables range) for which we are not able to provide a suitable criterion of identity: that is, a principle which says what makes an entity of a given kind the same as or different from another one of the same kind. He then carries on arguing that if and only if we know that are we then able to provide clear truth-conditions for those quantified sentences whose bound variables we take to range over that domain. In short: the criterion of ontological commitment merely tells us how to find out what entities whatever theory takes to exist *without* telling us what such entities are. In doing so, it relies on a further principle, the identity criterion, which warns us against postulating entities which do not possess clear identity conditions if our theory aims to be a good candidate for truth. Thus, recall Quine's examples of 'The possible fat man or the

[381] Quine, W.V.O. (1948). "On What There Is" *Review of Metaphysics* 2: 32.

possible bold man in the doorway'[382], according to both these criteria since we cannot say in principle if they are the same or distinct we should refrain from postulating them in our ontological theory if we want our theory to be in good standing as a candidate for truth.

I shall conclude this chapter on Quine's take on existence with a remark that perhaps should be raised at the outset of a critical analysis of Quine's interpretation of quantifiers rather than at the end. I am referring to how standard quantificational logic translates an existential statement into formal language. Take for example existential and negative existential sentences like 'Mars exists', 'Tables and chairs exist', 'Pegasus does not exist' and 'Santa Claus does not exist'. They are all standardly translated into the symbolism of standard formal logic as follows: "$\exists x$ (x=Mars)", "$\exists x$ (x is a table) & $\exists y$ (y is a chair)", "$\neg\exists x$ (x=Pegasus)" and "$\neg\exists x$ (x= Santa Claus)". But other sentences which are neither existential nor negative existential are translated in a similar way: for instance, the sentence 'Some man is wise' is translated into the language of standard logic as '$\exists x$ (x is a man & x is wise)'. Thus, as counterintuitive as it looks, the existential quantifier (more or less adequately) translates 'Some' and 'Exist(s)'. But there is a sense in which 'Mars exists' is just what it means without any additional meaning or hidden true structure like 'For some x, x is identical with Mars'.

In any case, most of contemporary philosophy endorses this kind of contentious view of existence. For example, recall how van Inwagen highlights the convenient conflation between 'Some/at least one' and 'Exist(s)': take the sentence 'Dogs exist' and its formal rendering '$\exists x$ (x is a dog)', given his account of quantification, that sentence is just an abbreviation for a more complex one: 'It is true of at least one thing that it_x[383] is such as it_x is a dog'. In turn, this sentence amounts to 'It is true of at least one thing that it is such that it is a dog'. Again, this last sentence is equivalent to 'It is true of at least one thing that it is a dog' which amounts to saying that 'At least one thing is a dog', and finally that 'There is at least one dog' which is the same as 'At least one dog exists' and 'At least one/some dog exists'. He then concludes that 'The existential quantifier therefore expresses the sense of 'there is' in ordinary English. If the second

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[382] *Ibid.* 23-4.

[383] van Inwagen's account of quantification begins introducing a stock of third-person-singular pronouns which are orthographically and phonetically diverse but semantically indistinguishable, for example it_x, it_y, it_z, and so forth.

thesis[384] is correct, 'There is at least one dog' is equivalent to 'At least one dog exists', and the existential quantifier expresses the sense of the ordinary 'exists' as well.'[385]. Thus, if I understand, van Inwagen's argument is that since 'At least one' and 'Some' turn out equivalent, then the existential quantifier correctly expresses the logical form of statements like 'Some man is wise'.

So much for Quine's view of existence. The aim of the previous two chapters was to broadly outline some themes of a view of existence which could tentatively fit with the outcome of Part I and II of this thesis.[386] The endeavour was to find out, if any, an understanding of existence which could at best accommodate the ontological implications of a view of time the likes of eternalism (or the B-theory). Quine's view looks like a suitable device for attaining that purpose. The next chapter will be dedicated to drawing some conclusions from what has been covered in chapter 3.0 and 3.1 with a view of bolstering my claim that Quine's view of existence seems to be a good candidate in accommodating the picture of time that eternalism (or the B-theory) conveys.

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[384] Namely that being is the same as existence. See van Inwagen, P. (1998). "Meta-Ontology". *Erkenntnis* 48: 235.

[385] *Ibid.* 241.

[386] See chapter 1.4 and 2.3.

3.2 Part III: *Conclusions*

The aim of chapter 2.2 was to draw a picture of time which, in the light of Sider's three respects in which space and time are alike and Lowe's account of time as extended (and considered as a dimension in which reality is extended), could comply nicely with the core of intuitions and common sense considerations which moved the whole project in the first place: a core which seemingly lies in the background of the notion of temporal parts. Namely, the evidence that things seem to have parts in time as they do in space (as well as the fact that such evidence seems to encourage considering space and time as alike under some respects). Next was the thought that such an initial core, if developed as in Part I and II of the thesis, could motivate a view of time the likes of eternalism.

Further to this, given the intimacy between philosophy of time and 'existence' as argued early on in chapter 2.2, the next step in the argument was to see if that specific combination of views of persistence and time could in turn suggest how 'existence' should be understood (basically the thought was to unpack further those remarks about existence briefly sketched in chapter 2.2). There is in fact a robust sense in which connections between the two could easily be singled out as I shall make clear in the following.

Let us recall the outcome of Part II: according to the picture of time tentatively formulated in chapter 2.2 (as a result of the previous investigation of what lies in the background of the notion of temporal parts: the evidence that things have parts in time as they uncontentiously do in space), the view of time which seems to accommodate it, minimally in the sense of avoiding unnecessary commitments, appears to be eternalism: a view of time which claims that past, present, and future moments, objects, or events exist. To this, eternalists often add that what exists or occurs at one time is similar to what exists or occurs at another place, space and time being similar under this respect (as well as others). It has been then argued that eternalism's claim can be broken down into two theses: an *ontological* one, which claims that all moments, objects, or events - past, present, and future - exist or occur in a four dimensional block of space-time; and a *static* one, which argues that the present moment does not move; which moment is the

present moment does not change. Interestingly then, according to eternalism, it seems that all sorts of things exist, past present and future instants, objects, or events (from, say, dinosaurs to future Mars outposts via the chair I am sitting on now while finishing off this chapter).

Picking up from this last claim, to wit the idea that 'all sorts of things exist' (past, present, and future instants, objects, or events), there is a sense in which that phrase appears to be nothing more than a roundabout way to say that 'Everything' (past, present, and future instants, objects, or events) exists; which as we have seen early on in this last part of the thesis, incidentally corresponds to Quine's answer to the ontological question 'What is there?'. Therefore, there is *prima facie* evidence that if there is a view of existence which appears to be suggested or motivated by the Eternalism Ontological Thesis - that *plenum* of things all coexisting - then it looks like it should be one which can accommodate *the most inclusive domain of coexisting entities*; that is 'Everything'. Nothing could exist outside such a domain for it would not exist. All the entities coexist in space and time or space-time, some of them closer, some other further apart. To conclude, there seems to be compelling evidence that Quine's view of existence can be motivated by the eternalism's ontological commitments.

In addition to the ontological thesis, eternalism consists of a second thesis, to wit the Eternalist Static Thesis: the idea that the present moment does not move, which moment is the present moment does not change. Therefore, a view of existence which is said to be motivated by eternalism must encompass the Eternalism Static Thesis too. If the present does not move along the time series lighting up instants, objects, or events, and if all there is is given in a *nunc stans* then this scenario does not seem to be able to accomodate a *genuine* turnover of things. By which I mean not just a change in the sheer number of existing (or coexisting) things but the denial of a more substantial kind of change[387], namely new things coming into existence whilst others going out of existence. This being the case, then again the view of existence which seems to allow for this is Quine's. In chapters 3.0 and 3.1 I looked at some themes regarding the idea that 'exist' is a second-order predicate and existence itself a second-order property, to

[387] See chapter 1.3.3. By the phrase 'not just a change in the number of existents' I mean that the problem is deeper than mere cardinality. There could easily be no issue with cardinality despite substantial change occurring in the world. It would simply be a case in which the things presently coming into being would match in number those presently going out of existence. A picture of reality which would comply with the Eternalist Ontological Thesis but not with the Eternalist Static Thesis.

wit a property of another property. Such a view of existence, as then developed by Quine, seems to have interesting ontological implications which could be useful for the purposes of my argument. If the answer to the ontological question is 'Everything', as Quine claims, then there is a sense in which if all there is consists of, say, past, present, and future instants, objects, or events, (which seems to be quite plausible) then they all exist too. In addition, by definition they are all there is, thus any change in such a domain of existents would presuppose something like a turnover of entities: for example, some entities going out of existence and some other coming into existence. Surely, all these entities popping in/out of existence would fly in the face of Quine's taste for desert landscapes and also likely to clash with his unsympathetic attitude towards *possibilia*. For something to come into existence seems plausible to be, at least, non-existent beforehand; for that very same entity to be, say, now non-existent but later on to come into existence would mean to be *possible* for it to come into existence (the same holds in the case of an existing entity which goes out of existence).[388] I am not sure how suspicious this would be deemed by Quine but we all know the fate of the possible fat/bold man in the doorway. Thus what Quine's view seems to entail is, ontologically speaking, a domain of existents which is *existentially closed*, everything exists, and all there is lies within those boundaries. To allow for a change in that domain would be for any entity which is not part of it to *become* part of it; or similarly for any entity which is part of it to *leave* that domain. In both cases, something which does not exist will end up existing and conversely something which exists will end up not-existing.

So much so, to see how the implications of Quine's view can be motivated by the outcome of chapter 2.1 I shall quickly recall few relevant points: the picture of time devised drawing upon Sider's three respects in which space and time are alike and Lowe's argument for time being extended (and a dimension in which reality is extended) showed to comply quite nicely with the ontological implications of eternalism; first and foremost the Eternalism Ontological Thesis according to which all moments, objects, or events - past, present, and future - exist or occur in a four dimensional block of space-time, and the Eternalism Static Thesis too, to wit the present

[388] Perhaps some would disagree with this. Perhaps a presentist might just assert that what exists is what exists, period. It just happens to be that this was different yesterday to today. (This being the case, I suspect such a presentist would not think of time as a dimension but just in terms of existents, and which ones there are changing so that this never means there is anything other that what there is).

moment does not move since all the entities - them being instants, objects, or events - coexist, which implies that which moment is the present moment does not change.

Thus, what seems to be required to accommodate the Eternalism Ontological Thesis and the Eternalism Static Thesis is a view of existence which ontological implications could guarantee a domain of existents whereby what there is is everything and that is all there is. The content of such a domain being past, present, and future instants, objects, or events, all existing (or-co-existing) and being located at different distances in time (as they might be in space) Nothing lies outside of that domain. Nothing can come in or go out.[389] That is, an *existentially closed*[390] domain of existents, something which Quine's view seems to be able to attain quite fittingly. Therefore, to conclude, it seems to me plausible to say that there is a sense in which if the initial core of intuitions and common sense considerations is developed as in Part I, and II, then the ontological implications of that core seems to suggest a view of existence *a là* Quine (even though, as advertised in chapter 3.0 and 3.1, we may not be particularly willing to endorse some of the contentious commitments of that very view of existence).

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[389] I would be tempted to say a domain in which there is no gap in what exists. However, in conversation, Dr. Francis Pearson called my attention to the fact that it might be plausible to be a Quniean and still quantify over change at different times: quantification is unrestricted, making no reference to time, just a timeless 'what exists'; but, as it happens, what is in this domain on one occasion of quantification might be different to what is in it on another. I must confess but I struggle with the idea of a domain (which in one go includes all the existents) and the idea which change suggests, namely a change in what exists. It might well be my own understanding of both ideas which is somehow flawed but if what there is is everything (unrestrictedly and atemporally) I cannot see in virtue of what a gap in what exists could be cashed out.

[390] The idea of an existentially closed domain of existents or *the principle of existential closure* as named by Dr. Francis Pearson and myself shall be investigated in the context of the philosophy of emergence in the upcoming research project funded by the Emergence Project Fellowship Scheme run by the Philosophy Department at Durham University. In particular, what we shall be focussing on in the relationships between Emergence and existence since whatever definition of Emergence makes existential claims which so far have not been investigated thoroughly.

4.0 *An Analysis of Persistence: Conclusions*

David Lewis claimed that 'Something *persists* iff it exists at more than one time'. He then added that *how* things persist can be twofold: 'something *perdures* iff it persists by having different temporal parts, or stages, at different times' whereas 'it *endures* iff it persists by being wholly present at more than one time. The debate that followed has focussed mainly around the interplay between theories of persistence and time, overlooking the evidence that Lewis' definitions embed philosophically ubiquitous and crucial notions like *existence* which deserve to be investigated too for a proper understanding of the topic at issue.

Overall, the thesis was an exploration of persistence, time, and existence to make sense of whether and how one could motivate the others. Specifically, the investigation concerned how perdurance (a theory of persistence), motivates eternalism (a theory of time), and both a view of existence *a là* Quine. As claimed in the Introduction, the project was designed to address three main questions: one general and two more specific. The general one: whether and how some of the notions embedded in Lewis' definition of persistence - *persistence*, *time*, and *existence* - motivate one another. Following from the general one, the first specific question investigated the interplay between perdurance and eternalism: in what ways, if any, a perdurantist account of persistence can motivate an eternalist account of time. It has been argued in the literature that nothing seems to crucially prevent any theory of persistence combining with any theory of time; however, upon careful analysis arguably there seems to be some constraints which favour some combinations whilst hindering others. From the first specific question, the second specific one explored, from a philosophical point of view, what time would be like if it were extended (so that things could take it up by having parts in it); and examined how we could make sense of it. More specifically, perdurance as a theory of persistence, with its commitment to a four-dimensional view of reality, seemed to imply such an *extended* view of reality; a view which in turn seemed to suggest the picture of reality which eternalism as a theory of time conveys.

The thesis contained in three parts which mirrored the three main topics above: persistence, time, and existence. The first part started off by deploying the terminological commitments: *perdurance* stands for the doctrine of temporal parts (whether instantaneous or short-lived); whereas *four-dimensionalism* qualifies as a view according to which space and time are somehow alike (which is neutral regarding the question whether or not there are temporal parts).

The investigation into the relationships between perdurance and its branching off into theories of time and existence began from the *prima facie* evidence that things change, and despite changing they still manage to continue to exist as the same. Change is then an undeniable datum of experience for which we have robust intuitions and about which we can make common sense considerations. A case of a persisting object has been used to show that our common sense thinking and intuitions may harbour a predicament: we believe there is a fact of the matter whether an object is or is not one and the same although we may not be able pin down the reason why. Upon careful analysis, it has been argued that the evidence that things change seems to be adequately accounted for by both contenders, perdurance and endurance; so that at this initial stage, *with some adjustments* the playing field seems to be somehow levelled. Following from this, focus has been redirected towards what discriminates between perdurance and endurance, namely the notion of temporal parts. Their centrality makes it decisive to understand what they are and what they do.

In chapter 1.3.1, a stalemate in defining the notion of temporal parts (from a perspective which could withstand philosophical scrutiny) has been assumed: for perdurance parthood is essentially atemporal whereas for endurance it is crucially temporal. This impasse bears as a consequence the fact that what temporal parts are is all too often inadequately understood by the opponents, with the result that there is a failure in the communication between the parties. It has been argued that the stalemate can be overcome by pointing out that the notion of temporal parts actually rests upon a robust basis of intuitions and common sense considerations which draw upon our ordinary understanding of parts in space; and this has turned out sufficient to give a working grasp of them as well as the potential for a definition which stands scrutiny. Interestingly, this set of intuitions and common sense considerations has been revealed to be a suitable way to gather agreement from both parties in a way that could then be communicated. Therefore, such evidence coming from intuitions and common sense

considerations is adequate as a starting point if a philosophy is to be constructed. At least initially, both parties seemingly can know what the other is talking about, and each one could be suitably understood by their respective opponents. For this reason, as mentioned above, perdurance's failure to develop a definition of temporal parts that could be adequately grasped by the opponent might just be contingent; at rock bottom the idea of temporal parts would still be perfectly understandable even without an adequate regimentation of it.

Temporal parts seem to be decisive in solving some puzzling situations. Chapter 1.3.2 looked into what Lewis called 'the principal and decisive objection against endurance' (which in turn has always been considered a decisive argument for perdurance and temporal parts), namely the problem of temporary intrinsics. It has been argued that the problem is actually an instance of the long-standing philosophical problem of change. From such a perspective the discussion has been framed along two distinct, although intimately related, strands: an argument for perdurance which draws upon the problem of the instantiation of incompatible properties, and a second one which relies on Leibniz's Law. In both cases, compelling evidence has been found which casts doubt on the established ways to conceive and account for the problem. Such a line of argument was then furthered and strengthened to the conclusion that Leibniz's Law generates a metaphysical problem (which in turn requires metaphysical tools in order to be solved - as Lewis, Heller, and Sider claim) insofar as the principle itself is formulated and interpreted metaphysically to begin with. But that could mean overlooking the true essence of the principle which is first and foremost a principle of the logic of identity.

This being the case, the myth of the problem of change is then debunked: the problem of change is not genuine, at least as set up in that paradigmatic way by perdurance. If there is no such problem then also Lewis' 'principal and decisive objection against endurance' fades away. Lewis' objection which in the first place boosted the doctrine of temporal parts turned out to rest on quite a flimsy philosophical ground: therefore, plausibly its status of a metaphysical problem has been downgraded to perhaps a semantic one.

To conclude, clutching to how perdurance advocates have accounted for the theory - defining temporal parts as in Sider, and finding support for it in the problem of change - the scenario does not look particularly promising for perdurance: a case in

which it is not clear what temporal parts are but also a case in which the principal argument showing what sort of philosophical work they carry out seems to vanish. In addition to the fact that it is not clear what they are, similarly it is less clear what they do. It has been suggested that perdurance should acknowledge the import of intuitions and common sense considerations, at the same time rejecting Lewis' dismissive attitude towards intuitions and common sense considerations, so that there are better, more intuitive ways, of motivating perdurance than generating a problem which fails to stand philosophical scrutiny.

The intelligibility and possibility of temporal parts, and hence perdurantism, has been shown to rely on the thought that reality is four-dimensional, so that in addition to the three spatial dimensions in which reality uncontentiously extends, there is a fourth, time, along which similarly reality extends. The aim of Part II was to test the initial core of intuitions and common sense considerations which have been argued to sit in the background of the notion of temporal parts: the evidence that things seem to have parts in time as they do in space, with a view to seeing how it could affect the philosophy of time. Space and time share some decisive features so the thought was that investigating what philosophers have said about this similarity could clarify whether and how space and time could be so considered. It has been argued that there is a sense in which such an investigation leaves the space/time analogy wanting and therefore a tentative picture of time which could accommodate the similarity thesis as well as a view of time as extended has been ventured. Such a picture of time drew upon Sider's three respects in which space and time are alike as well as Lowe's formulation of time as extended (and as a dimension in which reality is extended), and was so devised to accommodate that core of intuitions and common sense considerations spelt out above (chapter 2.2). The presumption was that such an initial core motivates a view of time like eternalism. Chapter 2.1 pursued the analysis of the similarity thesis which the core of intuitions and common sense considerations above mentioned seem to convey. In chapter 2.3, a brief overview of the state of the play of the current debate in philosophy of time was afforded, ideally to indicate which view of the nature of time the picture devised in chapter 2.2 motivates. In the light of the conclusions of the previous chapters, there seemed to be a robust sense in which the ontological implications of the picture of time in question motivates a view of time like eternalism.

As mentioned above, chapter 2.2 looked at the question what time would be like if things were to take it up by having parts in it (as they do in space) and concluded that: (i) it would have to be extended, somehow qualifying as a dimension; (ii) it would be a continuum (although nothing crucial depends on it for the conclusion of my argument); (iii) all the instants, objects, or events past, present, and future must coexist; and lastly which follows from (iii), (iv) anytime in the series could be 'now' (from some perspective, as anywhere is here).

Given this picture of time, it has then been asked what theory of time among those presented in chapter 2.3 would be able to be suggested by it. The answer was given in terms of the implications of the different theories: ontological on the one hand, and static/dynamic on the other. Since all the instants objects, or events past, present, and future must coexist as in (iii), then it has been argued that this picture of time would be accommodated by the Eternalism Ontological Thesis.[391] By analogy, it would not fulfil the conditions posited by the Presentism Ontological Thesis:[392] it is true that the present moment, objects, or events exist however, they are *not* the only things to exist. Past and future instants, objects, or events exist as much as the present ones.

If compliance with the Eternalism Ontological Thesis is plausible, then it must be decided which one between eternalism and the moving spotlight theory would be the best candidate since both endorse the Eternalism Ontological Thesis. The moving spotlight theory holds that in addition to what the Eternalism Ontological Thesis expresses, there is an objective property, presentness, which moves across the block universe lighting up different times, objects, or events. The same feature, that the present moves so that what moment is the present moment changes, appeared to be shared by the growing block theory (according to which past and present moments, objects, or events exist but future ones do not) forcing the conclusion that it could not be suggested by picture of time drafted in chapter 2.2.

For ontological considerations, the evidence suggested to dismiss both presentism and the growing block theory: all then seemed to come down to eternalism and the moving spotlight theory. Focussing on the static versus dynamic implications of

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[391] The eternalism ontological thesis claims that all moments, objects, or events - past, present, and future - exist or occur in a four dimensional block of space-time.

[392] The presentism ontological thesis claims that *only* the present moment, objects, or events exist.

the theories, between the Eternalism Static Thesis[393] and the Presentism Dynamic Thesis, the one which seemed to be suggested the picture of time ventured in chapter 2.2 conveyed is eternalism: the present moment does not move, all the instants, objects, or events coexist (or each instant, object, or event belonging to the past or future is as real as the present ones), which moment is the present does not change. Whereas, what the Presentism Dynamic Thesis claims is that what is *present* changes over time; a different moment, set of objects or events take over as a new *present* moment moves along, whereas the previous moment, set of objects or events becomes past as soon as that moment ceases to be the *present*.[394] Therefore, the conclusion is that between the two, eternalism and the moving spotlight theory, the one which is motivated by the picture of time elaborated in chapter 2.2 is the former rather than the latter.[395]

In light of the distinction between the A- and the B-theory of time, together with what Sider claims to be the third respect in which space and time are alike (the relativity of here and now), and considering Sider's comment that this latter element, together with eternalism yields the B-theory of time, it seemed that the most appropriate theory of time to be able to be suggested by the picture drafted above is the B-theory.

It has then been argued that granting Sider's claim, there seemed to be a sense in which we could do away with committing that picture of time to the B-theory. Given that the Eternalism Ontological Thesis and the Eternalism Static Thesis is all there is to eternalism, then there seemed to be a sense in which the thesis of the relativity of here and now as broadly put forth by Sider is somehow embedded in the couple Eternalism Ontological Thesis and the Eternalism Static Thesis. If all the instants, objects, and events (say past, present, and future) coexist (Eternalism Ontological Thesis), and the present moment does not move, change, or light up different times, objects, or events; then there might be a sense in which any point whatsoever in the series is here and any time is now. As there is no privileged point in space to be considered the 'here', so there is no privileged instant of time to be considered as the 'now'.

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[393] The eternalism static thesis claims that the present moment does not move since all the entities - them being instants, objects, or events - coexist, which implies that there is no turnover of entities. Which moment is the present moment does not change.

[394] See footnote 347.

[395] The reasons which motivate the rejection of the Moving Spotlight theory are elaborated in detail on p. 159-61.

To conclude, according to the picture of time tentatively formulated in chapter 2.2 (as a result of the previous investigation of what lies in the background of the notion of temporal parts, to wit the evidence that things have parts in time as they uncontentiously do in space) the view of time in the contemporary debate in philosophy of time which is suggested by it (avoiding unneeded commitments) is eternalism. If this is the case, then this is a counter-example to the claim that the relationship between views of time and persistence is relaxed so that any theory of time could fit with any theory of persistence. Specifically, looking at the ontological implications of the theories in question, the combination of perdurance and, say, presentism is not available.

Assuming the conclusion just stated above, it was interesting to see if this commitment to eternalism could result in a further commitment to a specific view of existence. As remarked in chapter 2.2, the dispute among different theories of time is a controversy about what exists: they all attempt to unravel and establish the temporal as well as the ontic structure of the world. If this is the case, it is plausible to suppose that perhaps a view of time like the one elaborated above might motivate a specific view of existence. And this is what was unveiled in the third part of the thesis: the nexus between perdurance, eternalism, and the notion of existence Perdurance's basic assumption that reality is four-dimensional which motivated an eternalist approach to time seems to suggest a view of existence *a là* Quine.

The view in the contemporary debate in philosophy of time which seems to accommodate the picture of time drawn in chapter 2.1 appeared to be eternalism: a view of time which claims that past, present, and future moments, objects, or events exist. There is no property of presentness moving along the temporal series, past, present, and future moments, objects, or events are all real. However, eternalists often add that what exists or occurs at one time is similar to what exists or occurs at another place, space and time being similar under this respect. In chapter 2.2, it has been argued that eternalism's claim can be broken down into two theses: an *ontological* one, which claims that all moments, objects, or events - past, present, and future - exist or occur in a four dimensional block of space-time; and a *static* one, which argues that the present moment does not move; which moment is the present moment does not change. Interestingly then, according to eternalism, all sorts of things, past present and future instants, objects, or events (from, say, dinosaurs to future Mars outposts via the chair I

am sitting on now while I finish off this chapter) exist. They actually all coexist, in a four-dimensional block of space-time.

Granting that definition of eternalism there seemed to be a sense in which it sounded like a roundabout way of saying that what exists (in terms of past, present, and future instants, objects, or events) is 'Everything'. Incidentally, to claim that what exists is 'Everything' corresponds to Quine's answer to the ontological question 'What is there?' If this is the case, then there seems to be *prima facie* evidence that if there was a view of existence which is suggested by the Eternalism Ontological Thesis, that *plenum* of things all coexisting, it should be one which could accommodate *the most inclusive domain of coexisting entities*, that is 'Everything'. Most inclusive since nothing could exist outside such a domain for it would not exist. All the entities coexist in space and time or space-time some of them closer, some other further apart. To conclude, there seems to be compelling evidence that Quine's view of existence is suggested by eternalism's ontological commitment.

In addition to the ontological thesis, eternalism consisted of a second thesis, the Eternalism Static Thesis: the idea that the present moment does not move, which moment is the present moment does not change. Therefore, a view of existence which is claimed to fit with eternalism must encompass the Eternalism Static Thesis too. If the present moment does not move lighting up different instants, objects, or events, if which moment is the present moment does not change, if there is *no genuine* turnover of instants, objects, or events which are present then again the view of existence which seemed to allow for this is Quine's. Such a Quinean view of existence, as developed in chapter 3.1 and 3.2 appeared to have interesting ontological implications useful to link it to eternalism. If the answer to the ontological question is 'Everything' then there must be a sense in which all there is consists of past, present, and future instants, objects, or events. Since by definition they are all there is, any change in such a domain of existents would presuppose something like a turnover of entities (instants, objects, or events): for example, for some entities to become or to cease to be present, or to come in or to go out of existence. But this would fly in the face of Quine's aesthetic sense for desert landscapes. Thus what Quine's view seemed to entail is, ontologically speaking, a domain of existents which is *existentially closed*: everything exists, and all there is lies within those boundaries. To allow for a change in that domain would be for any entity which is not part of it to *become* part of it; or similarly for any entity which is part of it

to *leave* that domain. In the former case, something which did not exist will end up existing (or something which was not present will be); in the latter case, something which exists will end up not existing (or something which was present will no longer be).

To see how the ontological implications of Quine's view can accommodate the outcome of chapter 2.1 a few relevant points must be recalled. The picture of time devised drawing upon Sider's three respects in which space and time are alike and Lowe's argument for time as extended (and a dimension in which reality is extended) were shown to comply quite nicely with the ontological implications of eternalism: the Eternalism Ontological Thesis according to which all moments, objects, or events - past, present, and future - exist or occur in a four dimensional block of space-time; and the Eternalism Static Thesis, to wit the present moment does not move since all the entities - them being instants, objects, or events - coexist, which moment is the present moment does not change.

What then seemed to be required to accommodate the Eternalism Ontological Thesis and the Eternalism Static Thesis is a view of existence whose ontological implications could guarantee a domain of existents whereby what there is is everything and that is all there is. The content of such a domain being past, present, and future instants, objects, or events, all existing (or coexisting) and being located at different distances in time (as they might be in space). Nothing lies outside of that domain. Nothing could come in or go out. That is, an *existentially closed* domain of existents, something which Quine's view seems to be committed to.

To conclude, it seems plausible to claim that there is a sense in which if the initial core of intuitions and common sense considerations picked out in Part I (the metaphysical datum that things change, as well as the intuitions and common sense considerations regarding things taking up time as they do space by having parts in it) is developed as in Part I, and II, then that core seems to fit in quite nicely with the ontological implications of a view of time like eternalism and a view of existence *a là* Quine. So that as in Wasserman's quote mentioned in the Introduction 'One's perspective on change is often determined by one's position in the broader philosophical landscape.'

If Wasserman's quote is taken to the letter, then there seems to be a question which regards what the priority of issues should be; that is, (i) should we get clear on

existence first (and perhaps identity), and then ask what theory of time and persistence are suggested by that, or (ii) *vice versa*? The way the thesis devoloped may appear to be closer to (ii), whilst, the intentions of the thesis - to look at those ubiquitous more general concepts like existence which are in the background of Lewis' definition of persistence - might appear to be closer to (i). The truth is I think there is some sense to both directions. Quine moved in direction (i), namely from his take on existence and modality to a theory of time, and from there to persistence. However, nothing hinders one from moving the other way around as I showed in the thesis. The important point, is to note that both directions can fit the general methodological approach that I want to take; one that enables us to consider the general and fundamental structure of reality, those elements invariant under different frames of reference. Wherever we decide to start from, if we look at the connections among theories of persistence, time and existence, a perdurantist account of persistence motivates an eternalist account of time, and both in turn suggest a take on existence *a là* Quine as well as a Quinean view of existence (and modality) implying an eternalist account of time, and both in turn motivativating a perdurantist view of persistence.

Lastly, I shall conclude touching briefly upon an issue which characterised the thesis from the outset and all along: the fact that our intuitions and common sense considerations seem to have a decisive role without supposing them to be inviolable. As mentioned above, the thesis started from the acknowledgement that we have strong intuitions and we can make common sense considerations about things changing. Later on, it has been pointed out that actually in the background of the notion of temporal parts there lies a set of intuitions and common sense considerations that we seem to have regarding parts in time. This initial set of intuitions and common sense considerations which has been then developed through Part II and III turned out to branch into very specific views of time and existence which, as pointed out in passing, have implications which may be slightly less intuitive or common sense compared to the evidence we began with (for instance, the ontological implications of eternalism as well as Quine's view of existence). Therefore, a further aspect which this thesis should like to point at is that although we may start off from evidence which appears to comply quite well with our intuitions and common sense considerations; for some reason further down the line 'generally as the outcome of a rigorous philosophical investigation', that initial evidence seems to make way for conclusions which are to a certain extent

counter-intuitive and in contrast with common sense. An instance of the methodology of philosophy I shall myself endorse as claimed in the Introduction; namely, the dialectic between descriptions and prescriptions, and the priority of the former over the latter.

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