

Philosophy of time: Combining the A-series and the B-series

MSc Thesis (*Afstudeerscriptie*)

written by

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Abstract

Concentrating on different theories of time, this thesis takes as a starting point the A-series and the B-series as presented by McTaggart (1908), and as used by philosophers of time during the last century. I will conclude that both of these series are, not only compatible, but *necessary* for the conception of time. A main part of this thesis will be used to show that theories that point to the incompatibility of the A- and B-series are flawed: I argue against the mutual exclusion of the A-series and the B-series.

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1 Introduction

Perception is precisely that kind of act in which there can be no question of setting the act itself apart from the end to which it is directed. Perception and the perceived necessarily have the same existential modality, since perception is inseparable from the consciousness which it has, or rather is, of reaching the thing itself. (...) If I see an ash-tray, *in the full sense of the word see*, there must be an ash-tray there, and I cannot forgo this assertion.

(Merleau-Ponty, M 1962, 374)

We primarily perceive time in two ways: As something ‘flowing’, where the present moves, and is more real than the future and the past, and as a fixed order of events that stand in relations of ‘earlier than’ and ‘later than’ each other. These two aspects of time have generally been seen as incompatible, and a great part of the recent philosophy of time has been an attempt to argue for the superiority of one over the other. This thesis is about reconciling the two, and prove that they are both necessary.

Firstly I will in the preliminary considerations look at the methods and tradition of our discussion of the topic of time. I will justify that the starting point of our investigation is from a phenomenological perspective. The main idea is that the objective world cannot be meaningfully abstracted from our experience of it, and that the topic of ontology naturally follows from the phenomenology.

In the following section I introduce John McTaggart Ellis McTaggart’s original argument for the unreality of time, where the original definitions of the A-series and the B-series were introduced. Then I will go on to look at two of the arguments for the mutual exclusion of the A-series and the B-series, presented as a philosophical dispute between the two most recent philosophers of time: Peter Ludlow and Hugh Mellor. Through an analysis and discussion of their respective arguments, I will seek to show how Ludlow’s argument for the reality of the A-series does not work, and how Mellor, although calling himself a B-theorist, allows room for the A-series in his theory.

I will introduce the main argument by presenting Nataša Rakić’s attempt to combine the two series with Einstein’s Special Theory of Relativity. Her argumentation is technical, and is based on (temporal) logic and modern physics. I will attempt to do the same thing (argue for the necessary co-existence of the A-series and the B-series), but I will do this by arguing from phenomenology and first person experience, rather than technical arguments, which will make a great difference in argumentation. Consequently I will seek to show that, firstly, the A-series is necessary for our conception of time, because of the essential character of *change*, and the interdependency between consciousness and the moment of the present. Accordingly, I will show that the B-series is equally necessary because of the human attempts to understand things *objectively* (scientifically), and more basically: We need to order events and perceptions temporally (‘internally’) to

perceive them, and this is only the B-series able to provide. Concluding the main section, I will attempt to show how the A-series and the B-series work in everyday understanding and use of time, and why they are both necessary.

In the last section I evaluate the method followed, and see how they are not contradictory.

2 Preliminary considerations: Tradition and method

2.1 Tradition

The focus of this thesis will, to a large extent, be on phenomenology and will take as its starting point the *perception* of time. The reason for not jumping straight into metaphysical speculations and arguments about the ontological reality of time independent of the mind and consciousness (although I will get there after awhile), is that it seems to leave out an important part of the whole aspect of time. A great number of philosophers have argued that time is both a constraint and a premise for experience and perception in to begin with. This is an important point which is fruitful to take into consideration and use as a starting point and a basis for our discussions. In this section I will have a look at two traditions in the philosophical study of time, the semantic and the ontological, and argue that the phenomenological method is a good way in of combining the two traditions, and is tightly connected to the examination of the concept of intuition and its relation to natural language.

As we will see in the next section, there are historically two main traditions of argumentation when it comes to uncovering the “real” nature of time. First, we have the metaphysical tradition that tries to uncover the *ontological* status of time, often by using thought experiments, and sometimes physics. The other tradition, which is very much alive today (and is discussed in more detail in the next section and section 4) is followed by, among others, Ludlow. Ludlow’s thesis is based on arguments concerning natural language and how we use and define time and temporal concepts in natural language. It fits well into the *semantic tradition*, where a close connection between the semantics of natural language and reality is taken as a premise, to such an extent that it is possible to “read” the nature of reality by looking at the way in which we use natural language and how we define certain concepts and words.

The central idea in the semantic tradition seems to be that an investigation of natural language and looking at definitions of words and the use of them will uncover a picture of time which corresponds to something like a “natural language metaphysics” of time. The point is that philosophers belonging to this tradition (Ludlow being a clear example) assume some kind of strong correspondence between language and metaphysics, to such an extent that the concept of time that is supported by the investigation of natural language corresponds perfectly to “real time”. That is, by investigating natural language semantics, one can uncover the actual nature of time. Ludlow claims: “(…) to be is to be a semantic value.” (Ludlow, P. 1999, 70) Furthermore, there is ontological commitment tied to semantic values: “Fundamentally, in view of the kind of deflationary metaphysical investigation being proposed here, it should not appear particularly bold or surprising that our metaphysical commitments are tied to our use of semantic quantification over semantic values in the meta-language.” (Ludlow, P. 1999, 76) This implies, in Ludlow’s thesis, that we can

infer metaphysical consequences from a Tarskian T-theory.

If one supposes that there is an interesting connection between metaphysics and the semantics of natural language, and if one supposes that the semantics of natural language can help illuminate our metaphysics, then one might hope that the semantics of tense can help illuminate the metaphysics of time.

(Ludlow, P. 1999, 4)

I will not take that connection between language and reality for granted, as is commonly done in philosophy of time. I will discuss this connection at length below, section 4 in particular. But I will state that so far, there is no good reason for taking the claim that the reality is mirrored in language as a *starting point* for an investigation of time. By investigating natural language semantics, one can uncover a conception of time that is presupposed in and supported by language. But even though an investigation of natural language can uncover these kinds of general concepts of time, that in itself is no reason to believe that those ideas are fundamentally correct *because* they feature in natural language and correspond to intuition or common sense.

There is nevertheless reason to believe that by semantic investigation of natural language we end up with a concept of time that is mainly *intuitive*, something like “common sense time”. Rakić, as we will see, motivates her theory on this focus on “common sense”: “(...) the semantical features of the connections of common sense and relativity are also relevant, since the common sense is understood to be encoded in our natural language.” (Rakić, N. 1997, 74). But how can we know that this common sense view of time is correct? As Daniel Dennett argues in his *Sweet Dreams* (Dennett, D. 2005), our intuitions about reality do not always necessarily *correspond* to reality. Dennett notes that, in other branches in academia, for instance in natural science, *counterintuitive results* are normally well received among researchers and scientists, because they tell us something about reality (although perhaps surprising in nature). But when it comes to philosophy, on the other hand, deriving a counterintuitive result can be taken as reason enough to refute the theory as a whole (or it will at least certainly weaken it): ““Consult your intuitions,” say the philosophers. “Do they agree with the following proposition? ...” And if the task were done well, it would yield a valuable artifact for further study: The optimized “theory” of late-twentieth-century-Anglophone folk psychology.” (Dennett, D. 2005, 34). It is easy to agree with Dennett’s claim here. If intuition is nothing but a priori reasoning based on prejudice, then it certainly is far removed from scientific method. But this is something that demands investigation.

Regarding the metaphysical (ontological) tradition, I will argue that, although the connection between language and reality (via intuitions) will not be taken for granted and unquestioned, we should, in an investigation of time presuppose *some* correspondence between the ‘real’ nature of time and our impressions of it. Investigating time in completely abstract, metaphysical terms

without some reference to our perception of time appears to be a hopeless task. Here, I will therefore start from the phenomenological perspective, and try to, from there, reach the ‘real’ nature of time.

I have argued that there is something to Dennett’s claim that philosophers simply trust their intuitions too much. On the other hand, it is hard to believe that philosophers’ intuition of time (“common sense time”) and the picture of time that is supported by natural language semantics only consists of unjustified ideas about reality. Intuition and “common sense” of time seem to be closely connected with the experience of time, and, although it can be wrong, this is no reason to simply disregard it completely from philosophy. Rather, it seems, it would be fruitful to investigate it to find which axioms it is based on; where it comes from and whether it is justified or not, what Dennett calls “*sophisticated aprioristic anthropology of folk (naive) psychology*” (Dennett, D. 2005, 33). In other words, even though I will not use the traditional semantic method which takes for granted that an investigation of natural language will uncover reality, I will assume that the conception of real time that is presupposed in natural language (natural language metaphysics) can shed some light on how we understand and perceive time: Thus investigating natural language can give some insight in common intuitions regarding time. In this sense we should grant that there is some correspondence between common concepts and language, and that this correspondence will make it easier to investigate the source of the conception of time that is presupposed by natural language. This will keep us from falling into the “trap” of naive folk psychology which is posed, according to Dennett, by intuition while not completely disregarding the possibility that intuition has the potential to inform our investigation (that is, this is an investigation that is more optimistic than Dennett’s).

2.2 Phenomenology and science

Our focus on the topic of time and investigation of the intuitive notion of time that is presupposed by natural language will spring from an anthropological method. By investigating our intuitions, experience, and perception of time, I hope to uncover something certain and reliable. I will take a *phenomenological* point of investigation, and see from there how we use language and interpret sentences. This will give us a pointer to how we *understand* time (which does not necessarily correspond to what time *is*). This semantic focus is a part of the *phenomenological perspective* which is taken here, in the tradition of Edmund Husserl¹ and Maurice Merleau-Ponty; since it is not reasonable to discuss the nature of time without discussing epistemology and the human perspective when it comes to the *understanding* of time. Natural science claims to be objective and distance itself from the first person perspective that is typically associated

¹Although one can argue that philosophers like St. Augustine, René Descartes, David Hume and Immanuel Kant performed phenomenology, Husserl is traditionally counted as the founder of the discipline.

with phenomenology. But in spite of this claim, the fact remains that science is a *human* enterprise, originated from a human desire to systematize and understand the world objectively. I will not ignore this fact, but rather use it as yet another dimension to view and understand time.

With the above in mind, there is a sense in which this thesis can be seen as an attempt to do what Husserl prompted in his *Crisis of European Sciences and Transcendental Phenomenology* (Husserl, E. 1970). In *Crisis* Husserl emphasizes the human first person perspective, and even objectifies it, as psychology attempts to do. Husserl argues that science is mistaken in ignoring the human life-world and seeking to step out of this perspective: The first person (phenomenological) perspective should be included in science because it is, after all, a vital part of perceptions. Nothing is experienced from a completely objective point of view: One is always situated in time and space and observes everything from such an indexical situatedness, and this goes for scientists too: “(...) science is a human spiritual accomplishment which presupposes as its point of departure, both historically and for each new student, the intuitive surrounding world of life, pre-given as existing for all in common.” (Husserl, E. 1970, 34) According to Husserl, science becomes meaningless when it is performed and written down while trying its best to ignore or objectify the actual subjects that perform it, invent the theories and hypotheses, perform the experiments, write down results and draw conclusions.

(...) Einstein uses the Michelson experiments and the corroboration of them by other researchers, with apparatus copied from Michelson's, with everything required in the way of scales of measurement, coincidences established, etc. There is no doubt that everything that enters in here - the persons, the apparatus, the room in the institute, etc. - can itself become a subject of investigation in the usual sense of objective inquiry, that of the positive sciences. But Einstein could make no use whatever of a theoretical psychological-psychophysical construction of the objective being of Mr. Michelson; rather, he made use of the human being who was accessible to him, as to everyone else in the prescientific world, as an object of straightforward experience, the human being whose existence, with its vitality, in these activities and creations within the common life-world, is always the presupposition for all of Einstein's objective-scientific lines of inquiry, projects, and accomplishments pertaining to Michelson's experiments.

(Husserl, E. 1970, 37-38)

In this sense, the current investigation, with its focus on the anthropological aspect, can be said to be in line with transcendental idealism. We will get back to this topic later in this thesis, but let us define what it means here. Transcendental idealism is associated with Kant, who most clearly argues for it in the Transcendental Aesthetic section of the *Critique of Pure Reason*. It is

defined as the view that time and space are simply *forms of human intuition*, which prevents us from perceiving time and space, and thus the external world, as they are “in themselves”. In other words: The concepts of time and space are completely dependent upon human intuition, because it is impossible to have experience of “pure” space and time, abstracted away from the objects we experience them in. Also, it is impossible to experience (or even imagine) objects that are abstracted from time and space. It is important to note that the concept of intuition that is used by, and in relation to, Kant, has a different content than the one which I have used in the discussions so far. That space and time are forms of intuition does, for Kant, mean that they are conditions for experience and perception in general, not that they occur as some specific ideas or as “common sense” in human consciousness. More specifically then, in this manner, time is a particular constraint on experience, and not something outside experience itself (at least it is not something *we* have the possibility to obtain completely *objective* knowledge about). The knowledge we can have about time and space is constrained by our own consciousness and the fact that we experience things in time and space. With asserting that the current discussion can be said to be in line with Kant’s transcendental idealism, I mean not that it denies the *possibility* of the existence of objects external to, and independent of, human consciousness (which was not Kant’s point either). The claim is that, if it is the case that time and space have any objective validity, totally independent of intuition (in Kant’s sense), we have no means of obtaining knowledge of it, simply because we cannot have experiences without time and space.

Before beginning the investigation of the nature of time, I will have a look at the most recent tradition of philosophy of time, which was started by McTaggart. A closer discussion of the tradition that followed his argument will provide background knowledge that will prove useful to keep in mind when discussing two recent and influential theories of time, provided by Ludlow and Mellor (in section 4).

3 Historical background

The first occurrence of the terms “A-series” and “B-series” was in McTaggart’s famous paper arguing for *The Unreality of Time* (1908). He claims that both series are fundamental features of time and they represent two aspects that are equally essential and fundamental for time.

3.1 McTaggart’s traditional argument

Positions in time, as time appears to us *prima facie*, are distinguished in two ways. Each position is Earlier than some, and Later than some, or of the other position. And each position is either Past, Present, or Future. The distinctions of the former class are permanent, while those of the latter are not. If M is ever earlier than N, it is always earlier. But an event, which is now present, was future and will be past.

(...)

For the sake of brevity I shall speak of the series of positions running from the far past through to the near past to the present, and then from the present to the near future and the far future, as the A series. The series of positions which runs from earlier to later I shall call the B series.

(McTaggart, J. M. E. 1908, 458)

However, McTaggart argues that the two series are in themselves insufficient models of time, and according to a whole tradition of philosophy after him, they are not even compatible. To be more precise, McTaggart argues that the B-series does not work as a sufficient model of time on its own: The fact that it is static, and the absence of an ontological distinction between the past, present and future in this model gives no room for the concept of *change*². So, McTaggart states, the B-series needs the *A-series* to work as a proper model of time: When an event has a position in the B-series (that is, it is earlier and later in relation to other events), this position is *fixed*, and there is no change at all in this picture. “So it follows that there can be no B series where there is no A series, since where there is no A series there is no time.” (McTaggart, J. M. E. 1908, 461)

However, the A-series is *in itself* contradictory. The reason for this is that it is impossible to define the positions that is included in it (past, present, future) without being caught in an infinite regress. The A-series accounts for the notion of change by referring to the future, the present and the past (recall the definition of the A-series: An event moves through the past, to the present and into the future). But then events have three contradictory properties: They

²The relation between change and time is an idea that was perhaps first stated explicitly by Aristotle in his *Physics*, book IV

are future, present and past, which are incompatible properties (an event cannot be, for instance, both past and present). An obvious reply to this would be that an event does not have those properties *at the same time*, but at different times; we would rather say, for instance, that something *was* future, *is* present and *will be* past. But then, McTaggart will ask, how do you define the terms ‘*was*’, ‘*is*’ and ‘*will be*’? If something was future, it surely means that at some point in the past it is the case that it is future, and when something will be past it simply means that at some point in the future it is past. So the A-series seem to be contradictory. But the A-series is the only model that can account for the notion of *change*. And change, according to McTaggart is the most fundamental aspect of time. Therefore McTaggart concludes that *time is unreal*.

McTaggart’s traditional argument generated two traditional standpoints that have dominated most of the philosophy of time after McTaggart: The A-theory and the B-theory, each corresponding to the A-series and B-series respectively. The relation between the two theories and McTaggart’s traditional argument is as follows. First of all, none of the philosophers on either side agree with McTaggart that time is unreal. Rather, they will advocate the reality and independence of their respective series, and claim that the other series is a mistaken way of modeling time.

The *A-theorist* typically agrees with McTaggart that the B-series does not work as a proper framework for time individually (that is, he will agree that *change* is a deeply fundamental feature of time), but he will disagree with McTaggart’s claim that the A-series inherently leads to an infinite regress, and will seek to prove this by providing semantical definitions of the terms that occur in the A-series, and argue that these definitions are unproblematic. This means that the A-series is typically connected to, and characterized by being dynamic, and therefore accounting for change (as we have already seen), and the ontological distinction between the past, present and the future. But also semantic argumentation is important, and it is claimed that the A-series accounts for *temporal indexicality* in language, in a way that the B-series does not, which means that there are sentences in natural language expressing true statements using terms that can only be defined in an A-series framework (typically words like ‘now’ and ‘yesterday’), and which, the A-theorist claims, cannot be satisfactorily translated into a corresponding B-series (tenseless) sentence that preserve the sentence’s meaning.³

The *B-theorist* will typically disagree with McTaggart’s first part of the argument, and claim that the B-series is a sufficient model of real time on its own, and (not surprisingly) agree with McTaggart that the A-series is inherently problematic. One important aspect that the B-theorist must deal with it that of *change*. He must either state that change is an illusion, and consequently not

³Other concepts connected to the A-theory are three-dimensionalism: The real world has only three dimensions (the spatial ones), which are ontologically different from the concept of time (or the temporal dimension, if there is one). Change is *real* in the strict sense: Objects have different properties at different points in time, and objects that exists in time are fully, completely and wholly present at every moment of its existence.

something *real* (which apparently is a view that is supported by modern physics, as we shall see later), or claim that change *is* an essential feature of time, but argue that the B-series can account for it without the aid of the A-series. This is typically done with accepting the A-theory challenge and attempting to define the A-theoretic ('tensed') sentences by B-theoretic ('tenseless') terms⁴. I will later have a look at the scientific aspect of the B-series, and shall for now briefly focus on the semantic argumentation.⁵

⁴Or, rather, define the A-theoretic notions with terms from the static B-series framework

⁵Other concepts that are connected with the B-series are *four-dimensionalism*: The view that the real world has four dimensions (a temporal one in addition to the three spatial ones), and *they are all equally real*. Change is *not real*; change, as we perceive it is actually an illusion: An object can have different properties at various temporal parts, in the same sense that an object different physical parts of an object can have different colors. Also *perdurantism*: The view that physical objects have temporal parts (sometimes labeled 'space-time worms'), and instead of being completely present at each moment, the moment is just a part (a "slice") of that object (just like one end of a stick is a part of the stick). So physical objects are made up of both temporal and spatial parts.

4 Arguments for the mutual exclusion of the A-series and the B-series

4.1 Ludlow and the A-theory

Ludlow makes the argument “from the structure of natural language to reality” that the A-series is the only model of time that correctly corresponds to reality and that the B-series simply contributes nothing of substance. The lines of argumentation in favor of Ludlow’s position from his *Semantics, Tense and Time: An Essay in the Metaphysics of Natural Language* (1999) that I will discuss are the following: First, Ludlow advocates the existence of a strong connection between metaphysical reality and natural language: By correct analysis of natural language semantics, it is possible to grasp the ontological status of metaphysical concepts. Second, Ludlow states that the B-theory must be a model of time that does not correspond to reality. The reason for this is that: “The B-theorist cannot account for the semantics of temporal indexicals; hence, the possibility of a B-theory metaphysics is undermined.” (Ludlow, P. 1999, xvi) Third is that the A-theory is better suited to explain the features of natural language where, according to Ludlow, the B-theory is insufficient.

4.1.1 The connection between language, thought and reality

As already mentioned in the introduction, Ludlow argues for a strong relation between language and reality. He quotes a passage from the quite controversial linguist-anthropologist Benjamin Whorf’s study of the Hopi language. Whorf argues that the natural language of Hopi contains no tense, no reference to time, and therefore, the Hopi people have no real concept of time, or rather, no concept of time that corresponds to the one we (speakers of English) have. Ludlow states that he thinks Whorf is right in a number of respects, although not in the specific claim that the Hopi language is radically different from ours. Ludlow agrees with Whorf regarding the more general point of the relation between language and reality: “I think he was correct in thinking that one can argue from the structure of human language to the nature of reality, and I think he was most likely correct in seeing a close connection between language and thought.” (Ludlow, P. 1999, xiiv) Thus there is a strong connection between language and reality, although the natural language semantics do not vary significantly, which basically shows that all languages share the same metaphysics (thus avoiding problems of cultural relativism): “It follows that humans all share the same metaphysics - the same reality.” (Ludlow, P. 1999, xiv)

The connection between natural language semantics and reality that Ludlow advocates is a very fundamental one: They are not independent of each other at all. The relation between them binds them so closely together that it does not really make sense to ask which one of them is the primary one: “Of course

many philosophers will hold that either metaphysics or the theory of meaning must be more fundamental than the other, but to me this has all the makings of a “chicken or egg” argument. There may be some deep truth about whether chickens or eggs are more fundamental, but no serious biologist would engage in such a debate, nor (I hope) would any serious philosopher be exercised by the question.” (Ludlow, P. 1999, 5) Ludlow’s idea is that we have “semantic knowledge”, which corresponds to knowledge about the world, and how to use the language to describe it. The way this works together with ontology, according to Ludlow, is that we are metaphysically committed to objects that serve as *semantic values in a correct T-theory for natural language* (Ludlow, P. 1999, 66) A T-theory is a theory about linguistic meaning that defines under which conditions sentences in the language are true. Specifically, the theory is based on truth-conditions (sentences that define when a sentence is true and when it is not, a typical example being: ‘Snow is white’ is true if and only if snow is white). For Ludlow, the T-theory describes the semantic knowledge that an agent has. When we are metaphysically committed to the existence of objects that serve as semantic variables, it means that, when we have a T-sentence like ‘For all x, Val (x, snow) iff x = snow’, it commits us to the existence of snow (Ludlow, P. 1999, 66) Ludlow further claims that a T-theory simply cannot avoid having metaphysical consequences, or commitments.

So, Ludlow argues that a semantics built on the B-theory view of time (the model he uses in his book is from Reichenbach: I will not go in any great technical detail here, but refer the reader to Ludlow’s book), has unacceptable metaphysical consequences: “If we take the metaphysical consequences of semantic theory seriously, then we shall be committed to a metaphysics in which future and past temporal points can be referred to and in which they are, in some sense, just as real as the present.” (Ludlow, P. 1999, 84) The Reichenbachian model of time operates with three different points in time to define the different tense operators in English: Reference time (R), event time (E) and speech time (S). Thus, according to this account, the future perfect is defined by E being earlier than R, but later than S. In effect, “(...) it seems that this semantic theory is committed not only to the existence of times, but also to their standing in certain temporal relations to one another (however those relations are ultimately to be cashed out).” (Ludlow, P. 1999, 85)

This is not a convincing argument against the B-theory. Recall that, according to the B-theory, or the B-series model of time, no times are ontologically privileged, in the sense that the future is just as real as the present and the past. The claim that a semantical theory based on the B-theory commits itself to the existence of more than one point in time (the present) is hardly a case against the whole theory. It could rather be that Ludlow’s point is that the B-theory’s commitment to more than one existing point in time is *counterintuitive*, but this is not a very solid argument either, since the B-theorists traditionally do not claim that their theory’s strength lies in its intuitiveness, but rather that it is supported by modern science.

Ludlow also thinks there are more specific problems with the B-theoretic account: the main claim being that the B-theory cannot handle the indexical nature of temporal discourse. This is an important objection, which will be discussed at length in the next section. In the end, it will become evident that Mellor, a B-theorist, proposes a possible answer to part of Ludlow's argument. For now, I will make a more general point against Ludlow: His use of intuitions as a basis for the account of time is flawed. He argues that an investigation of the structure of the semantics of natural language will point us in the right direction when it comes to metaphysics. This is because semantics and reality are so tightly connected that our *natural language metaphysics* view of time will become visible through the study of semantics. But, as Ned Markosian states (Markosian, N. 2001), is it not possible to have a natural language that is built up around some wrong metaphysical views? Even though all natural languages shared the same tense system (as Ludlow claims), this is not a reason to disregard the possibility that *reality* is radically different.

4.1.2 The indexical nature of temporal discourse

Ludlow's twofold semantic argument against the B-theory concerns temporal indexicals. Indexicality in language, for instance indexical utterances, refer to features that are dependent on the speaker and the speaker's context. A good illustration of an indexical "discovery" is provided by John Perry (1979):

Once I followed a trail of sugar on a supermarket floor, pushing my cart down the aisle on one side of a tall counter and back the aisle on the other, seeking the shopper with the torn sack to tell him he was making a mess. With each trip around the counter, the trail became thicker. But I seemed unable to catch up. Finally it dawned on me. I was the shopper I was trying to catch.

I believed at the outset that the shopper with a torn sack was making a mess. And I was right. But I didn't believe that I was making a mess. That seems to be something I came to believe.

(Perry, J. 1979, 3)

The clue in Perry's example is the word 'I', which Perry designates the "essential indexical": Perry's beliefs (and behavior) change radically when he realizes that he is the one making the mess. I will come back to indexicality in other contexts later: It occurs frequently among A-theorists. Ludlow is no exception: He focuses on indexicality in language. He claims that the occurrence of temporal indexicals in language, via the semantical knowledge argument that was just discussed, points to something *real* about the world. Ludlow describes a scenario similar to the one presented by Perry, but concerns temporal indexicals instead of personal identity indexicality. In the situation he describes, Ludlow is sitting in his office, calm and relaxed, thinking that his fifth wedding anniversary is on March 12, and that he should remember to buy his wife a present.

Then he suddenly realizes that “My fifth anniversary is today!”, which radically alters his calmness. Ludlow’s point is that, by the B-theoretic analysis, there is no difference in meaning between the two sentences ‘My fifth anniversary is March 12’ and ‘My fifth anniversary is today’, because the event time (his fifth anniversary) happens to be identical to the *speech time* (March 12) and the reference time (March 12) in both of the utterances (Ludlow, P. 1999, 87-88). So, according to the B-theory that Ludlow discusses, there is no difference in meaning between the two sentences. Furthermore, he argues that intuitively, they do not mean the same thing. One of the sentences describes some event taking place at a certain date, while the other one relates the same event to a ‘*now*’-point in time: The two sentences do not represent identical semantic knowledge. So it seems like the B-theorist gets into trouble because of her inability to define the notion of ‘*now*’ (or ‘*today*’) in B-theoretic semantics.

One way out of this problem that is commonly advocated by B-theorists, is the ‘token-reflexive’ account of the B-theory. According to this view, the present (or, more specifically, the term ‘*now*’ as it used in natural language) is defined as the time that is simultaneous with the occurrence of the utterance. According to the token-reflexive account then, the two sentences mean different things: One that an event takes place in a certain date (independent of the utterance), and the other one that the event takes place on the same day as the utterance. Consequently, “My anniversary is today!” simply means “My anniversary is on the same day as this utterance”⁶.

Ludlow does not accept this B-theoretic token-reflexive attempt to escape the problem of temporal indexicals: He correctly points out that the B-theorist gets in trouble when he encounters sentences like “There are no tokens” (or utterances). What makes the sentence “It snows now” true is that a token of it is uttered simultaneous with a moment in time when it snows. “There are no tokens” is a sentence that clearly has a meaning and that definitely can be true (when there are no tokens, or nothing is uttered). But the token-reflexive account makes the sentence true when a token of it is uttered at a time when there are no tokens. In other words, the sentence is gets a paradoxical character and will never be true (something which is clearly counter-intuitive).

Another kind of problem that the B-theorist runs into are sentences like ‘I’m glad that’s over with’ (or “Thank Goodness that’s Over” (Prior, A. 1959)). According to the token-reflexive account, the sentence means something like “I’m glad that the last point of that event is earlier than this utterance”. But, according to Ludlow:

On the standard B-theory analysis, this amounts to my saying that I am glad that my visit to the dentist’s office culminated at some time earlier than S, the time of the utterance. If my utterance was at 5 o’clock, this amounts to my saying that I’m glad the visit

⁶Accordingly, past is defined by “earlier than this utterance” and future “later than this utterance”

culminated before 5 o'clock. But is this really what I'm glad about?
(Ludlow, P. 1999, 88)

It certainly seems counterintuitive: One would want to claim that the relief that some unpleasant event is over has nothing to do with the starting point of utterances.

Still more perplexing for the B-theorist, the indexical element in 'this utterance' looks an awful lot like a temporal indexical predicate. It certainly isn't spatial; nothing in the perceptual environment is being demonstrated. It looks for all the world as if the extra indexical element just means *now*, and as if the expression 'this utterance' means something akin to 'the utterance happening now'!

(Ludlow, P. 1999, 90)

The *A-theory*, however, does not encounter the same problems as the B-theory account does, according to Ludlow. By including A-theoretic references to future, present and past in a T-theory, he claims to overcome the problem that is encountered by the B-theory analysis. The predicates, past present and future are defined by tensed verbs: "Val(x, PAST) iff x was true, (...) Val(x, PRES) iff x is true, (...) Val(x, FUT) iff x will be true" (Ludlow, P. 1999, 97). According to this definition then, the intended meaning behind the sentence "I'm glad that's over with", is happiness that the unpleasant event *ended at some point in the past*, and not that it ended earlier relative to the utterance of the sentence.

An interesting difference between Ludlow's analyses of the A-theoretic and the B-theoretic account is that the truth-value of statements like "Dinosaurs roamed the earth" (Ludlow, P. 1999, 147) is decided differently according to the two accounts. That is, the sentence has different truth-conditions. According to the version of the A-theory that Ludlow advocates (presentism), only the present exists, it cannot refer to past and future events, because they do not exist. The B-theory, on the other hand, claims that the future and the past are just as real as the present, which makes reference to those times unproblematic. For the B-theory, the sentence "Dinosaurs roamed the earth" is a statement about some point in the past, and is true *about that (past) time*. While for the A-theorist, we can only find clues in the present moment as to whether dinosaurs existed or not (i.e. fossils and similar evidence). Ludlow seems to think that the latter way of deciding is more convincing than the former: "(...) we do not evaluate this sentence by "traveling" to some time earlier than now and determining whether, at that time, 'Dinosaurs roam the Earth' is true. Rather, the truth of it is grounded by current fact (...)." (Ludlow, P. 1999, 148) This form of argumentation is based on the anti-realism of Dummett, and it is not unproblematic to use it as a *defense* of presentism, but it does certainly seem to be one of the consequences of such an account. Interestingly, it seems to be a rather counterintuitive result of Ludlow's presentism: One would like to think

that the truth of ‘Dinosaurs roamed the earth’ holds as true for a particular period of time in the past, and not something that is true only because we find signs that it was true now. Ludlow recognizes this problem. He states: “Since future- and past-tensed sentences are to be evaluated on the basis of the present, it is possible to envision a situation in which evidence that may have been present at t_1 is erased or eliminated and is hence not available at t_2 . ” (Ludlow, P. 1999, 149) This will not be discussed further here, but rather state that anti-realism is a possible problem for the A-theorist.

Anti-realism might actually be a reason to prefer the ‘growing block’-version of the A-theory over presentism. According to the growing-block account, the present is still ontologically privileged, and the flow of the ‘now’ is accounted for. But the past has the same ontological status as the present; however, the future does not yet exist and is indeterminate. This makes statements about past times as unproblematic as for the B-theory, and statements about the future are still not easy. But this is perhaps a desirable feature of the account? This is the version of the A-series that is advocated by Rakić, as we shall see later in this thesis. For now, let us look at some criticism of Ludlow’s account.

4.1.3 Markosian’s reply to Ludlow’s argument

Markosian (2001) argues that, if the difference between the sentences “My anniversary is March 12” and “My anniversary is today!” shows something about temporal reality, namely that the present is ontologically privileged, then one is also committed to the reality of personal and spatial indexicality as well. The reason for this is that the temporal “anniversary-sentences” Ludlow uses as examples have spatial and personal counterparts (or analogies). Consider Perry’s supermarket example (Perry, J. 1979): ‘John Perry is making a mess on the floor’ and ‘I am making a mess on the floor’; these are sentences that have different meanings, and the difference exists because, as we have seen, of the special meaning of the indexical word ‘I’, and their truth values will change accordingly. Or, considering spatial indexicality, look at the two sentences: ‘London is sixty miles south of here’ and ‘London is sixty miles south of Cambridge’. It is clear that the first one will only be true in Cambridge, as will ‘I am making a mess on the floor’ will be true when uttered by the person who actually is making the mess (John Perry), but the sentences ‘John Perry is making a mess on the floor’ and ‘London is sixty miles south of Cambridge’ will be true regardless of the identity of the speaker and the spatial location of the utterance. Recall that Ludlow argues that the use of temporal indexicals in language shows that there is something ontologically privileged about the ‘Now’, since the B-theory apparently is not able to deal satisfactorily with it. But would the spatial and personal analogies convince anyone that there is something ontologically privileged about ‘me’ or about ‘here’?

4.1.4 Mellor's 'reply'

Mellor is one of the most recent advocates of the B-theory. He emphasizes that the use of indexicals in arguments like the one that Ludlow presents has spatial analogies that also need to be considered:

In short, despite there being spatial analogues of everything that leads many people to believe in temporal *A*-facts, no one believes in spatial *A*-facts. No one thinks that Cambridge, as well as being 52°north and 0°east, sixty miles north of London, etc., also has the spatially variable property of being *here*. Whatever their views on time, all parties agree that things and events in space are - literally - neither here nor there.

(Mellor, H. 1998, 51)

Accordingly, then, as no one believes that there is something ontologically privileged about 'here', there should not be a reason to assume that there *is* something ontologically privileged about 'now'.

The other part of Ludlow's objection to the B-theory has to do with the meaning of sentences like 'I'm glad that's over with'. According to Mellor, the crucial point in the meaning of an utterance like that is not that the unpleasant event *is* over, but that the speaker *believes* it is over (and this is what causes him to utter the sentence that he is glad it is over). "(...) if at any *B*-time *t* I believe I am now in pain, this now-belief can be *made true by the B-fact* that I am in pain at *t*; and similarly if I believe at *t* that I am not now in pain." (Mellor, H. 1998, 41, my emphasis) Mellor's main point is that A-theoretic *beliefs* are indispensable, not that there is anything *ontologically* privileged about the present. The reason for this is that what makes both the sentences true, and their meaning different, are *B-facts*. This means that "My anniversary is March 12" is always true, and "My anniversary is today!" is only true on March 12. What makes "My anniversary is today!" true (on March 12) is not that a token of it is uttered on March 12, but the fact that the *belief* that the anniversary is today is true on March 12. So both A- and B-statements (tokens) exist, but what makes them true (their "truth-makers") are always B-facts, as there are no "tensed facts", that is, no A-facts.

(...) if we let *t* be either an A- or a B-time, we can all agree to replace the token-reflexive theory ... with any A-proposition 'P' about any event *e* is made true at any *t* by *t*'s being as much earlier or later than *e* as 'P' says the present is than *e*; and similarly for its personal and spatial analogues.

(Mellor, H. 1998, 34)

4.2 Mellor and “the new B-theory”

Mellor has developed and revised several B-theories during the last 20 years. I will take his most recent theory as presented in *Real Time II* (1998) as the main source, but will also make reference to other versions for illustration and comparison. This will be relevant when considering Ludlow’s discussion of Mellor’s arguments (Ludlow discusses Mellor’s (1985) *Real Time*)

According to Mellor, it is indeed not possible to reduce tensed (A-theoretic) beliefs to B-theoretic ones. He claims that our thoughts are tensed (a simple result of our thinking happening *in time*), but what makes tensed beliefs true, are not tensed facts, but *B-facts* (objective facts). Actually, there are no A-facts, according to Mellor. That is, there are no tensed facts. So what makes the tensed sentence “Joe is now in the kitchen” true, is not the fact that Joe is located in the kitchen *now*, but that the *token* of the proposition “Joe is now in the kitchen” is true for the person uttering it at the time when Joe is in the kitchen. Or, more generally: “any A-proposition ‘P’ about any event *e* is made true at any *t* by *t*’s being as much earlier or later than *e* as ‘P’ says the present is than *e*.” (Mellor, H. 1998, 34) Or put another way: “the truth value of any token *u* of any proposition ‘P’ [is] the truth value ‘P’ has for whomever produces *u* when and where they do so.” (Mellor, H. 1998, 79)

We cannot get around the fact that we have tensed beliefs, or rather, beliefs that we expressed with tensed sentences, which cannot be translated into ‘tenseless’ sentences in a way that is satisfactory. What Mellor means by “beliefs”, is something that can be made true by (B-)facts. True A-beliefs (for instance the tensed belief that ‘Jim races tomorrow’), Mellor shortens to “A-truths”: “No one will deny that such beliefs can be true or false, nor that which they are depends on when they are held. This means that we must, for example, distinguish believing *now* that an event is *past* from believing in the *past* that it was then *present*.” (Mellor, H. 1998, 23) Mellor’s definition of beliefs must therefore be that a belief is not an abstract entity that has a meaning all by itself, independent of time and the state of affairs in the world: “Here I shall apply [the concept of truth] to beliefs, to statements of them, to sentences expressing them, and to their contents, which I shall call ‘propositions’ and assume are what sentences expressing beliefs mean.” (Mellor, H. 1998, 23-24)

Mellor introduces a distinction between truth-conditions and meanings of propositions, the main point being that the truth-conditions of a sentence can vary over space and time, while the meaning does not. Consider the B-truth-condition of the tensed (A-) proposition It is now M: “It is now M is true at *t* if and only if *t* is in (or is) M.” (Mellor, H. 1998, 58) This proposition (expressing the truth-condition) is true *always*, while the original truth value of the tensed proposition ‘It is now M’ (taking M to be a date) varies; it depends on the time of utterance. Mellor’s point (which he grants to the A-theorists), is that the meaning of a sentence is not something that changes: To believe the meaning of the proposition “Jim races tomorrow” is to believe that Jim races the day

after today. But if we were to (as B-theorists traditionally have been known to attempt) reduce the *meaning* of A-sentences to B-meanings, we would end up with the result that the very same proposition “Jim races tomorrow” gets a different meaning every day: “on 1 June, that he races on 2 June; on 2 June, that he races on 3 June; and so on.” (Mellor, H. 1998, 59) Beliefs are therefore tensed: To know the meaning of a tensed proposition is, according to Mellor, to believe that something like the tensed sentence is the case, and not some B-proposition. If this was not the case, we would have to be dependent upon knowing today’s date to believe tensed propositions. And that is most certainly the case: Intuitively, we can believe (and know the meaning of) the proposition “It rained yesterday” without having a specific date in mind, or knowing which date it is today.

With this distinction between the (constant) meanings and (changeable) truth-conditions of a proposition in mind, Mellor claims that the constant meanings of tensed sentences are “(…) *functions*, from *B*-places and *B*-times to the *B*-truth-conditions of *A*-sentences at those places and times (…). This makes ‘C is here’ mean the [truth-condition]-function from any *B*-place *s* to *s*’s being where C is, and ‘It is now M’ mean the tc-function from any *B*-time *t* to *t*’s being in (or being) M.” (Mellor, H. 1998, 59) So if meanings are truth-condition-functions (tc-functions) from truth-conditions to B-destinations, then it is possible to know the meaning of a tensed proposition without having knowledge of the present date. “So if ‘Jim races tomorrow’ means the tc-function from any *B*-day *d* to Jim’s racing on day *d+1*, then I can know what this A-sentence means, and hence, what I believe by believing it, whether or not I know which day *d* is.” (Mellor, H. 1998, 60) Even if meanings do not supervene on truth-conditions, the opposite must be the case. Because the truth-conditions of A-propositions (and indexical sentences in general) vary across time (and space), while the truth-conditions of B-propositions do not, A-propositions cannot be reduced to B-meanings. “This is the real reason why no *B*-sentence can translate ‘C is here’, ‘It is now M’ or any other contingent *A*-sentence.” (Mellor, H. 1998, 61)

The result is that there are tensed, true beliefs, but no tensed, true *facts*, as what makes the proposition ‘Cambridge is here’ true, is not the *fact* that Cambridge is ‘here’. It is, rather, the fact that the proposition is uttered in Cambridge. Mellor defines something he calls “truth-makers”. These are facts that *make* propositions true: “‘Jim races tomorrow’ is *made true* by a fact P (…).” (Mellor, H. 1998, 25) And this fact P cannot be an A-fact, that is, what makes the proposition ‘Jim races tomorrow’ true, is not the fact that Jim races tomorrow: That would simply be trivial. Mellor proposes that what make A-propositions true are simply B-facts, which are similar to the concept of states of affairs. An example of a B-fact is that Jim races on 2 June (while an A-fact is that Jim races tomorrow). Mellor argues that the truth-makers for A-propositions are not A-facts, but B-facts. As the truth values of A-propositions depend on the time of the utterance, there is an apparent problem concerning how constant, unchanging B-facts can make A-sentences true, when the truth-values of A-sentences are not fixed. The solution is that there are as many

B-facts as times necessary for A-sentences to have independent truth-values: “(. . .) it takes a new *B*-fact to make ‘Jim races tomorrow’ true or false each day.” (Mellor, H. 1998, 28) So, for the A-sentence ‘Jim races tomorrow’, we need one B-fact each day as truth-maker.

4.2.1 Ludlow’s rejection of Mellor’s “way out”

Ludlow states: “Mellor holds that it is enough that my *beliefs* be tensed. On his view, a commitment to tensed beliefs entails nothing about there being tensed truth conditions for my tensed utterances, and certainly nothing about reality’s being tensed.” (Ludlow, P. 1999, 95) Ludlow’s point is that beliefs must also be (internally) formulated in language, and so have semantics. The arguments concerned with language must thus be relevant for beliefs. Also, he asks: “(. . .) what would it mean to say that we have tensed beliefs but a B-theory semantics and metaphysics? If the world contains only B-theory resources, then precisely how do we avoid having a B-theory psychology?” (Ludlow, P. 1999, 96) I want to argue that exactly the fact that we are embodied beings *situated in space and in time* is what makes us have A-theoretic psychology. As will become evident in the next chapter, we have all our experiences in the present, and this causes us to experience things from an A-series perspective, but the B-series is also necessary for us to understand and perceive time.

Let us have a look at Ludlow’s main argument against the B-theory. Recall that, according to Ludlow:

The chief problem with the B-theory is that it fails to account for the indexical nature of our temporal discourse. As an illustration, suppose that I know I have an important appointment at 2 o’clock, but that because my watch has stopped I do not know that it is now 2 o’clock. I blissfully think out loud: “I have an appointment at 2 o’clock.” Suddenly, the radio announces that it is 2 o’clock. I now think out loud: “Oh no, I have an appointment *now!*” The alleged problem for the B-theorist is that there is no way to distinguish the content of these thoughts/utterances with B-theory semantic relations. As far as the B-theory is concerned, ‘now’ just means ‘the same as this utterance’, which is just to say ‘2 o’clock’.

(Ludlow, P. 1999, xv)

As we have seen, Mellor can easily counter this, as he does no longer advocate the token-reflexive account of the B-theory. It is worth mentioning here that the token-reflexive account that Ludlow strongly criticizes is defended by Mellor in his *Real Time* (Mellor, H 1985). He later revised this theory, on the grounds that, for instance, as the token-reflexive view is not able to cope with statements like ‘there are no tokens now’: “(. . .) I now advocate the simpler view that ‘*e* is present’ is made true at *t* by *e*’s being located at *t*, and similarly for other

A-propositions.” (Mellor, H. 1998, xii) According to him, when I do believe that the unpleasantness of an unpleasant experience is past, this causes me to think the (tensed, A-theoretic) “I’m glad that’s over”, but the very fact that I believe this *after* the end of the unpleasant event is a *B-fact*, and it is this fact that makes my belief (that it is over) true.

It is interesting to see that Mellor’s theory claims to be a *B-theory* of time when it is, in such a high degree, built upon the A-series. The reason Mellor sticks to the B-theory is that he will commit only to *B-theoretic facts*, and specifically claims that there are no such things as A-facts. But it is also clear that Mellor’s theory uncovers an interplay between *beliefs* and experiences concerning past, present and future moments (A-determinations), and B-facts and B-beliefs. This points to that a *combination* of the A-series and the B-series might be possible. I will, in what remains, explore this possibility further, by looking at different arguments which maintain the A-series and the B-series are necessary for the understanding and perception of time. A few attempts have been made to combine the two series, they will be discussed. I will also have a look at Rakić’s dissertation, where the B-series and the A-series are combined with the Special Theory of Relativity, in an attempt to cover both modern science and a “common sense ” view of time.

5 Necessary co-existence of A-series and B-series

5.1 Interdependence and non-reducibility

I will claim that the A-series and the B-series are equally fundamental for our perception and understanding of time. What is the relation between the two series? Recall that, according to McTaggart's traditional argument, the B-series cannot be the right model of time, because it is static, and thus cannot account for change. It also seems like there is a broad agreement between the philosophers of time that *change* is one of the most essential aspects of time, and should therefore be accounted for by a theory of time. The traditional strategy for A-theorists has been to rely on the apparent fundamentality of change and claim that it represents an ontologically essential aspect of time, which only the A-series can account for. The B-theorist's classical claim here is normally that we indeed experience change in relation to time, but that change is an illusion, or at least strictly psychological and has nothing to do with the objective reality. Where McTaggart claims that the B-series needs the A-series to work as a proper model of time, the B-theorists typically deny this: The aspect of change is not necessary, and the B-series is a completely self-sufficient model of time. In addition to this, B-theorists claim that the A-series is reducible to the B-series.

Furthermore, as we have seen, McTaggart argued that the A-series is inherently contradictory: It is based on ontological distinctions between times (A-determinations), that is not definable within the A-theoretic framework. The classical A-theorist solution to this problem is of course to show that this contradiction does not really occur, while the B-theorists traditionally heartily agree with McTaggart on this particular part of his argument. In addition, A-theorists claim that the B-series is reducible to the A-series, to show that the A-series is a sufficient model of time by itself. I will not go into detail about McTaggart's classical argument and all the attempts to solve the problem, but rather concentrate on one attempt to combine the two series, and claim that both of the series are equally fundamental (which is to say that neither of them is "reducible" to the other), and that it is not the case that one of them supervenes on the other. I will then go on to look at different arguments from several fields in philosophy for that each of the series are necessary for our conception and understanding of time.

5.2 The possible co-existence of the A-series and the B-series: Rakić

The main motive of Rakić's dissertation (1997) is to show that it is possible to combine the A-series and the B-series in a mathematical model, and that this again is consistent with physics (that is, there is no contradiction between the A-series). Rakić argues that the A- and B-series can coexist by emphasizing the fundamental nature of time that *both* of the series represent: Time is both

dynamic and static by nature. Both are equally ‘right’ and fundamental, and the two characteristics of being dynamic and static are compatible. The bottom line in Rakić’s dissertation is that there is no contradiction involved in combining the A-series and the B-series. The A-series is simply a series of ontological becoming, the “sum total” of existence. The B-series involves no ontological distinction between what is past, present and future. To be sure, it does not involve any past, present or future at all: Ontology and ontological distinction between what is real and what is not is something that is closely attached to the notion of the past, present and future (in Rakić’s case, what is present and past is real, and what is future is not), which belongs solely to the A-series. The A-series is simply the realized part of the B-series.

Now, there is an apparent problem concerning the combination of the A-series and B-series with the Special Theory of Relativity. More specifically, it illustrates the apparent incompatibility of the A-series and the B-series, and at the same time shows that it is far from unproblematic to combine the A-series with Einstein’s Special Theory of Relativity. This argument has been formulated by several philosophers⁷, but it clearly and well presented in Kennedy (2003). Einstein’s Special Theory of Relativity includes the relativity of simultaneity (whether two events are simultaneous or not is dependent on the frame of reference). This poses a problem for the A-series, because Einstein’s theory does not seem to be compatible with a universal, clear distinction between past, present and future. Briefly explained, this is because, as the notion of simultaneity is relativized, then two events that are simultaneous from one frame of reference, are not necessarily in each other’s present according to a different frame. What Kennedy (2003) calls the *triangle argument* illustrates the problem in a simple way: Granted that I am not a solipsist, I want to say that there are some events that coexist with me (these are not necessarily simultaneous with me). If I also accept that simultaneity is relative, then, I am forced to accept that there are events that are simultaneous with *me-today* (a distant supernova, say), according to one frame of reference, but this supernova is simultaneous with *me-tomorrow* according to another frame of reference. If one accepts this scenario, one is forced to admit that *me-today* can *coexist* with *me-tomorrow*⁸. This again conflicts with what Rakić would call our “common sense” notion of time, because, according to that concept, there is a clear, ontological distinction between future, present and past events. According to the triangle argument then, there is a clear sense in which the present occurrence of me exist in the same way (has the same ontological reality) as the future me (Kennedy, J.B. 2003, 63), and this is a fatalist universe most philosophers tend to want to avoid.

The triangle argument shows that it is important that the notion of *present* in the A-series is an *absolute* relation. That is, when the notion of present is

⁷For instance Hilary Putnam (1967)

⁸The reason why one should not take the notion of simultaneity as transitive here, and thus claim that *me-today* and *me-tomorrow* are simultaneous, is that simultaneity is frame-relative, and to assume a transitivity of that relation would be trying to make it absolute. Existence (and therefore co-existence) is not a relativized term, and has to be transitive.

frame-relative, the notion of existence is frame-relative. Thus, Rakić defines the A-series in terms of the primitive relation \leq , called the *STR causal relation*. This is an *absolute* relation, defined as follows: $e_1 \leq e_2$ “(. . .) iff a signal emitted at e_1 can reach e_2 .” (Rakić, N. 1997, 16)

The reason that the definition is based on the possibility of a signal emitted from the first event reaching the second is that this guarantees that the STR relation is causal: The first event can causally influence the second. Interestingly, the use of the notion of signals in the definition is that the speed of light (which is the fastest possible speed which any signal can travel), sets a limit on what can be counted as the *causal future and past*. Rakić calls the group of events that are not connectible to an event e the *causal elsewhere* of e . By this, she means “(. . .) because of the speed limit c no observer can be present at e and at one of the events which is both outside and the causal future of e and outside the causal past of e .” (Rakić, N. 1997, 17) (In the quote, ‘ c ’ denotes the constant speed of light.)

The STR causal relation is absolute and generates three distinct classes in respect to every event e : The absolute causal future, the absolute causal past and the causal elsewhere of e (Rakić, N. 1997, 17) If, for instance, an event e_1 is in the causal future of e_2 , it simply means that e_2 has the possibility to causally influence e_1 . The use of the notion of causality in the definition ensures that the events are connected to each other, to a certain extent: “Since the speed of light sets limits on connectibility of events by a signal, it sets limits on causality as well by making some events nonconnectible by a signal.” (Rakić, N. 1997, 17)

Rakić uses this STR causal relation to define what she calls the *B-grid*: “The *B-grid* is the set of point-events ordered by the STR causal relation \leq .” (Rakić, N. 1997, 76) Thus, including the STR causal relation, the B-grid is an absolute event structure. Alfred Robb (Robb, A. 1936) has shown that, starting from the B-grid, one can reconstruct an axiomatic development *Minkowski space-time*. Minkowski space-time is Hermann Minkowski’s interpretation of the Special Theory of Relativity. Minkowski suggested seeing time as a fourth dimension (in addition to the three spatial ones), and constructed diagrams showing time and space as a four-dimensional mathematical structure. The fact that one can arrive at Minkowski space-time using the STR causal relation (the B-grid) means, in this context, that the B-grid is a model of Minkowski space-time.

From Minkowski space-time, Rakić defines the *B-series*. “A relation on events of Minkowski space-time which clearly does satisfy the conditions for generating a B-series is the frame dependent metrical relation of “earlier than”.” (Rakić, N. 1997, 77) Thus, the B-series is defined from Minkowski space-time: “A *B-series* is the set of point events ordered by a metrical “earlier than”-relation.” (Rakić, N. 1997, 77) The reason that she does not use the STR causal relation to define the B-series, is that, according to McTaggart’s original definition, the B-series must be *connected*. This means the following: It is the case that for any two events, they stand in relation of being earlier than, later than

or simultaneous with each other. This is not the case for anything generated by the STR causal relation, as we just saw, because of the notion of the causal elsewhere. The *B-grid*, on the other hand, is a structure defined by the STR causal relation. The B-series is, furthermore, defined by an “earlier-than relation”, which *is* connected, but frame-dependent: “(...) each reference frame will be supplied with its own B-series. In other words, the notion of “B-series” becomes relativized to a frame of reference.” (Rakić, N. 1997, 77) In other words, there are several B-series, with their own notions of simultaneity, one for each frame of reference according to the Special Theory of Relativity.

As we saw earlier, the *A-series*, in contrast to the B-series, must be *absolute*, and cannot be defined by a frame relative relation. The version of the A-theory that Rakić uses is a ‘growing block’ series, which is the one most commonly associated with the Special Theory of Relativity. According to the growing block theory, the past and the present are equally *real*, while the future is not⁹. Frame relativization of the A-series is problematic because the ontological status of reality is defined by the notion of existence: What is real now is what presently exists. If we make the A-series, which is completely dependent upon the ontological status of reality, frame relativized, it is clear that the notion of existence also becomes relativized in a similar manner. In other words, existence becomes frame-dependent, which is clearly unacceptable. So, according to Rakić, the A-series’ notion of the present must be *absolute*. Rakić states:

We take an A-series to be the realized part of the B-grid. In Broad’s terminology, an A-series is “the sum total of existence”. However, since “the sum total of existence is always increasing” by adding “the fresh slices of existence”, a new A-series will emerge each time “a new slice” of realized events is added to the already realized events.

(Rakić, N. 1997, 78)

Rakić’s definition of the A-series is based on the STR causal relation from the B-grid just introduced, and a *realization* relation R. This relation is binary and basically marks a division between a realized and a non-realized part with respect to any event in space-time. And, as we just saw, the realization relation must not be frame-relative. According to Rakić, the A-series is a set of realized events. It is then evident that this notion of the A-series corresponds to the growing block view of time: The ontological limit between the present and the future is determined by the realization relation, and the notion of the present, the binary relation PRES, is derived from R. According to Rakić, to events are in each other’s present when they are realized from each other’s perspective, which again means that they have the same set of realized events. Now, it

⁹The growing block theory is, together with presentism, advocated by Prior and Ludlow, the one most commonly defended by A-theorists. The growing block theory holds the advantage over presentism that it is more easily compatible with recent science.

is important to note that the relation PRES generates an *absolute* notion of present, because R is absolute, and not relativized to frames of reference.

The A-series thus constitutes the realized part of the B-grid. R is independent of the STR causal relation. The "earlier than" relation is, as we have seen, frame relative, while the realization relation is not. This means that it is not definable in Einstein-Minkowski space-time diagrams that Rakić connects to the STR causal relation, and, as Rakić states that the Special Theory of Relativity is a theory about time, the realization relation R is not about time, but rather has to do with ontology: The realization relation generates an ontological series, but: "(...) however, A-series are also temporal, since each A-series is a part of the genuinely temporal B-grid." (Rakić, N. 1997, 79)

An important point in Rakić's account, is the difference between the nature of the notions simultaneity and present. The notion of simultaneity is a temporal relation and is defined within the *B-series* as follows: "Two events e_1 and e_2 , occurring at points p_1 and p_2 of an inertial frame F respectively, are simultaneous in F if and only if light emitted at e_1 meets light emitted at e_2 at the midpoint m of the segment p_1p_2 in F (...)." (Rakić, N. 1997, 6) We see that this definition is similar to that of the STR causal relation in that it includes the possibility of signals being emitted between events, and the notion of simultaneity is thus frame relativized according to the Special Theory of Relativity. As the B-series is based upon a connected, 'earlier than'-relation, all the B-series, relative to their frame of reference, comes with their own notion of simultaneity. This latter point can perhaps be a bit challenging to grasp. We can illustrate this point by having another look at the triangle argument.

By using Rakić's model, we can try to get out of the problem of fatalism that the argument poses, as we saw at the beginning of this section. According to Rakić's account, fatalism only becomes a problem if one accepts the notions of past, present and future as frame dependent and therefore variable. As we have seen, Rakić argues that this is not the case. The notion of present (defined by the relation PRES) that belongs to the A-series is *absolute*, and based on the realization relation R. The notion of *simultaneity*, that belongs to the great number of B-series, on the other hand, is indeed frame-relative. This means, for the triangle argument, that the *ontological* claim that me-today and me-tomorrow coexist does not hold. Seen from me-today, the distant supernova is in my present if it is realized with respect to me, and vice versa, but if it is in the present of me-today, it cannot be the case that the same (instant of the) supernova is in the present of me-tomorrow. But it might very well be that me-today is *simultaneous* with the supernova, which again is simultaneous with me-tomorrow. But the reason why this is unproblematic is that simultaneity is a temporal relation, which must be distinguished from the ontological relation of realization. Simultaneity is relative, and bears no ontological commitment. The realization-relation is absolute, and the B-series, frame-relativized relation of simultaneity included in the Special Theory of Relativity gives room for it, according to Rakić.

5.3 (Necessity of the) A-series: Change, consciousness and indexicality

I will argue here for the necessity of the A-series, for the reasons that all our experiences are in the present, and we experience change (which makes the present privileged, something that the B-series doesn't account for). Also, I will argue that there is an interdependency between consciousness and the notion of the present, and that, consequently, there would be no A-series if it was not for conscious beings.

5.3.1 Nerlich and Varela

A-theorists traditionally argue that the A-series can account for the concept of *change* in a way that the B-series cannot. There seems to be two aspects of change connected to the A-series: The change that happens *internally* in the actual series (in a way that the B-series cannot), and the more general notion of the very *dynamic* character of the A-series (commonly represented with the moving present).

I will now look at some philosophers that have been emphasizing the complexity of the experience of the ‘now’-moment. Phenomenologists have based their studies of the phenomenology of time on Husserl's discoveries from the method of the phenomenological reduction. One of the most recent philosophers to do this is Francisco Javier Varela (1999). He emphasizes that the experience of the present is not the a small ‘knife-edge-present’: The moment of ‘now’ rather has some extended, complex structure, which includes elements from both the past and the present. Therefore, it is worth noting that, although Varela heavily emphasizes the feature of the ‘Now’ in relation to experience, his presentism must be clearly distinguished from the view of ‘limit’- or ‘knife-edge-present’ that was originally advocated, most famously, by St. Augustine. I will briefly look at Augustine's view, for a contrast. According to Augustine (Augustine 1953), the present is something without extension: It merely exists as a limit between the past and the future. The past and the future, on their side, are not real, as they are not available for us in the same way as the present is. The past and the future only exist as subjective thoughts (memories of the past and expectations about the future), which means that the present is reduced to a limit between two unreal things, and as the present has no extension itself, it too must be unreal. Varela, however, basing his view on that of Husserl, argues that the present does have some sort of extension, and that it includes aspects of both the past and the future. He calls the concept the *three-part structure of temporality*, and the structure in question is basically this:

There is always a centre, the now moment with a focused intentional content (say, this room with my computer in front of me on which the letters I am typing are highlighted). This centre is

bounded by a horizon or fringe that is already past (I still hold the beginning of the sentences I just wrote), and it projects towards an intended next moment (this writing session is still unfinished). These horizons are mobile: this very moment which was present (and hence was not merely described, but lived as such) slips towards an immediately past present. Then it plunges further out of view: I do not hold it just as immediately and I need an added depth to keep it at hand.

(Varela, F.J. 1999, 112-113)

I will not go in any great depth concerning Varela's general theory of time, but rather focus on the role he gives the present in relation to time-consciousness/experience. Interestingly, Varela argues that, because of the complexity of the present, it, in contrast to the future and the past, cannot be called a completely *temporal* location. The experience of the *flow* of time that is so often emphasized in relation to the A-series is not completely appropriate: It is not as if we are helplessly and passively "taken away" into the future, but we also 'live' the present moment: "In effect, 'now' is not a temporal location for it has a lived quality as well: It is a space we dwell in, rather than a point where an object passes transitorily." (Varela, F.J. 1999, 119) Varela uses thus a spatial analogy to bring out the characteristic of the 'nowness' as a *centre*, which is comparable to the centre of our visual field.

Furthermore, Graham Nerlich emphasizes the role of the present in our experiences, in stating that the time that an event that I experience takes, seems to be exactly the time it takes me to experience it:

If I see an extended happening, then I see it as taking the same time to happen as it takes me to see it. Its extension in time (...) seems exactly the same as that of my seeing it. So fast-or slow-motion photography looks comic because we see the happening itself as absurdly slow (fast). There is no perspective effect in temporal perception, whereas in spatial perception we are quite used to seeing as huge, distant mountains which fill but a small part of our visual field. (Nerlich, G 1998, 130)

Both of these philosophers thus tie the notion of the present very strongly to the notion of general change, and the feeling of 'flow' that is connected to the experience of time. I have not gone far into their arguments, but only touched upon how some phenomenologists see the general *change* as connected to the 'moving present' and how it is connected to simple experiences of events. I will now look more specifically at time in relation to consciousness.

The other aspect of change mentioned in the beginning of this section is that the A-series gives room for observing change in the world, something that the B-series does not do to the same extent. I will now look at David Schenck's

argument, which heavily relies on our experience on time (or the notion of present).

5.3.2 Schenck

Schenck's (1985) main claim is, in short, that all experience must be essentially *indexical*. According to Schenck, the problem starts when considering the point that we are inevitably *located* in space, and that this constitutes, in a sense, a boundary for experience, to such a high degree that we encounter the problem of solipsism. We never experience physical objects in a complete way: They are only given to us as incomplete objects, in the sense that we are never able to experience, for instance, the backside and the inside of a house when we are looking at it from outside, in front of it. But it must also be the case that we do not have the possibility to say which perspective is the *right* one, we encounter the problem of solipsism: Things look different from different angles, we cannot judge who is right in contradicting perceptions about the same thing. We can never experience an object from all possible angles at once. Because, Schenck argues, the notion of *location* would not make any sense if we did. Furthermore, if we were situated at and experienced something from all possible locations at the same time, we would not know what *experience* was. Schenck largely follows Merleau-Ponty in arguing that all the locations that are not currently the point from where we perceive an object should rather be seen as *possibilities* for experience, rather than representing a shortcoming, or a limitation of human experience. In essence, these locations represent possible perspectives for perception: They are necessary for our conception of the world.

Although Schenck's argument generally deals with the topic of spatial indexicality, it is possible to make a temporal analogy of his argument. Suppose that one had the possibility to experience an event from all possible *temporal* perspectives at one instant¹⁰. If we were to have experiences in all points in time at once, then it is hard to imagine that we would be able to notice any change at all, because everything would appear as static. This is not the typical 'B-view perspective'. To see a car-crash from the B-view, it would have to be there for us as a static film roll-view (or a cube in which the two drivers are shown as space-time worms colliding, or something similar): It is important to notice that, from this point of 'God-like' perspective, we would not be able to trace any change at all. If movement was apparent, it would not come from the event of the crash itself, but rather from the movement of our focus, tracing the film-roll, or the spacetime-worms. In our analogy based on Schenck's (let us call it all-embodied instead of disembodied) subject, the whole of the crash would happen at *one instant*: All temporal aspects, including the movement of the cars towards each other, the actual collision and the aftermath, would be indistinguishable, as, for the subject experiencing them they would happen 'all

¹⁰This can be said to be a sort of 'reverse' version of Wyller's disembodied, omniscient being that will be encountered later on.

at once': This subject would not be able to perceive any *change* or 'moment' at all: He would not see the movement of the cars, or the physical change happening in the moment of the impact, because he simply would not be situated in time.¹¹

Now, what about the claim that, because there is no privileged spatial perspective in time, no perspective can claim to be the right one? Schenck states that, according to Merleau-Ponty, to claim this is to forget that we are embodied subjects.

(...) the lived body moves in a world of privileged perspectives organized around the projects of that body and the given significance of its milieu. If that lived body were not oriented in this way, and if that orientedness were not accessible in some way to abstract perception (and to the *cogito*), *all* perspectives would be of equal value and, therefore, no knowledge would be possible.

(Schenck, D. 1985, 309)

So it seems that the very fact that there is no privileged perspective is what makes knowledge possible. This view can, it seems, also be transferred to the topic of time: As we are situated *in* time and our perception is indexical (equally in regard to time and space), perceiving events and, specifically, change is meaningful in a certain degree only from a present point in time.

I never see all six sides of a cube at once. Admitting those limits serves to underscore the importance of motility, and of the orientedness provided by the correlation of the inner bodily experience and the experience of the external world. Being able to walk around the cube with an awareness of its position and of my own movement is the only way for me to grasp the *objective*, six-sided cube. The agency of the body-subject and the logical necessity of perspectivism combine to make *objective* perception possible.

(Schenck, D. 1985, 309-310, my emphasis)

Transferred to the topic of time, this means that we would never have the possibility of an objective overview of time (time-lines) if it was not for indexicality: Only when situated in time and actually seeing the incident, can we perceive a car-crash as a movement and a change, that is, as a proper event. If we saw it from a B-series "tapestry-view" (or as a film roll if you wish), then we would not see the change at all, neither would we if we experienced it from

¹¹Not all of Schenck's argument (about spatial location) is transferable to the topic of time. He states that perspectivism and being bound to experience everything from a certain location represent possibilities for perception: The locations in space where a subject is not situated represent possible locations of perception for the subject. This does not work in the same way with regard to time: We do not have the same possibility of moving freely around by ourselves.

an ‘all-embodied’ point of view, like the one described above. Schenck bases a lot of his phenomenology on Merleau-Ponty’s phenomenology. I will have a short look at his theory about perception and his focus on humans as embodied subjects, a topic that will be encountered again when discussing Truls Wyller’s theory, and the relation between phenomenology and transcendental idealism later. The aspect of the embodiedness of human beings will turn out to have great importance for the relation between time and consciousness.

5.3.3 Merleau-Ponty: Bodily indexicality

In *Phenomenology of Perception* (1962), Merleau-Ponty famously stresses the relation between body and consciousness, and the view of human beings as *embodied subjects*: A combination of subject (consciousness) and object (body). This combination thus is a contradiction of sorts. Merleau-Ponty argues that the particular human relationship between the consciousness and the body when it comes to perception can tell us something vital about the concept of perspective. The relation we have to our body is completely different from the relationship between the subject and any other physical objects. The body is our first person perspective, our center of perception. It constitutes a perspective we can never leave, and can never study objectively, and, Merleau-Ponty emphasizes, this is not a shortcoming, but simply an essential feature of perception itself: It is constitutive for perception. Being situated at a spatial point gives us a ‘horizon’ that belongs to the objects that we perceive: We can never *fully* experience them. We only see one side of the physical object at a time, and we have to use our body to move around them to get a more complete picture of them. But there is more to this: We have *expectations* of the objects: Even though I only see one side of the book, I also expect it to have a backside, an inside etc: All its normal properties and physical appearances that I do not directly perceive. However, to understand it in this way, to understand that a chair is a chair, for instance, I would have to have an experience with objects as such. That is, I must have knowledge and previous experience with chairs: We see things as *things*, and not as bundles of properties. What constitutes the way we perceive things in this manner is the previous, *bodily* experience we have with the world around us: Merleau-Ponty calls this feature ‘habit’, and it is essentially something bodily: “(...) it is the body which ‘understands’ in the acquisition of habit.” (Merleau-Ponty, M 1962, 144) The meaning of entities in the world is inseparable from the previous interplay between the self (body) and the world: “Whether a system of motor or perceptual powers, our body is not an object for an ‘I think’, it is a grouping of *lived-through meanings* which moves towards its equilibrium.” (Merleau-Ponty, M 1962, 153, my emphasis)

It is clear that humans are *bodily* situated in the world, and this unique perspective and centre of perception has great importance for the knowledge of the external world, and the immediate first person experience we have of our own body is inseparable from knowledge of the objective world:

(...) my body is geared onto the world when my perception presents me with a spectacle as varied and as clearly articulated as possible, and when my motor intentions, as they unfold, receive the responses they expect from the world. This maximum sharpness of perception and action points clearly to a perceptual *ground*, a basis of my life, a general setting in which my body can co-exist with the world.

(Merleau-Ponty, M 1962, 250)

5.3.4 Kant

I will have a closer look at theories implying that consciousness presupposes the notion of the present. Kant, in his traditional argument in *Critique of Pure Reason* (Kant, I. 1996), argues that time is an *a priori* concept, which is a condition for having experiences to begin with, and which is *inseparable* from experience: “(...) pure concepts of the understanding (...) apply to objects of intuition in general (...).” (A79/B105) It is simply impossible to have experiences of objects that are separate from time: “Time is not an empirical conception. For neither coexistence nor succession would be perceived by us, if the representation of time did not exist as a foundation a priori. Without this presupposition we could not represent to ourselves that things exist together at one and the same time, or at different times, that is contemporaneously, or in succession.” (A29/B45) Because of this, and the fact that we *can* imagine time as an empty container without any events filling it, it must be the case that “(...) time is therefore given a priori. In it alone is all reality of phenomena possible. These may all be annihilated in thought, but time itself, as the universal condition of their possibility, cannot be so annulled.” (A29/B45). In effect, the concept of time is inseparable from *all experience*. It is enough to point to the fact that we experience the passage of time.

According to Kant, time is a direct condition for inner appearances. This means that we need time to be able to represent to ourselves, for instance, how the same object can be in two different places, or how the same space can be occupied by different physical objects: This would only make sense for us in the dimension of *time*; otherwise it would conflict with the fundamental principle of non-contradiction. One and the same object can only be in two places if it is in one of the places *before* it appears at the other location. This means that *temporal succession* is vital for human experience. Interestingly, Kant also argues that time, as a form of intuition, is more fundamental than that of space: As time is the condition for inner appearances, space is a condition for outer appearances. However, more fundamentally, time is the formal *a priori* condition of all appearances in general. The reason why time is more fundamental than space in this respect is the phenomenological character of Kant’s work: As he is investigating the “pure reason” from a first person perspective, then *all* appearances are inner appearances for us. Following Kant’s transcendental

idealism, the objective, independent world is something which we cannot know or say anything about, as we do not have any means of experiencing anything detached from the human perspective. Talking about time and space as independent of human beings does not make any sense, according to Kant. This means that all subjective appearances and perception, whether about the “outside” world, or private sensations, are first and foremost *inner* presentations: “(. . .) all presentations, whether or not they have outer things as their objects, do yet in themselves, as determinations of the mind, belong to our inner state; and this inner state is subject to the formal condition of inner intuition, and hence to the condition of time. Therefore time is a priori condition of all appearance generally.” (A34/B50) This is a clear argument that all time is a necessary condition for the consciousness to work in the first place: We would not have experiences if time did not provide us with, for instance, the way of solving the paradox of the same thing being in different places: “If I can say a priori that all outer appearances are in space and time are determined a priori according to spatial relations, then the principle of inner sense, allows me to say, quite universally, that all appearances generally, i.e., all objects of the senses, are in time and stand necessarily in relations of time.” (A34/B51)

We saw that Varela, Nerlich, and Kant argue that the concept of now is necessary for consciousness (consciousness presupposes “now”). There are also arguments in the other directions, which claim that the notion of present is dependent on a consciousness. In other words, that the “now” presuppose consciousness. For these arguments to hold concurrently with those from Kant, Varela, and Nerlich, there must be a *total* interdependency between consciousness and the present.

5.3.5 Shimony

Abner Shimony (1993) uses the point of the strong connection between the present and human consciousness to argue that the status of the present is dependent upon how we define the notion of *experience*. He takes as a fundamental point Grünbaum’s claim that “(. . .) presentness or nowness of an event requires conceptual awareness of the event, or, if the event itself is unperceived, of the *experience* of another event simultaneous with it.” (Grünbaum in Shimony 1993, 276). Grünbaum’s point is essentially that the “nowness” of an event is dependent on someone knowing at that point in time *that* she is experiencing the event. “(. . .) I avowedly invoked the present tense when I made the nowness of an event *E* at time *t* dependent on someone’s knowing at *t* that he is *experiencing E*. And this is tantamount to someone’s judging at *t*: I am experiencing *E now*.” (Grünbaum in Shimony, A 1993, 276)

Following Grünbaum’s thesis, then, this means in particular that A-determinations are subjective. Furthermore, according to Shimony, the ontological status of the this “nowness” is completely dependent on the ontological status that we attach to mental states like awareness and experience. If we take mental states as prim-

itive and ontologically fundamental, the notion of “now” has an uneliminable status in nature (although subjective), when nowness is mind-dependent. If on the other hand mental states, experience and awareness are reducible to other, more primitive entities and features, like physical processes or states in the brain, then A-determinations, and specifically the concept of now, are illusory, (mere qualia) and have no fundamental ontological status.

Shimony takes a standpoint in this dispute, and argues that there must be an ontologically privileged *now*, which is *objective*. And he seeks to show this by what he calls the “Phenomenological Principle”: “(…) even though the distinction between appearance and reality is maintained, a minimal condition on ontology is to recognize a sufficient set of realities to account for appearances *qua* appearances.” (Shimony, A. 1993, 278) This basically means that an A-determination cannot be an appearance without being *real*. There has to be a minimal amount of objectivity. A-determinations cannot function as an appearance without transiently singling out an instant of time. In other words, an agent cannot be *mistaken* when singling out a now-moment: The *now* cannot possibly be an illusion, because the ‘nowness’ always picks out one instant of time. *This* cannot be mistaken, for the reason that if an event is experienced by a human being as an illusion (say, as a hallucination), then, Shimony claims, the property of being an illusory experience for that subject is a part of the complete specification of the *event itself*. Thus it is not relative to a point in time: “Thus *nowness as an illusion* applies to the event (...) as well when the time *t* is long past as it does at *t* itself - and the singling out of a particular instant as *now, even as an illusion, evaporates*.” (Shimony, A. 1993, 278)

Shimony’s argument seems to be in line with that of Ludlow (1999), but where Ludlow argues from the occurrence and use of temporal indexicals in natural language to the existence of A-determinations, Shimony seems to claim something stronger than that: The present moment is *objective*. Indexicality is by definition a feature of subjectivity, of being situated in time and space, and having a personal identity, so Ludlow’s argument for the reality of the A-series seems to include some relativized notion of the present (relativized to each subject). Shimony, on the other hand, argues for the reality of an objective present moment (which, he argues, is in accordance with the Special Theory of Relativity). He argues that “nowness” is objective, in the following way: Two conscious beings, located at two different time-like world-lines, L_1 and L_2 : If the conscious organisms associated with L_1 and L_2 possess the usual means of communication and if L_1 and L_2 intersect at a space-time point P, then if one of the organisms judges P to be now, then so does the other. Shimony claims that this agreement between the two organisms associated with L_1 and L_2 rests on a fact independent of their consciousness: The intersection of L_1 and L_2 at the point P is the only reason why the nowness of P on L_1 entails the nowness of P on L_2 and conversely. He states: “This conclusion is that A-determinations must be ascribed to the point P itself, not to P as associated with one or another world line.” (Shimony, A. 1993, 284-285) For the present purpose, I will focus more on indexicality and the subjective experience of the ‘now’ from here.

I will not dwell further on this point here, but simply note that Shimony puts heavy emphasis on the relation between consciousness and the present. I will argue that there is an interdependency relation between those two. That is to say, that the moment of ‘now’ is dependent upon the existence of consciousness experiencing it, and, conversely, that experiences would not be possible if it was not for the moment of presentness (that all experiences are in the present). The latter point I have already discussed, to some extent, though perhaps not explicitly. Shimony, following Grünbaum, Kant, Schenck and Varela have emphasized the fact that the present is a necessary element for experiences. Perhaps the strongest argument is presented by our temporal analogy of Schenck’s argument of the indexicality of spatial experiences. Now, I will have a short look at Tomis Kapitan’s theory, which is more directed towards indexicality, and can therefore help us conclude this section before I move to show, with Wyller, that the notion of now is dependent on consciousness (in the form of human embodied subjects).

5.3.6 Kapitan: Indexicality

Kapitan (2006) focuses on *self-awareness* (consciousness of first-person identity) and claims that this is what creates indexicality. Furthermore, an index (first-person awareness) is defined in the following manner: “(...) the index must be something to which the agent alone has privileged access, yet, it cannot be the entire organism nor a single experiencing state of the organism. (...) The index is a prehensive unity, moreover, a comprehensive unity made up of the maximally integrated perspective and the associated emotional, conative, cognitive reactions of which one is co-aware during a given interval of first-person awareness (cf., Casteñada 1999, 244, 263; Lockwood 1989, 88-89).” (Kapitan, T. 2006, 28) This means that, according to Kapitan, an index for a first-person identification is a comprehensive unity C existing over a temporal interval t , and whose spatial point of origin is v , we have this analysis of the executive I -mode that guide a person’s first-person identification: “ I ([C at (t,v)]).” (Kapitan, T. 2006, 29)

Technicalities aside, indexicality is, according to Kapitan, made up by awareness of one’s own first-person identity:

Why does the executive I concept apply to some things but not others? More figuratively, that makes me an I ? Perhaps this. Since being identified in a first-person way is precisely what confers the status of *being a self*, then to be a “self” just is to be reflexively conscious via an executive first-person form. It follows that whatever is so identified is an experiencing subject and, as executor of an identification, an agent. So, nothing is an I except a reflexively identifying active experiencer (Casteñada 1986, 110, Perry 2002, 190)

(Kapitan, T. 2006, 24)

This description is rather close to Wyller's definition of indexicality, as we will see in the next section. More specifically, Kapitan argues that the 'I' is connected to the concept of time in such a way that *momentary* indices constitute first-person identity: It is *made up* by spatial and temporal situations. This again means that identity, which (as we have seen) relies on consciousness, is closely connected to *present-time points*. This is a rather complex relation, but an important one, to see the connection between time and consciousness. It is clear, from Kapitan's argument that consciousness and perception in general cannot be abstracted from time; this is the essential point I will take from Kapitan's argument. Now, I have established a strong connection between consciousness and time (the A-series), and I have presented arguments, primarily from phenomenology, that consciousness is dependent upon time and that comprehensive experience should not be possible outside of, or abstracted from, the A-series. I will now turn to look at the other side of the thesis: That there would be no time, no distinction between present, future and past, if it was not for the existence of human, embodied subjects.

5.3.7 Wyller

Wyller (2009) presents a strong argument that suggests a close connection between consciousness and the present. Wyller's argument is in essence a defense of transcendental idealism, which I will come back to later. Wyller argues that: "Extended items of space and time have no determinate, particular size in a world without human beings." (Wyller, T. 2009, 326) Spatial size is taken as a property which only makes sense if it is seen in relation to (and by) a perceiving, embodied subject (which means that particular size is indexical). In other words, things can only have a spatial size when perceived by humans: In a world without embodied consciousness (human beings), physical things would not have a particular, determinate size. Wyller defines *particular* size as "real" size, in the sense that: A metre has a particular size in the physical world, corresponding to some kind of defined size. This, "real" metre is not the same as a "metre" represented on a map, or in a model (for instance, a Lego house). The latter "metre" is defined as *conceptual*, in the sense that it can be conceived of independently of a metre in the actual world (as in narratives: "And then, two years passed," is conceived of independently of the actual duration of a year.) (Wyller, T. 2009, 326)

Wyller's main point regarding spatial size is that something can have a *particular* size only in relation to an epistemic, embodied subject. The reason for this is that, according to Wyller, we perceive the particular size of things in the world first and foremost in relation to our own body. This can be seen with the hypothetical scenario that if everything physical in the world, including yourself and your body, doubled in size, you would not notice any difference in the world around you¹². This point indicates that the size of things in the world would be

¹²To this, one can object that one *would* notice if everything doubled in size if the gravita-

perceived by you in relation to your own body: The reason that you would not notice it if everything physical in the world doubled in size, is precisely because *your own body* would also double in size, so all conceptual relations between objects would stay the same. On the other hand, if everything *but* you doubled in size, there is reason to believe that you would notice: Everything would be larger in comparison to your body than it was before¹³. It is possible to imagine an all-knowing, disembodied, God-like creature: “(…) a scientifically *omniscient being*, who knew all physical sensations and relations of the universe.” (Wyller, T. 2009, 330) (that is, in particular, knowledge like “unit x is twice as long as unit y”), but, Wyller argues, this kind of creature, not being an embodied, physical being, would only have knowledge of *conceptual* size, and would not be able to make the distinction between conceptual and particular size, which we, as embodied epistemic subjects, are. That is, it would not have knowledge of, or any means of finding out, the ‘real’, determinate size of things (Wyller, T. 2009, 330). Thus, the disembodied creature would not notice anything different in the double-size scenario, because, if all proportions and relations were preserved after the change, the only way to notice it would be to compare it to something physical ‘outside’ the completely objective world, and the creature would not have something corresponding to spatial indexicality¹⁴.

The conclusion is that human beings are “dual role subjects”, which is to say that we are both subjects and objects (physically embodied consciousness). Thus, we have an *indexical* perspective on the world, which makes us able to perceive the particular size of physical objects. It is easy to imagine that being physically situated in the world provides a perspective which is, in some sense, privileged in comparison to a totally objective, “God-like” view (which is a topic also treated in Schenck’s analysis of Merleau-Ponty’s phenomenological theory of the embodied subject (Schenck, D. 1985), which I discussed earlier in this section; we should recognize the same characteristic of human beings from Merleau-Ponty.)

From a position literally outside the empirical world, there is certainly no chance of discovering a measure of that selfsame world.

We have to look inside the world, where what we find are human agents. As embodied agents, we are not only objects of observation,

tional constant would remain the same. This indicates that the gravitational force between physical objects would increase as an effect of things becoming larger, and the world would consequently collapse. But Wyller’s thought experiment is a purely hypothetical scenario. It could be that the world would collapse if the world *actually* doubled in size, but that is irrelevant to the topic: The focus is on a doubled, but *identical* scenario to the actual one.

¹³Actually, keeping the focus of human, bodily perspective and indexicality, an interesting point is this: Rather than thinking that everything around you has suddenly grown twice as big, it is far more likely you would reach the conclusion that the world did not change at all, *except* your own body, which would appear to have shrunk to half of its original size

¹⁴Wyller mentions the hypothetical, godlike creature as “she” (Wyller, T. 2009, 332). Following his own axioms, it would not be possible to determine whether a disembodied creature is male or female, as sexes are distinguished on the basis of physical differences. A disembodied ‘person’ would not even have hormones, much less a sense of a sexual identity

we also enact subjective intentions, plans and felt bodily states. Accordingly, we occupy a *role* that is different and distinct from that of objects of observation.

(Wyller, T. 2009, 332)

The bottom line is that humans, as “spatially dual role subjects” constitute a measure of the world, in the sense that we are, as a combination of subject (consciousness) and object (physical body), we are, in a sense both ‘inside’ and ‘outside’ of the world, and, consequently, extended objects only have a particular size in relation to subjects, according to Wyller. The fact that what Wyller calls “global models” (maps, Lego houses) exist as created and used by humans, and that we know how to ‘play’ with the world in that manner, Wyller thinks is evidence for our mastery of the distinction between conceptual and particular size. We understand that a map is a global model of a spatial area, while maintaining the spatial relations that actually occur in the area (one river being twice as long as another one): The conceptual size, and also we know the particular size (by looking at the scale on the map and seeing that in relation to the knowledge we already have about how large for instance a meter is).

With respect to time, things are a bit different: “The particular size of a temporally extended unit cannot be an object of propositional knowledge, only of embodied, practical knowledge.” (Wyller, T. 2009, 326) The thing is, we do not have the same types of models of time as we have when it comes to space. While spatial (local and global) models and perspectives illustrate the human ability to “play” with spatial proportions and size, there is no temporal parallel to this. There can be no global models of time, which means that changes in experiences of time would be impossible to describe to someone disembodied.

This point about global models can perhaps be a bit difficult to see right away, so let us try to clarify this a bit. Recall that spatially global models are “full” (complete) spatial models (like maps or whole Lego cities inhabited by Lego people), in contrast to local models which are one element with an abnormal size in relation to its surroundings (like Gulliver in Lilliput town). Wyller’s point is that temporal global change in temporal unit size (the temporal counterpart to the hypothetical scenario where everything spatial doubles in size), would not be noticed. The closest we get to this kind of scenario is watching scenes from a film in fast (or slow) motion. But this is, according to Wyller, not a global, but rather a relational change: “(...) I believe one never quite gets used to watching slow replays as if they were completely normal. How could one? Because they are slow in relation to everything else in the perceived world, the change is relational, not global.” (Wyller, T. 2009, 334)

Wyller then asks us to consider a piece of music. We already have a sense of musical normality (what is “normal” tempo), so that when we hear a piece of music, we can easily perceive it as too fast or as too slow (“abnormal”). But we do not have the same kind of perception of space: When it comes to space, we can experience variations as normal without changing empirical normality:

Without having already changed our sense of musical normality, we cannot perceive a piece with an abnormal tempo as normal. But that is exactly what we do in space. Without having already changed our sense of empirical normality, we experience pieces of spatial variations as normal. They are perceived to be normal because they are global - a feature for which there is no temporal counterpart.

(Wyller, T. 2009, 334)

What Wyller seems to mean here when he claims that we perceive spatial variations as “normal”, it is not the case that we do not *notice* spatial change. The point is that we do not have any problems *understanding*, and using, global spatial models, like maps and Lego cities (We do not ask, while pointing at the map ‘is that river really that short?’, referring to the spatial size on the map, not the spatial size it represents in the real world). But it is the case that if we see a fast forward replay of an event, the movement seems unnaturally fast, and if we see a Lego city or a map, we know immediately what it means, and how to use it. It nevertheless seems to be the case that, since time is only one dimension, we do not have the same means of comparing temporal size units in the way that we have with spatial size. This is the reason that, according to Wyller, that we have an already established sense of what is “normal” when it comes to music tempo, which needs to change if we are to experience temporal abnormality as normal.

How does Wyller explain that we actually do experience temporal changes? When time feels slow because of boredom, for instance, things seem to happen in a slower way, so that they take longer to happen. To explain this to a disembodied person would be impossible. “In space, the thought that a unit of length is not double its own size may instantiate real empirical knowledge. In time, it is propositionally empty (...).” (Wyller, T. 2009, 334) This is because, although global models of space can make sense for us (for instance entire Lego cities), the same type of temporal model is not obtainable: For instance, when a process seems to be going slowly it can be explained by spatial distance (like a distant train running up a hill seems slow only because it is far away (Wyller, T. 2009, 333)), or that the film or sound is going “too fast” (or slow). In any case: “(...) changes in seemingly temporal perspectives are just a way of compensating for variations of spatial perspectives, with no perceptual change in temporal duration *per se.*” (Wyller, T. 2009, 333) The conclusion is that units of space and time are possible objects of knowledge only in relation to human beings.

If we accept Wyller’s argument, it clearly establishes a close connection between consciousness and time. His argumentation is a defense of the position of transcendental idealism provided by Kant: Time and space are forms of human experience, and can be known only in relation to consciousness: They have size independent of human beings. But also, it seems like Wyller’s argument is a lot stronger than merely establishing the thesis of transcendental idealism, as he also claims that temporal and spatial size is something that can have mean-

ing only in relation to *human beings*, as *embodied, physical subjects*. Now, the first point is an (independent) indication of the claim that only human beings can “play” with, and understand, proportions and global models, such as maps. This point, although interesting, is perhaps not very controversial. What is interesting to note, is the latter claim: The fact that the physical embodiedness of human beings is important for temporal (and spatial) indexicality. This seems like a more particular and systematic point than Kant’s original argument that time and space simply cannot exist independently of intuition. By emphasizing the human being as both physical and conscious (that is, as object and epistemic subject): “dual role subjects” (Wyller, T. 2009, 332), Wyller connects the spatial indexicality to the temporal one, in a way that some phenomenologists have defended, perhaps, most notably, Merleau-Ponty.

I have established the close connection between the present and the consciousness. Now, what is the role of the B-series in all this? I propose that the B-series, with its static and objective character, accounts, in the perception of time, for the need to systematize and view information and time objectively.

5.4 (Necessity of the) B-series

I will argue that the B-series is necessary because we need it to understand and perform science and physics, where there is no room for a privileged “now”. In physics, there is no use for an ontological distinction between the future, past and the present. An important point which can be an interesting perspective on seeing the relation between A-theorists and B-theorists is that B-theorists have a tendency to be *realists* concerning time: They typically use science and the Special Theory of Relativity to support the B-theory, which is supposed to give a picture of *real time* (which, by the way, is the title of two of Mellor’s main books about time). The B-series is often mentioned as the *real* time by the B-theorists, supported by scientific evidence and accounts for a static, time-line perspective of time. This B-series picture of time is, by B-theorists, typically presented in contrast to the A-series as a wrong temporal model because it is based on the perception of time and change, which is not *objectively real*, according to the B-theorist.

This realist view is also visible in semantic arguments: What gives tensed sentences like ‘It is raining now’, their meaning, according to B-theorists, is not that the statement ‘it is raining’ is true *now*, but that it is true at the point in time when the sentence is uttered. This is clearly a more ‘objective’ way of looking at it, than the approach favored by the A-theory which typically has a more phenomenological and epistemological perspective.

5.4.1 Wang

So far, there seems to be one very relevant question that I have not yet (directly) treated: Is objective knowledge of the world possible? I have, so far, discussed arguments from phenomenology, which first and foremost bases itself on the human experience and perception of the world, rather than starting from strict (natural) science, such as Einstein's theories of relativity. In an earlier section, I argued that "real" objects in the world are inseparable from the human conception of it, and I have touched upon the argument of Husserl and Merleau-Ponty that our situatedness in the world, and the fact that we experience everything from a first person point of view (where Merleau-Ponty focuses more on the role of our physical *body* than Husserl does) implies that a science describing the objective world must avoid seeking distance from and neglectance of the first person, subjective, observers (the scientists). But is it possible to get obtain a "right" description of the external world, in the sense of some theory of time and space corresponding to reality? This is a question treated by Hao Wang (1995), which I will have a closer look at. Recall that according to Kant, as time and space are forms of intuition, and *conditions* for perception of anything at all, there is a possibility that the actual, 'real' structure of space and time ('in-themselves'), independent of human experience, is radically different from how they appear to us. It would seem as though fairly recent scientists like Einstein have proved Kant wrong on this point. More specifically, completely objective knowledge about the nature of *time* seems possible (granted that one treats his Special Theory of Relativity as a theory about time), for it seems quite evident that the nature of time as described in Einstein's theories is very far from the everyday appearance of time to human beings.

According to Wang's discussion of Gödel's view of time (1995), the concept of Now has no room in physics, because physics aims at describing things as they are in themselves, objectively. The objective reality of the constantly moving 'Now' that we experience (or constantly adding successive layers of 'Now') is problematized by the Special Theory of Relativity. The reason for this is that Einstein's theory implies that simultaneity is *relative*; in other words, that there is no objectively real, privileged 'Now', or one true world time. Wang states the problem as follows:

When I project my consciousness of time onto the world, I get an idea of objective or absolute time. On the one hand, there is a continuing sequence of world-states which individually are at rest and collectively constitute the material content of time. On the other hand, there is a mysterious process of lapse or flow of change, by which every world-state travels through being future, present, and past. If we leave out my consciousness and that of other beings, then it is hard to see what is so special about Now, or indeed to make sense of this very distinction between past, present and future. Without this distinction, however, time would be like space in the

sense that there is no flow and there is no distinguished direction or arrow of time.

(Wang, H. 1995, 220)

A result of this view would therefore be that if we follow the ideal science described in Husserl's *Crisis* (1970), and let first-person experience of time play a central role in physics and natural science, it seems like we open for a subjective, relativized notion of 'Now' and the flow of time, instead of the objective, true world time. This seems to be Gödel's general idea, and he connects it to Kant's conception of time as a form of intuition, according to Wang. Gödel states that the main doctrine of Kant was that 'reality', or the natural conception of the world, as perceived by humans, even though it seems to be characterized by the highest degree of objectivity and truth, will always be *subjective*, to some extent. Gödel claims that the theories of relativity confirms this argument by Kant, by making simultaneity a local matter: "Specifically, our intuitive concept of time,, which is an essential part of this natural conception, is more clearly seen - with the help of relativity theory, strengthened by Gödel's interpretation of it - to be not necessarily true of reality itself, which exists independently of us and our consciousness." (Wang, H. 1995, 222)

With Gödel's argument in mind, it is possible to see the Special Theory of Relativity as a result of the human drive to understand things objectively, or as they are 'in themselves', which implies that, the B-series, as it is traditionally connected to science, and (philosophers argue) is supported by the Special Theory of Relativity, can be seen as exactly the kind of "mathematical structure" projected on the world by humans, to understand it objectively. This brings us back to the question from the beginning of this section: Is it at all possible to obtain objective knowledge about the realm of 'things-in-themselves' or the real world? According to Wang, Gödel thought so, and he claimed that the fact that Einstein's Special Theory of Relativity is clearly an advancement in the sense of scientific progress, compared to Newton's physics, is a sign that objective knowledge is obtainable, and furthermore, that Kant's argument against the possibility of knowledge of 'things in themselves' is mistaken:

Kant's mistake, or at least the disagreement between his doctrines and modern physics, is, for Gödel, not that our intuitive conception cannot fully capture reality itself, but that his philosophy sets an eternal limit on our theoretical knowledge of things in themselves. - The fact that relativity theory is accepted as an improvement over Newton's scheme indicates that we are capable of knowing more about things in themselves than merely their Kantian appearances as determined by the Kantian frame of our natural conception of the world.

(Wang, H. 1995, 222)

So according to Gödel, scientific progress (or the acceptance of some physical

model as superior to another when it comes to describing the world), is a symptom of that objective knowledge about the world is indeed *possible*. Specifically, it is possible to obtain knowledge about time as time “in itself”. But is it unproblematic to claim that scientific progress transcends the human perspective and experience of phenomena like time and space? Is the Special Theory of Relativity a convergence to the objective reality as independent of human beings, or is it a model and categorization of the world attempted by human subjects? It seems evident that Einstein’s theories are classifications of *observations* (and deductions of observations) after all. The Special Theory of Relativity is an attempt to take observed and experienced features (such as the constant speed of light, Galileo’s principle of relativity and the laws of physics) as premises, seeking to combine them. In this manner, then, the STR is not describing the world as it is, independently of human subjects. Rather, it is an attempt to classify observations and experiments performed by humans, and therefore, the STR is *inside* the human life-world, to use a term from phenomenology. This is not to say that physical theories are not corresponding to reality, that they cannot be right. This is simply to argue with Husserl, that the objective reality is inseparable from the human conception of it. Seeking objective knowledge about the world, or formulating a model of that ‘corresponds to reality’ is not a hopeless project at all; assuming we are able to transcend the boundaries of our own human perception is. I will come back to these issues in section 6, where the relation between transcendental idealism and phenomenology is discussed.

5.4.2 Kant

Kant (1996) claims that our mental idea of time as an objective, one-dimensional, infinite line, is a symptom of the human drive to cope with a problem of time, namely that the “inner intuition” that, according to Kant, is the only ontological status that time has, “gives us no shape” (A34/B50). This passage of the *Critique* is quite cryptic, but the idea behind Kant’s argument seems to be that time is not objectively real; it is not something that belongs to the external world, but rather is a human way of mentally organizing experienced events. Picturing time as an infinite line-segment is thus a result of the human incapacity of experiencing anything objective:

Time is nothing but the form of inner sense, i.e., of the intuiting we do of ourselves and of our inner state. For time cannot be a determination of outer appearances, [because] it does not belong to any shape or position, etc., but rather determines the relation of presentations in our inner state. And precisely because this inner intuition gives us no shape, do we try to make up for this deficiency by means of analogies.

A33/B49-50

We represent time as an infinite line in our mind, and this is to be able to order the inner appearances of events for ourselves. When two points are (spatially) localized at different places on our inner ‘time-line’, this means that they stand in the relation to the one of them being earlier than the other. It should be clear that Kant’s description of the time line is (somewhat surprisingly) not the A-series, but the B-series. His point is that we need a B-series, static ‘time-line’ to be able to experience and represent events. In this sense then, the B-series is a necessary condition of experience, on a much more fundamental level than just being a result of a human desire to understand things scientifically and objectively. It is a condition for experience in the first place, or one can say, perhaps, that the human desire to understand things objectively is so deeply rooted that it makes us able to represent things (historical events and everyday experiences) on this internal time line. Take, for instance, the example of the event of a car crash from the section on Schenck. Without the B-series view, we would not be able to order all the instances of the event internally, and thus understand it. The traditional B-series (the time line) is a *spatialization* of time, which makes possible the ordering of (whichever) events, which again is a necessary feature of human experience. The A-theorist (and, in particular, the presentist) solution to Kant’s problem of contradiction (how one thing can be in two places) is to claim that something can be fully and wholly at one place at one temporal A-determination (like the present), but that the same thing can be located at another place at another A-time (at some future point in time, for instance). But the difference between these two temporal locations is that one of them is *real* (namely the present), while the other is not real, but *will be* (the future).

The one-dimensional time-line that Kant presents is only one of several different B-series, and they each correspond to, and are supported by different phenomena, I will have a short look at the most common ones.

5.4.3 Natural language metaphysics and modern physics: Two B-series

There are several possible types of B-series (or models of B-series), so we should distinguish between some of them. First of all, there is the B-series that is provided by physics, like the Special Theory of Relativity. The model of the B-series which is most associated with contemporary physics, is the *block universe*, in which everything is just a frozen ‘block’, where there is no room for dynamics, and no real change: Four-dimensionalism. Here, in addition to the three spatial dimensions, time constitutes a fourth: “On this view, time is a dimension along with the three spatial dimensions; it is just another dimension in which things are spread out.” (Loux, M. 2006, 213) Connected to this view, therefore, is *perdurantism*, according to which, an object is never completely and wholly present at each moment of its existence. Rather, things exist as ‘space-time worms’, with temporal parts just as real as the spatial ones. According to this

view, then, there is no ontological distinction between the present, future and past, but rather a completely frozen view of the world. This four-dimensional view of time and space is therefore often referred to as the ‘block-universe view’.

It is argued that the block universe version of the B-theory is supported by modern physics, more specifically, by Einstein’s Special Theory of Relativity. Most notably, Einstein himself seemed to admit to the reality of the block universe view, and it does not seem like he was happy about this. The reason for this is easy to imagine: If there is no ontological distinction between, for instance, the present and the future, the future already has some sort of reality (in fact, it is just as real as the present), and in a sense has *already happened*.

The four-dimensional continuum is no longer resolvable objectively into slices, all of which contain simultaneous events; now loses for the spatially extended world its objective meaning (...). Since there exist in this four-dimensional structure no longer any slices which represent now objectively, the concepts of happening and becoming are indeed not completely suspended, but yet complicated. It appears therefore more natural to think of physical reality as a four-dimensional existence, instead of, as hitherto, the evolution of a three-dimensional existence.

(Kennedy, J.B. 2003, quotes Einstein 59-60)

On the other hand, natural language metaphysics (intuitions that become visible by studying natural language) uncovers another type of B-series, that seems more like the B-series presented by Kant above, which also corresponds to Newton’s model of time as one-dimensional line, with events ordered by the B-series relation of being “earlier than” and “later than” each other. This B-series picture is simpler than the block universe in that it is two-dimensional, and resembles the classic time-line view of events. The block universe is a fairly counterintuitive picture of time, because it does not have room for the concept of change, and the objective ‘Now’: The feeling of moving through time, which is at the core of human experience of time. Connected to this ‘natural language intuition’ is also the position of *endurantism*: The idea that we are fully and totally present at each moment of time that we exist, instead of existing as constituted by temporal parts where me-tomorrow is just as real as me-today and me-10-years-ago.

5.5 How the A-series and the B-series work together in our understanding

The A-series and the B-series are equally important and reflect essential aspects of the nature of (use and understanding of) time. We have seen how the A-series is necessary for the concept of change, and the experience of the unique moment of *present*. We have also seen how the B-series is necessary for our understanding

of time, not only to order events in the temporal relations of ‘earlier than’, ‘later than’ and ‘simultaneous with’, but there is also a deeper point (which is perhaps more interesting), that the B-series can be seen as a result of a human drive to understand and order the world scientifically, and as objectively as possible. As we have seen in our discussion of, most notably, Wang (1995), there is no room for the concept of ‘Now’ and the concept of *change* in science. Wyller (2010) illustrates McTaggart’s view of this matter nicely in the following manner:

If, for example, Easter Saturday 2006 falls after April 1, this is an eternal, immutable fact. Before 2006 it was true that this would be the case in 2006; on Easter Saturday 2006 it was true that “Easter Saturday is today, i.e. after April 1”, and in posterity it will always be true that Easter Saturday was after April 1 in 2006. In these descriptions the temporal forms change. But this is only relative to the position of the narrator, and (...) such personal positions do not form part of the natural sciences. Only the before/after relations are dealt with in the sciences and these relations are not subject to change.

(Wyller, T. 2010, 142)

However, several philosophers have argued that the Special Theory of Relativity indeed opens for a universal ‘Now’-point in time. These arguments are all fairly technical, and I will not go though them here, but refer the reader to the most recent Rakić (1998) (and Shimony (1993)). In the completely opposite direction, some philosophers also take the view that natural science cannot account for change, and seem to imply the reality of the B-series, as a premise for advocating the reality of determinism (fatalism), for instance (Putnam, H. 1967). It is interesting to note how something as (ideally, at least) unambiguous and objective as a physical theory based on observable premises gives room for so radically different views, as both Shimony, Rakić and Putnam claim to base their theories on Einstein’s Special Theory of Relativity.

To go back to Wyller’s quote, and take a step back from science, it is important to note how vital both the A-series and the B-series are in relation to dates and times. How they work together in everyday life can be illustrated with so-called “office-situations”: Imagine the two following sentences on a post-it note attached to the door to an office: “I will be back at 4 o’clock” and “I will be back in two hours”. For a person who wants to meet with the person who has written the notes, the two sentences equally rely on both A-series and B-series information to be informative, otherwise they would be useless.

“*I will be back at 4 o’clock*” : This is a B-series sentence, locating a point on a static, objective time-line. But it requires A-series (indexical) knowledge to be informative: The A-series is necessary, because the information is useless if we do not know when “4 o’clock” is in relation to ‘Now’. If one does not have any knowledge of what time it is ‘Now’, or anything but B-series temporal knowledge, the note on the door does not hold any *useful* information.

"I will be back in two hours" : This is an A-series sentence, locating a point in time which is relative to a ‘Now’-point. But it requires B-series knowledge to be informative: The B-series is necessary, because the information is useless if we do not know when “in two hours” is in relation to the B-series time when it was written. If one does not have any knowledge of what B-time the note was written, or anything but one’s own indexical, temporal knowledge, the note on the door is not useful.

The reason why notes like “I will be back at 4 o’clock” seem to be more informative (and common) than “I will be back in two hours” (or similar), is that temporal indexical knowledge and a recognition of the relation between this and B-series time is something that most human agents have. “I will be back in two hours” will only make sense if one knows the B-time when the note was written or taped to the door, and this is knowledge that is restricted to the person who wrote the note (or someone observing the event). For a visitor, this note simply gives information relative to an A-time which one has no knowledge about (except, perhaps, that it was written within two hours previous to the discovery of the note). Wyller presents an analogous point in relation to space: One person can have the indexical knowledge ‘I am here’, but we would not really say that the person, if he knows only this about his spatial position, has any *real* knowledge about where he is. “On the other hand, someone who has mastered all the objective, geographical data about the world does not necessarily know where he is either. Unless, that is, he can correlate this knowledge with the subjective awareness of being “here and now.”” (Wyller, T. 2010, 128)

5.5.1 The watch

Here, there is an interesting observation to be made: The actual, practical *combination* of the A-series and the B-series must be made up by instruments that locate our temporal indexical A-series location on the objective, static B-series time-line. These are artifacts such as *the watch*. It ‘places’ the A-series ‘on’ the B-series by *connecting* the indexical awareness of the present moment with the B-series perspective of time. In other words, it locates the ‘Now’-moment on the objective, B-series time-line. An important feature of the watch is that it is imperative that it always shows the right time according to *human understanding* and knowledge of it (a watch can show the wrong time; it can for instance two hours late and still be as informative as one that runs right, but this is dependent upon us *knowing* that it is two hours late). That the clock’s function completely depends on the human ability to use it, strengthens the relation between consciousness and the present. A watch that is misleading (or stands still) is useless. Now, the reason for this cannot be the fact that it fails to display the objective B-series time correctly, but rather that it fails to provide sufficient information of where on the objective time-line we are *now*, and the information is insufficient according to our interpretation of it.

The watch is special compared to other time-related artifacts, such as the

calendar and the stop watch. The stop watch simply measures periods of time, and the calendar gives us the B-series list of the correspondence between the dates and the weekdays of a specific year. But as both weekdays and dates are B-series features, for a calendar to be practically helpful for us in everyday life, we need additional information: Namely which date is it *today*? Perhaps a look out of the window on the light and weather will help us determine what time of the year it is, or roughly the time of day, but not the date, the year, how many days we are from Christmas eve, or how many hours it is until the shops close. The watch is (at the same time) both a B-series overview of the hours of the day, and it tells us what time it is *right now*: Our location in that overview.

6 Transcendental idealism and phenomenology

So far in this thesis I have looked at arguments mainly from two important philosophical traditions (or methods): From transcendental idealism (most notably with Kant and Wyller) and the phenomenological tradition (Husserl and Merleau-Ponty). Now, the question is whether there are any problems connected to combining these two positions. They are, after all, two different philosophical positions: Are they compatible?

According to transcendental idealism as presented by Kant, one must distinguish between the realm of things as they are (things-as-themselves) and things as they are perceived, and a similar distinction is found in Husserl's *Cartesian Meditations* (Husserl, E. 1960) between *noema* and *noemata*, where the former designates the mental (subjective) experience of things, and the latter is the actual object (represented in the mental state).

As for the position of transcendental idealism, Wyller explains:

Through his so-called *transcendental idealism*, Kant wanted to uncover the “subjective conditions for the possibility of” objective knowledge, and the practical, reflexive insight a subject of knowledge has about the size of his own body appears to constitute precisely such a subjective condition. Kant’s truly radical idea, however, was that these subjective conditions of possibility concern both our knowledge and the objects of this knowledge. They apply not only to “objectivity” in a wider sense, but also to the actual objects we possess more or less objective knowledge *about*. His project was to demonstrate that the subjective conditions allowing human *experience* are simultaneously “conditions of the *possibility of the objects of experience*”, as he puts it.

(Wyller, T. 2010, 131)

So Wyller is taking this kind of Kantian position of transcendental idealism, but he arrives at that conclusion by a line of reasoning that is somewhat different from that of Kant. Wyller comes to this conclusion by asserting that space only has a particular size in relation to embodied consciousness, human beings. The reason for this that space is a possible object of knowledge only when perceived by something that is spatial itself: A disembodied, omniscient creature would not have any perception of “real” space. If it does not perceive the world from a indexical point in space, it would, although having all possible knowledge of the spatial *relations*, not know anything of the *real*, objective size of things: Imagine several (global) world models, modeling the same thing, with the exact same spatial *relations* preserved in all the models (that is, the *conceptual* size would be the same in all the world models, but particular size would vary from model to model). Presented with all the different models, a disembodied creature would most probably be capable of realizing that the models are of different

size (by comparing the models to each other), but this is simply also *conceptual* knowledge; particular, “real” knowledge does not enter the picture at all here. Wyller’s crucial point is, consequently, that the disembodied creature would not be able to tell which of the models represents the “real” picture (that is, which one corresponds to reality), but *we*, by virtue of being objects as well as subjects, *have* this ability; simply because we are “bound” to an *indexical* perspective (from our body), we can compare the different models to the size of our own body, and in this sense, figure out which one is the one that represent the real world as we know it. This again means that we have, in some sense, more knowledge than the omniscient being (or at least, our being embodied grants us the possibility to gain a type of knowledge that is not accessible to a disembodied creature). The notion of indexicality plays a central role in Wyller’s theory. Indexical knowledge is knowledge that concerns the spatial and temporal perspective that the subject experience from. The sentence “I am here now” is generally considered an indexical tautology in the sense that it will always be true, no matter where, when and by whom it is uttered. What causes the fact that this sentence is always true, is that the meaning of the words “T”, “here” and “now” refer to unchanging conditions that are defined by the speaker’s identity and the speaker’s context: Those three words are special, because every moment in time is a “now”, every person is an “T” and every spatial location a “here”. “Indexical words and concepts are characterized by their distinctive combination of both being conditioned by situational factors and being independent of them.” (Wyller, T. 2010, 73)

In this sense, propositional knowledge of the “objective” size of things in the external world is only possible if one is a part of this external world already (as in being embodied). A disembodied omniscient being would not have knowledge of the “real” size of things in this sense, and the reason for this is simply the creature’s disembodiment, and the fact that it thus lacks any indexical perspective. The outcome of all this is that spatial, “real” size becomes dependent on the existence of what Wyller calls “dual role” epistemic subjects. The duality in this role consists in being both subject (consciousness) and object (having a physical, external body) (in other words, human beings). The reason Wyller’s view is that of transcendental idealism is that a result of his theory is that time and space become *purely human concepts*. Without human beings (and perhaps animals) there would not be something like “objective size.”

Wyller also states, regarding the omniscient, disembodied being: “The point of such a hypothesis is to show that we cannot *conceive of* the possibility of a world based on non-perspectival knowledge about objective size.” (Wyller, T. 2010, 131) Now, what does this tell us? Can one not just simply ignore the thought experiment featuring the disembodied omniscient being, and disregard it because it is hypothetical and therefore has no actual validity? According to Wyller, claiming this is misunderstanding the thought experiment. The thought experiment shows that the “detached”, completely disembodied picture of the world is inconceivable from a human perspective: “And if it is *inconceivable*, does this not suggest that there must be something about the space we are

dealing with that limits what sort of knowledge we can have about it?” (Wyller, T. 2010, 133) The point is that the thought experiment points to the limits of what is conceivable for us, and this again shows that the sort of knowledge we can have about space is limited *by space itself*. This is to say that, as a result of the fact that the only knowledge available to a disembodied being is knowledge about relations between the different sizes of external objects, and not their *actual* size, the relational knowledge that the disembodied being has is *non-indexical*, and not spatial:

(...) the thought experiments indicate that something about which one *can* have non-indexical knowledge is not a spatial matter. Hence, if the only conceivable knowledge about spatially extended size includes the perspectival self-knowledge of an extended body, there must be something about this space that makes other forms of knowledge impossible. This means that per definition, space is an object for potential reflexive self-knowledge.

(Wyller, T. 2010, 133-134)

The conclusion from this observation is that space is not objective at all, but rather subjective, as it is dependent upon subjectivity (consciousness) as well as objectivity (the human body): “Consequently, it is a subject of knowledge just as much as it is an object of knowledge. And since only living, conscious beings can be the subjects of knowledge, space must be a space for living, conscious beings; in other words, something *subjective*.” (Wyller, T. 2010, 134)

In Wyller’s argument, indexicality plays an essential role. All that is called objective is also, first and foremost, objective *because* it is subjective. Science is seeking to describe things from a detached, objective, abstract point of view. But, Wyller claims:

(...) objective knowledge of increasing richness about the relationship between different empirical events is produced by the physics of relativity. But it is only because it is integrated into an indexical space of knowledge containing directions, distances and magnitudes that can only be determined intentionally that this knowledge may be called “objective” at all.

(Wyller, T. 2010, 134)

With this in mind, it becomes clear that the Wyller’s position is not strictly *idealistic* in the strict sense (namely that the existence of external objects is dependent on subjects). Wyller’s theory is a *realist* position: It claims that external objects *do* exist independently of humans (subjects), but only in the sense that objects exist in other locations in space than where the subject’s body is situated. However, as Wyller remarks, transcendental idealism is not concerned with the external objects that exist in space, but rather with the

concept of space itself. And this, as we have seen, is strictly dependent on the existence of conscious subjects, according to Wyller. So in this sense, it is clear that Wyller's position is one of transcendental idealism: External objects exist independently of us, but the space they exist *in* (which certainly must be seen as a condition for the objects existence at all?) is essentially *indexical*, and therefore dependent upon the existence of conscious subjects:

Newton was a transcendental realist in the respect that he believed space, as well as the objects in this space, to exist independently of human subjects of knowledge. Transcendental idealism implies that the spatial form which makes it possible to "realistically" distinguish between our own body and other objects in the world is a space of actions whose existence depends on human subjects of knowledge.

(Wyller, T. 2010, 134-135)

Shortly put then, the existence of space and external objects are dependent on the existence of subjects. "By this I mean that space is tied to human beings as perceiving subjects, not as perceived objects. It is not an object of empirical knowledge, but a subjective condition for such knowledge." (Wyller, T. 2010, 144)

Now, is this version of transcendental idealism compatible to the phenomenological theory presented by Husserl? Wyller states that defenders of the position of transcendental idealism, such as Kant (and Gödel), do not get into conflict with science. There *appears* to be a conflict, for the following reason: Science typically claims objective validity and reality, while transcendental idealism holds that space and time are subjective. But there is no problem, according to Wyller, because the "subjectivation" of time and space by transcendental idealism makes it plain that this position does not speak of the same thing as, for instance, physics does (Wyller, T. 2010, 145). The point is that A-determinations (past, present, future) seem to be simply subjective, and what Einstein's theories describe is not the same concept of time as this A-determinations; what Einstein's theories seem to describe is the four-dimensionalism, according to which, things have opposing properties at different times, in the same sense that there can be different colors on different parts of the object. This is the *objective* picture of time and space: "(...) just as there is no objective "hereness" or "thereness" in space, there is no objective "present" or "future" in time. All of these concepts are indexical; that is, inextricably tied to a specific, personal perspective that has no place in the sciences." (Wyller, T. 2010, 146) Time and space present themselves as essentially indexical and subjective to humans.

This kind of argument is one that is frequently advocated in philosophy, most notably, perhaps, in phenomenology. I will, in what remains of this section, have a look at how Wyller's view can be supported by the theories of Husserl and Martin Heidegger. As we saw in the second section (on phenomenology and

science), Husserl argued that, as natural science traditionally seeks to give as objective and accurate description of the world as possible, it ignores the human *life-world* (i.e. the subjective aspect), and thus the fact that science is essentially a *human enterprise*, and a result of a human desire to understand the world (*objectively*). This means, according to Husserl, that modern science, psychology especially, misses an aspect of such importance, that it is in essence incomplete. By ignoring the human perspective which is a necessary condition for its existence, science seeks to “objectify” something that is essentially subjective: The life-world of the scientist (which includes his background knowledge and scientific methods).

This does not, however, mean that the entire existence of the external world (that we seek to describe in science) would disappear if human beings stopped existing. Rather, it implies that the subjective, human perspective give (or, perhaps, stronger: Projects) a certain *meaning* to the external world which it inhabits: The external surroundings are there for the human observer, and physical objects are typically seen as more than the mere physical matter that it consists of. Rather, for human beings, external objects (and especially those constructed by humans), are seen as possible *tools*, or equipment for us to use. This idea is most commonly associated by Heidegger. He states in his *Being and Time* (1962): “Dasein, in its concernful absorption, understands itself in terms of what it encounters within-the-world.” (Heidegger, M. 1962, 268) More specifically, the space that surrounds us is not perceived by us as a purely objective space; it is rather loaded with meaning, and this aspect of reality is completely dependent on the *subject* (embodied consciousness), or Dasein, in Heidegger’s terminology. The meaning that external space and objects gets, seen through human eyes, is mirrored in the human way of *interaction with the world*:

Equipment - in accordance with its equipementality - always is *in terms of [aus]* its belonging to other equipment: ink-stand, pen, ink, paper, blotting pad, table, lamp, furniture, windows, doors, room. These ‘Things’ never show themselves proximally as they are for themselves, so as to add up to a sum of *realia* and fill up a room. What we encounter as closest to us (though not as something taken as a theme) is the room; and we encounter it not as something ‘between four walls’ in a geometrical spatial sense, but as equipment for residing.

(Heidegger, M. 1962, 97-98)

There seems to be a quite clear connection then, between the phenomenology presented by Husserl and Heidegger (and also that of Merleau-Ponty, discussed in the previous section), and the transcendental idealism defended by Wyller and Kant: They all distinguish between objective and subjective space, and the general claim is that space and time can have meaning and size only in relation to embodied, epistemic subjects. Wyller observes a tension in Heidegger’s

works, between the life-world (where we perceive things as equipment, and give them “human” meaning), and science, which seeks to describe the world in a completely objective manner. “Against the background of the problem arising from Heidegger’s ideas, I will propose (...) that the realism of natural sciences should be integrated into a life-world perspective.” (Wyller, T. 2010, 60). In other words, Wyller’s task is in line with Husserl’s ideal: Instead of objectifying or neglecting the human subjective (phenomenological), indexical standpoint, Wyller wants to integrate it into his theory.

One question that seems to be worth some consideration is why Kant, when it can be argued that what he was doing was, after all, a type of phenomenology, an analysis of the appearances and the conditions for their appearances, did end up describing the *B-series* and not the *A-series*? It seems to be the case that, by investigation of the first person experience of time, most phenomenologists end up describing the *A-series*, with focus on the moment of the present. For Kant, things seem to be slightly different. He rather emphasizes time as first and foremost an *ordering principle* of the human representation of events for ourselves. Because time has no *form* for us,

(...) we try to make up for this deficiency by means of analogies. We present time sequence by a line progressing *ad infinitum*, a line in which the manifold constitutes a series of only one dimension. And from the properties of that line we infer all the properties of time, except for the one difference that the parts of the line are simultaneous whereas the parts of time are always sequential. This fact, moreover, that all relations of time can be expressed by means of outer intuition, shows that the presentation of time is itself intuition.

A33/B50

It is clear that the series that is described here is very similar to the *B-series*, and does not correspond to the *A-series*. However, Kant does state that *change* is real, and that change can only be perceived in time, but he does not elaborate more on how exactly how he thinks this works.

7 Conclusion

Some have claimed that there is an apparent contradiction between the A-series and the B-series, in that the B-series is completely still and static, while the A-series is dynamic and changing, so the combination of the two will not work. I have argued that there is no contradiction at all here: The A-series and the B-series represent, as McTaggart claimed, two equally fundamental aspects of time, and both need to be included in a model of time, and both are exercised by human beings in understanding and experience in general. When it comes to the apparent ‘paradox’, the incompatibility of the dynamic and the static aspect, it does not seem to be more of a problem than the view that human beings are embodied consciousness: We are both subject and object. Some philosophers have indeed claimed that this aspect of the human nature is puzzling and problematic, but that is no reason to claim that it is an impossibility.

Wyller’s theory of space and time shows us that the absence of an indexical perspective (corresponding to the A-series view of time), will make “real” knowledge of the world impossible. The reason for this is that indexicality and embodiment (embodied consciousness) are interdependent, and the B-series’ point of view seems to presuppose a “disembodied” view of time: That is, as a frozen block universe or a one-dimensional time line. Both these perspectives represent time as something completely objective, from a ‘God-like’ viewpoint, outside of, or abstracted from, time itself. Being bodily situated *in* this block universe or time line would imply the feeling of change and of the ‘Now’, but the ‘outside’ perspective alone provides one with no ‘real’ knowledge about the world, only relational differences in size. So this excludes the possibility of the B-series as the only model of time at work in the human understanding, perception and interpretation of the world. This means that the A-series is necessary in the sense that it provides us with temporal indexical knowledge, which does, as we have seen, not make much sense on its own (‘I am here now’ is not a very informative sentence). Also, the B-series is nevertheless *necessary* for the subjective understanding of the world, in the sense that it provides us with the scientific, objective overview of time and events in time, which the A-series is not capable of providing by itself.

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