Section 1.01

What is the problem of change, what is the adverbial solution and what are the metaphysical implications of this solution?

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Abstract

This thesis in concerned with the problem of change, and in particular the adverbialist solution to the problem. In the first chapter, we look at the problem in detail. We look at three important formulations of the problem that come from Lewis, Johnston and Haslanger. These three formulations have their difficulties and, in particular, struggle to capture the *metaphysical* worry that change brings. We then present a formulation of our own, which exploits Lowe's distinction between the semantic and metaphysical versions of the problem of change. In the semantic case, the problem relies on the principle of non-contradiction. In the metaphysical case, it relies on the indiscernibility of identicals. We then briefly explain the four main solutions and how they solve the problem. These solutions are presentism, temporal parts, relational properties and adverbialism.

In the second chapter, we focus on the last of these solutions. Beginning by looking at adverbs in general, we give a condition for a solution to be adverbial. In the semantic case, a solution is adverbial if and only if it considers the temporal element in sentences to modify some other part or parts of the sentence. In the metaphysical case, a solution is adverbial if and only if time governs the relationship between objects and properties. We apply these conditions to Johnston's 'adverbialism', under two different interpretations, and discover it fails. Then we search for a strictly adverbial solution. Looking at Lowe, Forbes and two of Haslanger's articles, we discover a solution that is really adverbial. This solution, known as 'State of 'Fairs'ism (SOFism) maintains that statements are Austinian and say of a historical situation that it belongs to a type of situation. Time is part of the context of the statement that picks out a specific historical situation and it governs the obtaining of a type of situation. We then briefly show how this solves the problems of change.

The third chapter looks at criticisms of adverbialism. In a number of places the criticism is aimed at a version of adverbialism that we ruled was not adverbial. But we consider the extent to which these criticisms apply to our version. We look at the criticisms of Lewis, Lombard, MacBride, Merricks and Rodriguez-Pereyra. We then examine a further worry that sentences containing adverbs entail sentences with the adverbial reference removed. That is, if A Fs gly, then A Fs. Allowing this adverbial entailment would ruin the adverbial solution. The reply to this is that different types of adverb need to be distinguished, and temporal adverbs do not allow this entailment.

Our final chapter examines the commitments of adverbialism. The other solutions have clear commitments, but those of adverbialism are less obvious. Using the SOFist picture, we distinguish several commitments. In the first place, we are committed to the 'Austinian' view of statements and propositions. The adverbialist also has substantial ontological commitment to states of affairs, in particular to types and tokens of states of affairs and their relationship. We look at what token states of affairs might be and what types of states of affairs might be. The relationship between the two suggests that we should either be compositionalists about both or non-compositionalists about both. Each of these positions has significant issues. We also note the consequences this has for our notions of instantiation and change. We conclude that the adverbialist account has substantial commitments.

Chapter 1: The Formulation of the Problem

1.1 Introduction

The concepts of change and persistence are ones that generate a number of different philosophical puzzles. One of the most pressing can be introduced as follows: let us suppose that a poker is hot at one time and cold at a subsequent time. That is, let us suppose that the following two statements are true:

(1) The poker is hot at t

(2) The poker is cold at t'[1]

If both (1) and (2) are true, then the poker has changed. We accept a large number of pairs of sentences that are like (1) and (2) in the relevant way, i.e. we accept that things change. We believe, for example, that an oak tree was a seed at one time, a sapling at another and a mature tree at some third time. Someone is born, ages and dies, and it is one and the same person that goes through all these states. It seems fundamental to our view of the world that it support pairs of claims such as (1) and (2).

However, as common-sense our beliefs about change seem to be, there is a challenge to their cogency. (1) and (2) appear to be making claims that conflict with each other. How can they both be true? How can it be true that a thing is hot and true that it is cold? It seems plausible to think that one and the same thing cannot have incompatible properties. But it appears that this is what the joint claims of (1) and (2) assert. The natural way to deal with is to get time involved;

[1] The properties *hot* and *cold* in these sentences should be understood as *wholly hot* and *wholly cold*. They are thus incompatible. This interpretation is implicit in everything that follows.

the sentences can both be true as they are talking about different times. If this is true, then the puzzle is to work out *how* time allows both (1) and (2) to be true[2].

It is not yet transparent why exactly we should be worried about the truth of these sentences. We shall therefore look at three ways in which the problem has been formulated before suggesting our own formulation.

1.2 Some versions of the problem: Lewis, Johnston and Haslanger

The problem of change is a longstanding puzzle, but was introduced into the modern discussion in Lewis's *On the Plurality of Worlds*[3]. We shall look at Lewis's presentation of the issue, a clear and influential formulation by Johnston and a contemporary presentation by Haslanger as representative of the diverse approaches to the conceptual difficulties of change in persisting things.

Lewis's version

Lewis presents the problem when considering a question concerning the overlap of (concrete) possible worlds. He takes the two to be analogous and terms the debate over change the problem of temporary intrinsics[4]. He considers two alternative views of the way in which objects persist: endurance and perdurance. An object endures "iff it persists by being wholly present at more than one time" and perdures "iff it persists by having different temporal parts, or stages, at different times"[5]. The problem of temporary intrinsics is supposed to be a decisive reason against endurance because there is no plausible endurantist account of how objects can have contradictory temporary intrinsic properties.

[2] This approach is not the only way to address the issue. We shall consider other interpretations of the problem in what follows.

[3] We are not claiming that Lewis's way the first modern discussion of the problem, only that his contribution was significant. Johnston's (1984) PhD thesis, for example, predates *On the Plurality of Worlds*.

[4] The problem is usually formulated using intrinsic properties as examples to clarify the argumentation, but the problem applies to extrinsic and relational properties too.

[5] Lewis (1986) p202

As many after him have done, Lewis does not formulate an explicit argument but appeals to our intuitive understanding of the issues involved[6]. Following Lewis we shall use the example of shape. We have several facts that must be compossible, for experience shows that they can be true together. In the first place, we have facts about my shapes: I can stand up and sit down at different times. When I stand up I have a straight shape. When I sit down, I have a bent shape. So, I can have both of these properties (at different times). Secondly, we have facts about what my relationship to my shapes is: my shapes are *intrinsic* properties, i.e. they do not and cannot depend on anything outside of me[7]. So my changing shape cannot involve anything other than me myself, the subject of predication. Thirdly, we have facts about the nature of the shapes: being straight and being bent are incompatible properties, so no one thing can have them both. Everyone agrees that these three types of fact are rendered compossible by my having the shapes at different times. Lewis's question is then "how does having [incompatible shapes] at different times help?"[8] Lewis sees three options here.

(i) Re-examine the second type of facts. Shapes are not, in fact, intrinsic properties but are relations between an enduring thing and times. I have the straight-at relation to the times I am standing and the bent-at relation to the times I am sitting. Lewis rules this out as 'incredible' because it amounts to the claim that, *really*, there are no temporary intrinsics. And he believes that there are.

(ii) Re-examine the first type of facts. I don't really have both of the properties *straight* and *bent*. Rather, the only properties I have are the properties I have at the present time. The present time is the only one that exists. This is presentism, and it asserts that other times are

[6] This is not supposed to be overly critical; Lewis was not writing a paper on the problem but covered it in three pages.

[7] Providing clear necessary and sufficient conditions to distinguish intrinsic and extrinsic properties is not going to be easy. But for the sake of his argument, we will allow Lewis to make this distinction here. As we have mentioned in footnote 4 there is a problem in cases of temporary extrinsics too.

[8] Lewis (1988) p65. Obviously his preferred solution is that the properties belong to different things (or parts of things), as he is a perdurantist.

useful fictions. Lewis finds this 'even less credible' than the first solution as it rejects persistence altogether. And Lewis believes in persistence.

(iii) Lewis's favoured solution: things do not endure, they perdure. The subject of the predication of shape is different at different times. The object that is straight is a different object to the object that is bent. I, however, am identical to neither object but each is a part of me. I am a collection of all of my temporal parts.

We are not here concerned with the force of the argument for temporal parts, but the formulation of the problem to which (i)-(iii) are solutions. It is a fairly spartan way to introduce the issue (though we should bear in mind that in Lewis' dialectic the problem of temporary intrinsics is used as an analogy to support the claim that possible worlds do not have overlap). We should note, however, a few difficulties that can arise from his formulation. In the first place, as is shown in his dismissal of options (i) and (ii), Lewis makes two assumptions. These assumptions are (a) that there are such things as intrinsic properties, and that these are had *simpliciter*[9], (b) that persistence requires eternalism, the thesis that non-present times are equally real[10]. The assumptions put constraints on any account of persistence through change; it must be an object existing through equally real times having truly intrinsic, truly incompatible properties. Anyone who does not accept this understanding of what change and persistence are will be left untouched by Lewis' version of the problem.

A second difficulty is a consequence of the haste with which Lewis presents the puzzle. The difficulty he points to isn't exactly clear. Let's try to spell out the problem in Lewisian fashion. Talking of intrinsic properties, he takes straight and bent as incompatible properties that cannot be had by the same thing. But what is the precise reason that these properties cannot be had by the same thing? The answer must lie in their incompatibility; what it is for properties to be incompatible is for them to be mutually exclusive. So the incompatibility of the properties

[9] This is why Lewis thinks the relational account fails; it "amounts to a denial that things really do have temporary intrinsics, and therefore is untenable". Ibid

[10] This is why Lewis thinks the presentist account fails; it "amounts to a denial of persistence and change, and therefore is untenable". Ibid p66

means that one thing cannot have them both. Having the property *straight* logically entails not having the property *bent*. If I have them both (as is in fact the case) this appears to amount to the claim that I have the property *bent* and do not have the property *bent*. This is a straightforward violation of the principle of non-contradiction.

If this is the right way to expand Lewis' reasoning we do indeed have a problem. But, as we shall argue below when giving our formulations of the problem, this is only one species of the puzzle. And this, semantic, species is not the most troublesome. Furthermore, solutions to it are semantic and some further work would need to be done to motivate Lewis' ontology of temporal parts. But we shall return to this later.

Johnston's version

We can now look at a second way to generate the problem, found in Johnston (1987)[11]. Johnston suggests that the problem is formulated using temporary intrinsics "only to more vividly illustrate the general problem of change."[12] But he does indeed formulate the problem using temporary intrinsics. The first step in his argument is to try to prove that properties are not time-relative[13]. This is equivalent to showing that solution (i) to Lewis's formulation is wrong. He does this by way of our concept of duplicates.

Intrinsic duplicates are two objects that share all intrinsic properties but not all extrinsic properties. Intrinsic properties are those properties that are had by objects independently of anything outside of the objects. An example of an extrinsic property that exact intrinsic duplicates might not share is *being liked by P*. Johnston claims that intrinsic duplicates are possible. The two objects can be in different spatio-temporal locations. Intrinsic duplicates

[11] It is worth noting that in this paper Johnston gives a formulation of the problem that reflects the formulation from his thesis (1984) and Lewis's account. However, he explicitly states that he "think[s] that both Lewis's formulation of the problem and [his] old formulation suffer from not focusing on a fourth option" (p113). Still, the (1987) presentation is helpful to us, and the fourth option (adverbialism) fits as a solution to this formulation.

[12] Johnston (1987) p113

[13] This is the first step conceptually, but actually in Johnston's paper it comes after the formulation of the problem.

"existing at wholly different times are as much duplicates as duplicates existing at the same time."[14] But if this is so, then intrinsic properties cannot have a temporal element, for otherwise these duplicates would have different intrinsic properties and hence not be duplicates. If hot-at-t and hot-at-t' are different properties, then a poker that is hot at t cannot be an exact intrinsic duplicate of a poker that is hot at t'. If we accept the conceptual possibility of duplicates at different times, we cannot accept any solution to the problem that makes the nature of intrinsic properties in some sense time-dependent.

Johnston hopes to have thus put paid to the claim that "the things properties hold among include times"[15]. Without this claim, he suggests that we do not have the tools to show how the conjunction of (1) and (2) differs from the explicitly contradiction 'the poker is hot and the poker is cold'.

> "[W]e cannot explain how it is that the temporally qualified report of change 'At *t*, *z* is G and at *t*, z* is not G' is relevantly different from the contradictory report '*z* is G and *z* is not G' by expressing the fact of change by the pair
> G(*z*,*t*)
> -G(*z*,*t**)"[16]

The challenge of change is to find some way to differentiate between the two cases. Our job is to "explain the role of temporal qualification in our attributions of change, where explaining does not just mean opting for a style of appending '*t*'s and '*t**'s but defending the views about properties, the nature of time and the nature of persisting objects which justify this style of appending"[17].

Johnston increases the difficulty of this job by arguing against the presentist solution to the problem. While, unlike Lewis, he doesn't think that persistence is ruled out by giving ontological significance to the present, he does believe that it fails. He suggests special relativity has shown that any attempt to describe this 'present' in a frame insensitive manner will not

[14] Johnston (1987) ibid
[15] Ibid
[16] Ibid
[17] Johnston (1987) p115

succeed. So what is present must be a frame-relative matter. But what is real cannot be a frame-relative matter, so the present thus cannot be an ontologically significant category. It seems, then, that the temporal parts solution is the right answer to the challenge.

This is an elegant and powerful formulation of the problem. It has the advantage that Johnston explicitly poses us a metaphysical and ontological challenge, while Lewis's formulation seemed a semantic issue. But there are concerns with this account too[18]. The crucial element in Johnston's formulation of the problem is his notion of 'relevant difference'. The problem is generated by comparing sentences including temporal reference with sentences that do not contain such references. To rephrase Johnston's question, why is '*z* is G and *z* is not G' a contradiction whereas '*z* is G at *t* and *z* is not G at *t**' is not a contradiction? The suppressed reasoning here seems to be something like the following: these two statements are identical but for the addition in the latter of the temporal modifiers. However, as the first is a clear violation of the law of non-contradiction, in order to assert the latter we ought to be able to explain how the temporal modifiers alter the meaning of the claim such that the principle of non-contradiction isn't transgressed.

There are two points to make about this reasoning. Firstly it relies upon a resemblance between statements like '*z* is G' and statements like 'at *t*, *z* is G'. It is not unreasonable to think that there is a resemblance here, but Johnston does not argue for the claim. The second point is that, despite Johnston's desire to give metaphysical import to the problem, as it stands this still seems a semantic issue. For in trying to explain how '*z* is G' and 'at *t*, *z* is G' are relevantly different, we are looking at the *meaning* of these statements. We are seeking an account of how the linguistic structure of the sentences differs in order to avoid a *logico-linguistic* principle: the law of non-contradiction. Analysing the meaning of certain sentences is a job for semantics, and explaining how temporal modification works in such sentences may not metaphysically commit us. An extra argumentative step needs to be made to show that solutions to this semantic

[18] One concern we shall not consider is the strength of the duplicates and special relativity arguments against the alternatives to temporal parts.

problem entail certain metaphysical claims. This is not to say that Johnston is wrong to think there is a metaphysical problem of change but only that, if there is such a problem, his formulation doesn't fully capture it.

Haslanger's version

We shall now turn to Haslanger's detailed and informative discussion of the area in *The Oxford Handbook of Metaphysics*. In her formulation of the puzzle, we have five assumptions which together generate a contradiction:

A. *Persistence condition*. Objects, such as a candle (or poker), persist through change.
B. *Incompatibility condition*. The properties involved in a change are incompatible.
C. *Law of non-contradiction*. Nothing can have incompatible properties, i.e. nothing can be both *P* and not-*P*[19].
D. *Identity condition*. If an object persists through a change, then the object existing before the change is one and the same object as the one existing after the change.
E. *Proper subject condition*. The object undergoing the change is itself the proper subject of the properties involved in the change.[20]

The contradiction can be seen if we take an example. Consider the poker of (1) and (2). It is hot at t and cold at t'. From A, the poker persists through change. From D, the poker at time t is the same poker as the poker at time t'. From E, the poker is the proper subject of the properties *hot* and *cold*. So, at this stage we have a single persisting object being the proper subject of the properties *hot* and *cold*. But as (1) and (2) together are an example of change, from B we can deduce that *hot* and *cold* are incompatible properties. Thus the poker has incompatible

[19] As it is formulated here, C. is not a logico-linguistic principle. In fact, it is not even clear that this rules out the truth of contradictory propositions (this was pointed out to me by Rodriquez-Pereyra).
[20] Haslanger (2003) p316-317. For clarity we have used alternate numbering and cropped some of the assumptions.

properties. But C, the law of non-contradiction, states that this is impossible. We therefore have a contradiction if we accept all five assumptions A-E.

Our task is then to find which of these assumptions is false. One point to make is that Haslanger's C, the law of non-contradiction, is time-insensitive. It is interesting to note that Aristotle (in the *Metaphysics* IV 6 1011b13–20) formulates the principle of non-contradiction explicitly to include the qualification that opposite assertions cannot be true *at the same time*. It might well be that in modern philosophy the law of non-contradiction is seen to contain no temporal reference. But it seems at least worth arguing for such a position, and in the absence of such arguing Haslanger's account seems incomplete.

However, aside from this, we have another criticism. Haslanger's is not an atypical presentation of the issue, which takes solutions to be effectively dissolutions of the problem[21]. If one of the above assumptions is false, then there simply is no problem of change. There are not, properly speaking, solutions to the problem but ways of showing the argument valid but unsound. But if this is the case then the problem as it stands is really a problem for no one; any of the solutions take all dialectical force out of the argument. It would seem preferable to construe the solutions as positive statements about the nature of change rather than negative rejections of assumptions.

1.3 Our formulation

Having seen these three ways of presenting the problem, we can propose our own. We shall seek a puzzle with real metaphysical import. Our formulation will aim to make the fewest possible assumptions so as to make the problem as difficult as possible. We also intend to leave space for solutions to the problem to be genuine, rather than dissolutions that deny assumptions. In this vein, we will make no judgements about what exactly change or persistence are. Rather, we shall claim that whenever change happens sentence pairs such as (1) and (2) are

[21] See, e.g., Hinchliff (1996) Sect. I for a similar methodology.

true. Thus, if there is a problem with sentences (1) and (2), there is a problem about change. Furthermore, solutions to problems with (1) and (2) will have something to say about what change can be.

Given the truth of (1) and (2), there are two ways in which we might try to formulate the problem: either with respect to the law of non-contradiction or with respect to the indiscernibility of identicals.

1.3.1 The semantic problem

The first suggestion is that (1) and (2) together violate the law of non-contradiction. The law of non-contradiction is a basic principle of logic that states contradictory propositions cannot both be true. More formally, $\forall P \neg [P \wedge \neg P]$. The principle is central to a great deal of our formal and informal reasoning, so should be accepted by all sides in the literature[22]. In order to show that (1) and (2) transgress this principle, we would have to show them to be contradictory. This would be to show that the propositions they express are a proposition P and its negation ¬P. How might we do this?

The property *cold* can plausibly be thought of as the negation of *hot*, or at least as entailing its negation. Replacing *cold* with ¬*hot* in (2) we get

(3) The poker is ¬hot at t'

In this context, x is ¬F at t implies ¬ x is F at t[23], so we can replace (3) with

(4) ¬ The poker is hot at t'

[22] Although see the collection Priest, Beall and Armour-Garb (2004) for the claim that the law of non-contradiction is false in some cases. To say that the law of non-contradiction fails in the types of situations our sentence-pairs describe would be a dissolution of this version of the problem.

[23] The general principle that x is ¬F at t implies ¬ x is F at t may be controversial. In cases such as ours, however, it is admissible.

But we have not arrived at a violation of the law of non-contradiction. For the law says of any single proposition that it cannot be the case that both it and its negation are true. (1) is the assertion of the proposition 'the poker is hot at t' and (4) is the denial of the proposition 'the poker is hot at t''. These propositions are not identical, so we do not yet have a problem. This is fortunate, as the steps to this stage seem uncontroversial.

However, it seems we do get a formal contradiction when we have the statements:

(5) The poker is hot

(6) ¬ The poker is hot[24]

If (1) and (4) are not contradictory but (5) and (6) are, we can ask whether (1) entails (5) and (4) entails (6). For, if they do, a contradiction is derivable from our pair of sentences (1) and (2)[25].

First, however, we ought to discuss possible interpretations of (5) and (6), because their meaning isn't obvious. Three interpretations of (5) (and correspondingly its negation (6)) suggest themselves:

(i) The poker is hot at all times

(ii) The poker is hot at one or more times

(iii) The poker is hot timelessly

(i) and (ii) are fairly clear. (iii), however, is somewhat obscure. It states that the poker is hot timelessly. The most promising understanding of (iii) is that it is equivalent to the claim that the poker *just is* hot. This is sometimes expressed as the poker being hot *simpliciter*, or being *just*

[24] We shall assume a univocal meaning of 'is' across the two sentences.

[25] One reason to suggest that there is no entailment might be to claim that all propositions essentially contain time references. This is, however, rather revisionary so we will avoid it if possible

plain hot. But these locutions are not transparent either. The best sense to be made of this type of *having* is that it is a *having* independent of anything else. The poker is hot and this relies in no way on anything external to the poker and the property. Nothing, not even time, is relevant for the evaluation of the truth of 'the poker is hot'. (iii) amounts to the claim that the poker is hot in a time-insensitive way.[26]

Which interpretation(s) shouldn't we adopt? I suggest that (ii) is not an appropriate interpretation. On this interpretation, (5) asserts that there is at least one time at which the poker is hot. Then it is entailed by (1). But (6) would mean that it is not the case that there is at least one time at which the poker is hot. This is not entailed by (4), which asserts that the poker is not hot at t'. We could then have the truth of (1), (4) and (5) without a contradiction. We should not admit this interpretation because it doesn't allow incompatibility between the properties *hot* and *cold*. These properties are supposed to entail one another's negation. But according to this interpretation, (5) is compatible with:

(7) The poker is cold

For (7) only states that there is some time at which the poker is cold. We lose the incompatibility between the properties. Therefore what we mean by (5) is not interpretation (ii), that there is some time at which the poker exemplifies *hot*, but something more robust.

Interpretation (i) gives (5) the meaning 'the poker is hot at all times' and (6) the meaning 'it is not the case that the poker is hot at all times'. (6) follows clearly from (4), so to generate a contradiction we only need to derive (5) from (1). But why should being hot at a time entail being hot at all times? The only justification for this that I can see would be if properties were the sorts of thing that, if something has a property at any time it has it at all times. But why

[26] There are other options too. For example, the timeless having of a property could be having a property outside of the temporal sequence; having a property without having the property at any time. But the option in the text seems the most plausible.

should we think that having a property at a time implies having it at all times? No argument seems forthcoming[27]. The very contradiction of (1) and (2) that would arise gives us good reason to think that properties don't work in this way. We conclude that this proposal for the entailment is not persuasive. Thus, if we are looking for the most dangerous form of the problem of change, interpretation (iii) is to be favoured.

Interpretation (iii) makes the entailment of (5) from (1) and (6) from (4) most difficult to deny. Let the expression Hp mean that the poker is timelessly hot and let H(t)p mean that the poker is hot at t. Do H(t)p and ¬H(t')p entail [Hp ∧ ¬Hp]? In other words, can we drop the temporal modifiers and preserve truth? This is a semantic issue, as it concerns the meaning of the sentences: the propositions that they express. The simple answer is no. Time is essential to the meaning of the sentences (1) and (4). It is time that makes possible the conjunctive truth [H(t)p ∧ ¬H(t')p]. This is what our intuition tells us. But this simple answer is not sufficient. We need to show *why* (1) doesn't entail (5) and (4) doesn't entail (6). To do so, we need to explain the role of the temporal elements in the propositions expressed by (1) and (4) such that time is insolubly tied to the meaning of the sentences.

There are a number of different ways to do this, and these are the solutions to the semantic problem of change. Each of them agrees that time is essential to the meaning of (1) and (4), but they differ in how they understand the temporal element of these sentences to work. The task is an investigation into the semantic value of the time parameter in pairs of sentences like (1) and (2). But, the linguistic work aside, this version of the problem should not give us too much concern. The principle of non-contradiction has not given us a metaphysical worry, as it is only concerned with the logical-linguistic threat of a formal contradiction (though the semantic solutions may be metaphysically suggestive). We therefore respond to the worry

[27] The poker being hot at t might entail that *at all times* 'the poker is hot at t' is true. But this is not what is needed.

by examining the meaning of the sentences and the function of the temporal modifiers[28]. So, to repeat; the problem presented here seems no metaphysical worry, only a concern over legitimate meanings of the sentences.

1.3.2 The metaphysical problem

If the law of non-contradiction doesn't lead to a metaphysical problem for change, we should look elsewhere. It seems a real metaphysical difficulty rears its head when we consider the principle of the indiscernibility of identicals[29]. This Leibnizian principle states that, if x and y are identical then y will have a property iff x has that property (and *vice versa*) i.e. $\forall x \forall y \forall F[x=y \rightarrow [Fx \leftrightarrow Fy]]$. The principle is *prima facie* very plausible. To deny it would seem to be to say that one and the same thing can have different properties. But Fa and $\neg$Fa cannot both be true at the same time, from the principle of non-contradiction[30][31].

Let us set out the argument. For ease of exposition we shall term the poker of sentence (1) p^1 and the poker of sentence (2) p^2. Our assumptions are the following:

(1) p^1 is hot at t

(2) p^2 is cold at t'

(8) $p^1 = p^2$

(9) If x = y then any property of x is a property of y and *vica versa*

[28] As we noted when discussing Johnston's formulation, the semantic solutions may carry with them metaphysical implications. But we would need additional reasoning to show that the implications do, in fact, follow.

[29] The indiscernibility of identicals is sometimes called Leibniz's law, a term unhelpfully also in use for the principle of the identity of indiscernibles.

[30] It seems, then, that the principle of non-contradiction entails the indiscernibility of identicals. But they are not equivalent, for the indiscernibility of identicals doesn't entail the principle of non-contradiction were not. Suppose that the indiscernibility of identicals is true. Suppose also that some sentence, for example the Liar sentence 'this sentence is false', is in fact both true and false. In such a case, the indiscernibility of identicals it true but the law of non-contradiction isn't.

[31] There are alleged counterexamples to the indiscernibility of identicals. These include cases of transworld identity and of the substitutability of different terms for a single entity. We shall not consider these here, as the principle is almost universally accepted.

(1) and (2) are accepted.

(9), as we have stated it, is temporally insensitive. That is, it applies across times[32]. For any entity at any time, no entity is such that it has and lacks a property. This is weaker than the principle of non-contradiction, because it is entailed by it but does not entail it[33]. It is a metaphysical claim because it is a claim about what entities, properties and the having of properties is like. From (9) we can deduce that, if $p^1 = p^2$, p^1 and p^2 will share all properties[34]. p^1 will have all the properties of p^2. Another way to put this is that anything true of p^2 will also be true of p^1.

We do not yet have a problem. For we have not said anything about the contents of sentences (1) and (2). But what makes (1) and (2) sentences describing change are the properties they involve. *Hot* and *cold* are complementary properties, they are incompatible. Nothing can be both hot and cold. It is impossible for both 'x is hot' and 'x is cold' to be satisfied by any entity x.

(10) 'p^1 is hot' and 'p^1 is cold' cannot both be true.

Once this is added to the assumptions, we can generate a problem. The problem is as follows:

From (8) we know that $p^1 = p^2$. From (9) this means that p^1 has all the properties of p^2. (2) states that p^2 has the property *cold* at t'. This implies that p^2 has the property *cold*. In turn, this means that p^1 has the property *cold*. But (1) states that p^1 has the property *hot* at t. This

[32] One way to avoid this metaphysical problem of change would be to temporally relativise the principle of the indiscernibility of identicals. But this amounts to little more than the assertion that time makes possible the fact that the same object can have incompatible properties. We already knew this from the truth of (1) and (2). We want to know why and how this is the case, and in so doing will give reasons to temporally relativise the indiscernibility of identicals.

[33] See footnote 30.

[34] If the converse principle, the identity of indiscernibles, is true, then the conditional can be strengthened to 'if and only if'.

implies that p^1 has the property *hot*. So p^1 has both the property *cold* and the property *hot*. 'p^1 is hot' and 'p^1 is cold' are both true, contravening (10).

How, then, are we to solve this problem? We need to find a way for (1), (2), (8), (9) and (10) to be all true. We don't want to give up any of them. This is in keeping with our desire to *solve* the problem, not dissolve it. Given that the assumptions *prima facie* lead to a contradiction, we must show how the reasoning that leads there is mistaken. To do so we explain the philosophical concepts at work in (8)-(10) so that they don't combine with (1) and (2) to make a contradiction. Such explanation not matter for semantics. Rather, we have to look at the things that the assumptions talk about and see what kinds of things they are. We shall shortly look at solutions that do just this. The solutions explain philosophical concepts like *persistence, property* and *property instantiation*. The substantial metaphysical problem needs substantial philosophical work.

1.3.3 The difference between the two and a methodological aside

First, however, we should deal with a couple of asides. We should make explicit the difference between the metaphysical and semantic problems of change. An important point is that the metaphysical problem does not seek to show that (1), (2) and (8) together generate a contradiction. The dialectic is *not* the following: p^1 is (timelessly) hot but p^2 is not (timelessly) hot. But $p^1 = p^2$. Therefore a proposition and its negation are true. This is the semantic problem of change and is dealt with above. The semantic problem relies crucially on the claim that (1) and (2) imply that the poker both is and is not (timelessly) hot. The metaphysical problem does not need the claim that the poker being hot at a time entails its being hot timelessly. It does need to move from (1) and (2) to the claims that the p^1 has the property *hot* and p^2 has the property *cold*. But this is substantially less controversial. The dialectic of the metaphysical problem of change relies crucially on (9), the indiscernibility of identicals. Without (9) we cannot

move from the claim that p^2 has the property *cold* to the claim that p^1 has the property *cold*. This, combined with (1) and (10), gives us the problem.

A further difference is that the semantic problem of change deals with propositions whereas the metaphysical problem deals with objects, properties, time, instantiation and identity. The conceptual space between the two can be highlighted by the fact that there are solutions that only solve one of the two problems. The claim that all propositions essentially contain a time reference solves the semantic problem of change but not the metaphysical problem. Making the indiscernibility of identicals time-sensitive solves the metaphysical problem but not the semantic problem.

Our second aside is to briefly address one way that our metaphysical formulation might seem weaker than the others we have given above. We have attempted to construct a puzzle which isn't committed to a great deal[35]. This allows the solutions to the problem (which we shall shortly survey) to be genuine solutions to the problem. But there is a methodological worry with this. Unlike Haslanger, we are not considering the solutions as denials of assumptions. Haslanger's approach has the advantage that we can trade off our intuitions about the various assumptions and critically interpret them until one seems plausibly false. How should we decide between solutions to our problem? If any solution to our form of the problem will be successful, on what grounds do we judge them?

This is not as problematic as it appears. There are several independent grounds for comparing the solutions. How do they fit with our general philosophical and conceptual scheme? How far do they agree with common sense and intuition? How simple and elegant are they? These are exactly the same considerations that would be used to determine which assumptions in Haslanger's A-E should be rejected. So our way of engaging the problem of change doesn't undermine our resources for debating the strength of the various solutions.

[35] We are committed to the indiscernibility of identicals, which is not an explicit assumption in Lewis, Johnston or Haslanger (though Johnston mentions it as a route for deriving temporal parts on p115). But it is a highly plausible principle.

1.4 Four solutions, an overview

We have two problems, one semantic and the other metaphysical. The popular solutions of these have versions that solve each problem. This is not to say that a solution to one of the problems is a solution to the other. But the solutions to the semantic problem have metaphysical analogues[36]. We shall start with the semantic solutions.

We stated above that our semantic problem would be solved if sentences such as (1) and (2) contained essential temporal reference. That this is the case is not an implausible claim. But *how* is it the case? There are four broad options for interpreting the sentence pairs in such a way. The four solutions analyse 'the poker is hot at t' in the following way:

Relational properties	the poker is hot-at-t
Presentism	t: the poker is hot ('t:' indicates that it is now t)
Temporal parts	the-poker-at-t is hot
Adverbialism	the poker is-at-t hot

On each of these analyses (1) is not inconsistent with (4) similarly interpreted, because the temporal qualifier is fundamental to the meaning of the sentences. The comparative strength of these solutions is not something we have space to investigate here. We are not primarily interested in the semantic problem. Instead we shall look at the solutions to the metaphysical problem.

The main solutions for the metaphysical problem fall under the same types, the three given by Lewis and a fourth, adverbial solution. In the first place, we could temporally relativise properties so that they are not strongly incompatible. Or we could be presentists and deny that

[36] Does selecting a solution to one of the problems entail selecting the analogue for the other problem? It is not immediately clear. Most do, as it happens. But to tie the analogues this closely together would require an investigation of the relationship between semantics and the nature of things. This is unfortunately beyond our scope.

times other than the present exist[37]. Alternatively, we could agree with Lewis and see this issue as reason to accept an ontology of temporal parts. A final option would be to treat the instantiation of properties by objects as in some sense adverbial[38]. In concluding our formulation of the problem, let us look at how these solve the metaphysical problem and the views about the world they suggest.

A simplified version of the relational properties view sees properties as disguised relations. The poker being hot at t is a matter of the poker having a relation *hot-at* to the time t. In general, seeming *n* place relations are disguised *n+1* place relations. This is a solution to the problem because these relations are not strictly incompatible. We cannot move from 'x is hot at t' to 'x is hot'. We can only conclude that 'the *hot-at* relation holds between x and t'. p^1 has the relations *hot-at* to t and *cold-at* to t' (as does p^2); the poker has the relations at all times. This does not violate (10). (10) itself is badly formed, as there are no bare properties corresponding to *hot* and *cold*.[39]

The relativisation of properties alters our understanding of what it is for a thing to have attributes or character. An object being a certain way is a matter not just of the quality it has, but the time at which it has that quality. Nothing *just is* red, or tall, or bent, or liquid. The properties that things have are relations to times. The persisting poker, then, does not have one property at one time and an incompatible property at another. It has two relations to different times, and has these relations at all times. It is not entirely clear what ontological statement is being made by the relational properties view, but at the least it claims that the traits things have are not primitive, time-insensitive attributes.

[37] A growing block universe such as that envisioned by C. D. Broad would be able to deal with future change, but not past or present change.

[38] Some see this as a species of the relational properties view. Hopefully our later discussion will make it clear that this is not the case. The similarity in the way they deal with the metaphysical problem does indicate their resemblance.

[39] Another way to present a relational properties solution is to assert that properties like *hot* do not exist, instead there is a family of properties *hot-at-t, hot-at-t', hot-at-t''*... The property *hot-at-t* is not strictly incompatible with the property *cold-at-t'*.

The presentist solution suggests that we must be wary of tense in our sentence pairs. If the time is t then the following pair are true, 'The poker is hot', 'The poker will be cold'. If the time is t' then this pair are true, 'The poker was hot', 'The poker is cold'. This solution avoids the problem because only the present exists and references to properties had at other times must be understood in a tensed way. At t, 'p^1 is hot' is true. But it is not true at t', because t no longer exists. What *is* true at t' is 'p^1 was hot'. So 'p^1 is hot' and 'p^1 is cold' are never true together and (10) is not contravened.[40]

Presentism rules out the existence of times other than the present and hence the existence of objects at times other than the present. Whatever properties the poker *now* has are its properties, and it does not now have two incompatible properties[41]. Presentism is a claim about what exists.

The temporal parts solution accepts persistence but in a special way. Persistence does not imply strict identity over time, and (8) is thus inaccurate. While both of our sentences are true, they are true because certain parts of the poker have the appropriate properties. The poker itself has its properties only derivatively; the basic subjects of property instantiation are temporal parts. For the temporal parts theorist persistence does *not* mean that $p^1 = p^2$, it means that p^1 and p^2 are parts of the persisting poker. p^1 simply doesn't have the property *cold* so 'p^1 is cold' is false. The indiscernibility of identicals has shown that the discernible p^1 and p^2 are not identical. Thus a full understanding of the nature of objects furnishes us with a solution.

Temporal parts theorists suggest that objects are collections of parts extended temporally as well as spatially. Different parts of the poker are spread throughout its life. The t part of the poker has the property *hot*, and the t' part has the property *cold*. Objects persist by having appropriately related temporal parts, and the t and t' parts of the poker bear this relation

[40] Another assumption that would need to be re-examined is (8). The presentist's notion of persistence is presumably something like existing at the present time and at the present time having the property of having existed previously. This might block the simple identity $p^1 = p^2$.

[41] There are at least two ways for the presentist to expand this. One would be to suggest that, at t', the poker just isn't in any way hot, another would be to suggest that at t' the poker has the property 'having been hot (at t)', which is not incompatible with being cold at t'.

to the collection of temporal parts we call the poker. There is no metaphysical issue because the properties are held by different things that form a mereological sum. The temporal parts theory is a claim about what objects are.

The adverbial solution treats the temporal element in the sentences as an adverb, modifying the having of properties by objects. In our example, the poker is *tly* hot, but *t'ly* cold. Or, to put it another way, the poker is-at-t hot and is-at-t' cold. Using a modal equivalent may make this clearer; the sentence pair 'the poker is actually hot', 'the poker is possibly cold' are consistent. The adverbialist solves the problem like the relational properties theorist, by denying the move from 'x is hot at t' to 'x is hot'. (1) really means that 'x tly is hot' and (2) that 'x tly is cold'. These do not contravene (10). (10) itself is not perspicuously expressed; it really means 'x is tly hot' and 'x is tly' cold cannot be true together. But we are not claiming this of an entity, only that p^1 tly is hot and p^1 t'ly is cold. And this is allowed.

According to this picture, time acts like an adverb in sentences like (1) and (2). The having of properties by objects changes over time. This account is, as yet, incomplete. We need to know *how* time modifies the having of properties by objects. There are other outstanding questions too: what exactly does adverbialism claim about the world? And how, precisely, does such a claim solve the metaphysical problem of change? These are questions to which we shall return. But first, we need to complete the account and set out more rigorously what exactly the adverbial position is.

Chapter 2: Varieties of Adverbialism

2.1 What is adverbialism?

In the previous chapter we formulated two problems from the pair of true sentences about a persisting object:

(1) The poker is hot at t

(2) The poker is cold at t'

One was a semantic problem about how to avoid the charge that (1) and (2) fall foul of the principle of non-contradiction by entailing propositions that were formally inconsistent. The second, more significant, problem is a metaphysical worry that the persistence of the poker of (1) and (2) violates the principle of the indiscernibility of identicals[42]. One of the proposed solutions to both of these problems was adverbialism. Adverbialism does not lend itself to elegant expression in natural language, but at least two different locutions can indicate what is meant. An adverbialist interpretation of (1) suggests that the poker is-at-t hot, or that the poker tly is hot[43]. What these phrases are trying to capture is the notion that, according to adverbialism, the temporal elements of sentences like (1) and (2) modify the having of properties by objects.

One good way to start to get a grip on what the adverbialist position is is to look at other adverbs. In the following, softly, usually and nearby are adverbs:

[42] In practise, we shall shift between referring to the problems of change and the problem of change. Nothing should be read into this; in the first case we are emphasising the two types of problem and in the second we are treating them as different species of the same fundamental concern. The modes of expression simply indicate tone.

[43] We should explicitly note that the modification here not applied to the property *hot*. These phrases are not wholly unambiguous.

Sally spoke softly

Tom usually wears a shirt

Jenny is waiting nearby

In these cases, the adverb modifies the verbs in the sentence (though adverbs can apply to other non-nominal parts of speech). The sentences (1) and (2) are supposed to operate in a way similar to these examples.

A particularly helpful type of adverb for comparison is the modal adverb. An analogy is often drawn with modality in the exposition of adverbialism. The poker could be actually hot and possibly cold. More carefully, if w and w' are some possible worlds[44], the following sentences are true

(i) The poker is hot at w

(ii) The poker is cold at w'

We can see 'problems of modality' analogous to our two problems of change. The semantic worry is how to parse the sentences such that they don't entail a contradiction and the metaphysical worry is how to explain what's going on such that the indiscernibility of identicals isn't violated. The modal and temporal cases have parallel solutions: actualism/presentism, counterparts/temporal parts and world-relative properties/time-relative properties.

The adverbial solutions to the modal problems suggest that the modal references 'at w' and 'at w'' are sentential adverbs, modifying the whole of 'the poker is hot' and 'the poker is cold'. If w is the actual world and w' some other possible world, we say that the poker is *actually* hot, but *possibly* cold. The analogy is supposed to show the plausibility of incorporating a world

[44] We are assuming (following Plantinga) that possible worlds are maximal sets of states of affairs that could have obtained.

or temporal perspective in the mode in which properties and objects are related. But these gestures towards interpretations need to be spelt out, and this has been done in different ways. We shall, therefore, look at the different varieties of adverbialism and evaluate them.

It will be helpful to have a definition of adverbialism so that we can see what theories might fall within it as a category. Adverbs function by modifying other parts of language. Specifically, they modify verbs or other parts of language that are not nominal[45]. There is no universally accepted way of interpreting the role of adverbs in sentences, and a number of types of adverb have been distinguished. But it is at least clear that adverbs alter the meaning of a sentence by colouring the meaning of other parts of the sentence. We can apply this to the temporal context. Linguistically, an adverbial interpretation of our sentences (1) and (2) takes the temporal reference to modify some part or parts of the sentences. This could be done in two ways, by time modifying either (a) the copula or (b) the whole of the rest of the sentence. The former case sees time as acting like an adverb of manner, the latter case sees it as analogous to the modal case.

This semantic adverbialism has a metaphysical counterpart, where *what it is for an object to instantiate a property* is temporally sensitive. An adverbial metaphysic sees the adverbial semantics as an accurate representation of ontology. The time at which the poker is hot alters the poker's being hot. There are also two ways in which this can be cashed out. Corresponding to (a), the adverbialist could claim that the *way in which* the poker is hot is temporally relativised. Corresponding to (b), the adverbialist could claim that time governs the obtaining of the poker's being hot.

We shall only consider adverbialism of the (b) sort. This is for two reasons. Firstly, we shall later show in sect. 3.5 that the (a) interpretation is prone to a fatal objection. Secondly,

[45] C.f. Higginbotham, James (1998)

there is no viable adverbial position that fits (a) in the literature[46]. We thus restrict our view to type (b) adverbialism in both the semantic and metaphysical cases.

We can therefore make the following definitions. A semantic adverbial theory is a theory that treats the linguistic function of 'at t' in our sentences as operating within the sentence by modifying the sentence. A metaphysical adverbial theory is one that sees the relationship between things and the features they have as governed, in some sense, by time. An adverbial theory therefore interprets our sentences such that what is temporally modified is the whole phrase 'the poker is hot' or 'the poker is cold' and further holds that this is representative of the nature of reality.

2.2 Johnston's 'adverbialism'

Given this account of what it is for a theory to fall under the category of adverbialism, we shall start our examination of adverbialism by looking at the theory proposed by Mark Johnston in his 'Is there a Problem about Persistence?'. Johnston introduces his adverbial account by analogy with modality (as we have done above). He uses an example of Sam, who is fat but could have been thin. His favoured understanding of modal variation is 'eponymous'; the mode or way in which Sam has the properties of being fat and being thin is different in the case of the actual world and some possible world *v* where Sam is thin. "[W]e could say that Sam is related to the property of being fat in the actual world way and is related to the property of being thin in the *v* way."[47] Johnston tells us that the syntactic category for such qualification is the adverbial category. This interpretation of what is going on in modal case encourages Johnston to apply a similar interpretation to temporal variation.

[46] We shall show in the next section that Johnson's 'adverbialism', which might be thought of as an adverbial theory of type (a), is not actually adverbial.
[47] Johnston (1987) p127.

> "Temporal qualification has to do with the ways individuals *have* properties. Unproblematically, Sam may have the property of being fat in a *t** way and have the property of being thin in a *t* way. Temporal qualifiers are often adverbs. Sam is presently fat. But he is *t*ly thin."[48]

Following Johnston's analysis in the modal case, we can suggest that Sam is related to the property *fat* in a *t** way, and related to the property *being thin* in a *t* way.

Johnston then suggests that the role of time in sentence pairs such as (1) and (2) is to modify the 'copula of predication' such that '*a* is F at *t*' is interpreted as '*a* is *t*ly such that it Fs'. We can then give a semantics for such sentences by saying they are true-in-L iff *a* satisfies$_L$-at-*t* 'such that it Fs'. "[S]atisfying-at-a-time for various times is well enough understood to take as basic for these purposes"[49], he claims. Satisfying-at-a-time does the same work in the semantics as instantiating-at-a-time does in the metaphysics. "Instantiating a property, it turns out, is instantiating at some time the property"[50].

Unfortunately in his (1987), Johnston only spends two pages on his solution to the problem of change, so leaves some exegetical work to do. *Prima facie*, Johnston advocates a simple copula tensing. Such a theory temporally relativises the instantiation relation by tensing the copula. The copula in our sentences is the verb 'to be'. Tensing it means that there is some irreducible temporal element in the copula. Or, in other words, for any sentence that essentially involves time there is a temporal element in the copula that attaches subject and predicate. At a metaphysical level, this amounts to the claim that the tie between objects and their properties is fundamentally temporal.

There are two ways to explain this.

(a) Instantiation is a two-placed relation between object and properties. But there is no single relation of instantiation, instead we have an instantiation relation for each time; is-at-t is a

[48] Ibid p128. This passage has the same ambiguity noted in footnote 1.
[49] Ibid
[50] Ibid p129

different relation to is-at-t'. There is a class of relations made up of the instantiation relations for each time[51]. An object instantiates a property if and only if it bears a relation to that property that belongs to the class of instantiation relations. By tensing the copula, we introduce a distinct relation for every time that ties things to their features[52].

(b) We have only one instantiation relation but it is three-placed; relating objects, properties and times. What it is for an object to instantiate a property is for this three-placed relation to hold between the object, the property and a time. Any case of instantiation involves these three. For things to have certain features is for them to have these features at times. A seeming two-placed instantiation relation is actually a disguised three-placed instantiation relation[53].

So, in (a) the temporal aspect of the connection between object and property is in which relation holds between them and in (b) the temporal aspect of their connection is in the third relata of the relation they satisfy.

But there is a serious worry that confronts both of these interpretations. If we look carefully at (a) and (b) they both seem to fail the definition of adverbialism we gave on the previous page. We stated there that an adverbial theory takes time as governing (adverbially)

[51] This class would have an infinite number of member if either time is infinitely divisible or of infinite extent in any direction. We need an explanation of what class-membership of this class consists in. Alternatives might include a family resemblance criterion or some characterisation of an instantiation relation as one that can be the only relation in a subject-predicate sentence. Another possibility is given by MacBride, see next footnote.

[52] This interpretation is not dominant, but bears significant similarity to MacBride (2001) sect. IV, where he speaks of a 'temporal parts of the instantiation relation' (TPIR) theory. According to this theory, the instantiation relation itself has temporal parts.

[53] This interpretation is taken by, among others, Lombard (2003) and Lewis (2002). It seems to have more support in the literature. However, some pages previously in regard to the relative properties solution Johnston states "we do not do well to represent the role of temporal qualification in reports of change...as specifying distinct relata of the relevant predicate" (p113-114). While the 'relevant predicate' here refers to a property, making time into a relata of the instantiation relation might seem to fall foul of the duplicate example Johnston gives against the relational properties view. We do not here have space or need to decide between interpretations (a) and (b) however.

the relationship between a property and an object. Time modifies the rest of a sentence. Let us see if such governance can be found in the interpretations in turn.

In (a) we have a number of different instantiation relations that all belong to a class. Or, another way of expressing this, we have an instantiation relation type that has tokens at each time. What time does, according to interpretation (a), is to be constitutive of a relation that holds between an object and a property. Time is not governing a relationship but is part of the make-up of that relationship. What time it is bears not an object's having a property but on which relation they satisfy. Adverbs are supposed to act on part or parts of language but here the phrase 'at t' is not acting on anything, it is only indicating which relation holds between the object and the property. 'At t' is not acting adverbially. For adverbialism, what we need is the *same* relation holding between the poker and the properties at both t and t', but the *governance* of that relation varying. For a theory to be adverbial it must consider 'at t' an adverb modifying 'the poker is hot'. But interpretation (a) doesn't say that 'at t' modifies anything. Instead it sees 'at t' as a constituent part of a relation that holds between object and property. By introducing a different relation for each time, the proponent of interpretation (a) ends up with a theory that isn't adverbial.

In (b) too there seems no adverbial element. According to (b), time is a relatum in a three-placed instantiation relation. The three-placed instantiation relation is one and the same relation at different times but has a different relatum at each time, namely that time itself. But changing one of the relata of a relation doesn't modify that relation. If instead of saying that the poker is hot at t we say that the spade is hot at t we are claiming of a different thing that the relation that holds between it, *hot* and t is the same as the relation that holds between the poker, *hot* and t. But we have not altered in any way the relation itself. Similarly, if we change the time element of the three-placed instantiation relation we are not modifying that relation but the claim that is being made. There is no modifying function for time on interpretation (b).

And, as it is a condition for a theory to be adverbial that time modifies how a property is had by an object, interpretation (b) isn't adverbial either.

We should explicitly note that this is not to say that interpretations (a) and (b) of Johnston's 'adverbialism' fail to solve the problem of change. They do solve it (or at least they may). But they don't solve it in a properly adverbial way. If we are strict with our definition of adverbialism then whatever category these solutions fall under, it is not adverbialism. For a semantic solution to be strictly adverbial the 'at t' phrase in such sentence pairs and (1) and (2) needs to modify the rest of the sentence. For a metaphysical solution to be strictly adverbial time must govern the having of a property by an object. As we have seen, neither (a) nor (b) satisfy either of these two conditions. And an alternative interpretation that is strictly adverbial does not appear forthcoming.

Given that Johnston's theory fails the conditions for membership of the adverbialism category that we have given, we have two options. We could either adjust our definition of adverbialism, or we could stand by our definition and rename Johnston-style approaches. We will take the latter option and call any theory which satisfies our definition 'strictly adverbial' and types of theory like Johnston's 'nominally adverbial'. We can now ask whether there are any strictly adverbial theories on offer.

2.3 The semantic version: Lowe's account and Haslanger's 1989 expansion

Lowe's account

A promising first place to look is at E. J. Lowe's exchange with Lewis in a series of articles in *Analysis*. In them Lowe puts forward an adverbial solution to the semantic problem of change[54]. Lowe presents the solution in the context of shape as a temporary intrinsic; "the

[54] Lowe separates the two problems of change, but does not take an adverbial solution to the metaphysical problem. He instead investigates the notion that identity over time relies on the preservation of certain relationships between the constituents of an object. See sect. II of his (1988).

ascription of a shape to *a* is *temporally qualified* i.e., the property-exemplification relation between *a* and a shape is relativized to a time"[55].

But Lowe is at pains not to equate this position with the positing of a three-place instantiation relation, *contra* Lewis "[t]o say that the *having* (instantiating or exemplifying) of a shape is related to a time is to say that the holding of a *two*-place relation is related to a time, not that a *three*-place relation is involved, one of whose relata is time."[56] Such a three-placed relation is what interpretation (b) of Johnston above proposed. We have already said that this position is not strictly adverbial, and Lowe believes something similar. He takes Lewis' analysis of the solution to not take seriously the adverbial content of the claim. The claim is that "an adherent of [adverbialism] will want to say, in explanation of the consistency of saying that an object *a* is bent at time *t* and straight at time *t'*, that this amounts to saying that *a*'s having a bent shape *obtains at t* while *a*'s having a straight shape *obtains at t'*."[57] This seems to be a strictly adverbial solution that treats the phrase 'at t' as modifying the rest of the sentence. The relation that holds between the object and property is temporally relativised because the relationship obtains at times.

Lowe gives us a spatial analogy to try to cash out the theory more explicitly. Consider a parallel problem of local intrinsics. We have two sentences:

(11) The Thames is broad in London

(12) The Thames is narrow in the Cotswolds

The truth of these and the indiscernibility of identicals appears to give us a familiar difficulty. The best way to parse these sentences, according to Lowe, is to treat the spatial location mentioned in the sentences as modifying the property ascription. 'In London' operates as a spatial adverb,

[55] Lowe (1988) p73
[56] Ibid p74.
[57] Ibid p75

indicating where along the length of the Thames the property of *broad* is instantiated. This, Lowe submits, is the natural interpretation of the meaning of (13) and (14). The place reference tells us where we should look to verify the claims made by the sentences. **The Thames' being broad** obtains in London and the **Thames' being narrow** obtains in the Cotswolds[58].

This analogy is not perfect. But it is sufficient to indicate how adverbial temporal modification is supposed to work. The temporal modifier 'at t' specifies when, along the career of the poker, the property of *hot* is instantiated. Lowe's is a semantic account; he is trying to show how the meaning of sentences like (1) works. Once more, there is not a great deal of material to cash out the proposed semantics. But, in any case, if we want an adverbial solution to the metaphysical problem, we need to seek elsewhere. We have two gaps, then. One is an expansion of Lowe's account and the second is a complementary metaphysical position.

Haslanger's expansion

A good place to look for the first is at Sally Haslanger's (1989) position. Hers is a strictly adverbial position; she believes that "objects have properties at times, and that time should modify this 'having', rather than the subject or the property."[59] Like Lowe, she rejects a move from this to the three-placed instantiation relation of our (b) interpretation of Johnston above. She considers semantic accounts that adverbialism makes possible. Expanding Lowe's position, she detects two separate options.

In the first place, we could treat the role of time in semantics as similar to the role of a world. Propositions would not include temporal elements but would be evaluated with respect to relevant times. For example, the proposition expressed by (1) is the same as the proposition expressed by

[58] The use of bold text indicates that **the Thames' being broad** is a state of affairs. States of affairs (also called facts) are the sorts of things that obtain.
[59] Haslanger (1989) p120

(5) The poker is hot

But the truth conditions of (1) are evaluated with respect to t[60]. There is a fixed meaning to the phrase which describes a dyadic relationship between the poker and the property of being hot, but the truth of such a proposition depends on the time part of the circumstances of its evaluation[61].

In the second place, we could include time in the content of propositions without attaching this content to either the subject or the predicate. In such a case, (1) and (5) do not express the same propositions, although the meaning of 'the poker' and 'hot' is constant over the two different sentences. The meaning of 'the poker is hot' is not fixed over time. This second possibility allows that propositions have an unchanging truth-value over times.

Haslanger then responds to a worry that arises for the Lowe semantic account– how does it give us a different version of adverbialism? Isn't it committed to a three-place instantiation relation? Haslanger thinks we have a different version of adverbialism, but that this position is indeed committed to a three-placed relation between times, properties and objects. She thinks it is a different version of adverbialism because the three-placed relation is derived from a basic two-placed relation of instantiation. Her version of adverbialism is not problematically relational because the fundamental relationship between object and properties is not relational.

In her own words:

> "...[T]he three-place relation indicated above, viz., the relation between an object a, property F, and time t, such that the proposition that a is F holds at t, is a relation defined partly in terms of a more basic notion of a's being F, i.e., of an object instantiating its properties. Even if we grant that the three-place relation is an instantiation relation, the primary instantiation of the property F by the object a, need not be construed relationally."[62]

[60] This has the consequence that propositions fixed in meaning can change in their truth-values over time. This goes against a philosophical trend for an eternalist picture of propositions.
[61] C.f. Recanati (2008) and Kaplan (1989)
[62] Haslanger (1989) p122

So Haslanger argues that the three-placed relation is not the basic instantiation relation. It is not primitive in the theory, so the fact that we can construct such a relation shouldn't be a worry. The three-placed instantiation relation is troublesome because (among other reasons) it indicates a theory that is not strictly adverbial[63]. But Lowe and Haslanger's position *is* strictly adverbial because the fundamental role for time in their picture is to modify the holding of the subject-predicate relationship. The fact that we can subsequently define a relation of instantiation holding between the subject, predicate and time is not problematic.

But there is a worry for Haslanger's reply. In the above quote she says that a two-place instantiation relation between object and property is basic. But adverbial solutions in general temporally modify the having of the property by the object. These two claims seem in competition. To what extent is the instantiation relation basic, and to what extent is it modified?

Let us try to defend Haslanger. Taking her second semantic option above (as the first has undesirable commitments), we have the following three claims:

(i) The proposition expressed by (1) that the poker is hot at t is not the same as the proposition expressed by (5) that the poker is hot,

(ii) Neither the poker nor the property *hot* is modified by 'at t'

(iii) The instantiation by the poker of *hot* in (1) is basic.

How are these compatible? One suggestion might be that 'at t' modifies the whole phrase 'the poker is hot' such that the proposition expressed by (1) is the proposition that there is a basic instantiation relation that holds between the poker and the property *hot* and that this relation occurs at t. (1) is then equivalent to the sentence that reports that (5) holds at t, but not

[63] Haslanger's worry here is a different one: "[t]he danger of a three-place instantiation relation is that it invites us to treat objects as related to their properties as individuals are related to other individuals; this would be undesirable." (Ibid)

equivalent to the bare (5). The semantic values of 'the poker' and 'hot' are not altered by the modifier 'at t', rather the whole of (5) is modified. The having of *hot* by the poker is temporally modified. It seems Haslanger can also claim that non-derivative two-place instantiation is upheld in this interpretation of (1). The poker and the property are correctly intimately related, regardless of the temporal aspect of the sentence, but the obtaining of their relation is time-indexed. (i)-(iii) are compatible. This seems to be at least one way to give a fuller account than Lowe's of what is going on semantically.

2.4 The metaphysical version: Forbes and Haslanger's 2003 expansion

Forbes's adverbialism

We can now consider whether we can give an adverbial solution to the metaphysical problem of change. This is an important issue, as we took the metaphysical problem to be more significant than the purely semantic problem. We shall turn to Graham Forbes for another, metaphysically loaded, version of strict adverbialism. Forbes is reacting to Lewis's (1986) expression of the problem, and tries to provide an account of sentences (1) and (2) that doesn't temporally modify properties (as properties are not relations) or entities (as this concedes Lewis's ontology of temporal parts)[64]. He therefore considers the statement (1) as the formula (5) modified by the expression 'at t'. In order to examine such a modification he draws heavily on the modal analogy.

Looking for an account of how the meaning of 'the poker is hot' is altered by 'at t' that is consistent with enduring object having non-relational properties, he says:

[64] Incidentally, his criticism of Lewis's argument is that it assumes that a time is identical "with the mereological sum of temporal individuals which exist at it." (Forbes (1987) p140). But to admit such an assumption is to admit that temporal individuals are instantaneous (i.e. temporal parts), because it makes no space for difference in times if the same mereological sum of individuals exist *but with different properties*. Change therefore must be change in existents. The adverbial account is not presented as a solution to Lewis's problem so much as a possible account of temporal variation in enduring objects.

> "I suggest that the best way of doing this is to treat the formulae which modal and temporal adverbs govern as having for semantic values functions from, respectively, tokens and types of states of affairs."[65]

In our example, 'the poker is hot' is a function from a type of state of affairs. Forbes leaves somewhat obscure what states of affairs are supposed to be. Furthermore, the function that he refers to is hard to fathom. It is a function from a type of state of affairs, but what could be its value? Forbes' explanation here seems rather incomplete.

In his next paragraph Forbes states:

> "A state-type such as that of α being bent, which might be written <Bentness, α>, is in a clear sense 'complete' by itself; a temporal adverb expresses a temporal mode of obtaining for it, while a modal adverb expresses a way of obtaining for its tokens"[66].

This seems to imply that what the temporal adverb is doing in governing the formula is expressing some particular temporal way that the formula itself obtains. There is the core of an adverbial position here, and one that is very interesting. The relationship between types of states of affairs, their obtaining and temporal adverbs is one worth developing. Once more, though, the theory proposed here is covered in only a couple of pages and would benefit from clarification and expansion. Luckily, we can turn to Haslanger again for a development of the position, found in her (2003).

[65] Forbes (1987) p141. The modal adverbs are treated in a similar way to temporal adverbs, but deal in the tokens rather than types of state of affairs. In this quote Forbes says that the formulae have 'for semantic values functions from...'. This is somewhat ambiguous. The natural reading is that the semantic value of 'the poker is hot', i.e. what 'the poker is hot' does to the meaning of (1), is a function. That is, it is an operation that produces output belonging to some set when given input belonging to some set. This seems a strange semantic value for a formula like 'the poker is hot'. However, it might be that what Forbes was trying to say is that the whole of (1), or perhaps the temporal adverb in (1), is a function from an argument that is a type of state of affairs to a value that is 'the poker is hot'. This leaves uncertain what the meaning of 'the poker is hot' is, but gives a value to the function Forbes mentions. If this is what Forbes was saying, he found a very strange way to say it.

[66] Ibid p142

Haslanger's expansion: SOFism

Haslanger, in her (2003), describes herself as siding with Forbes in what she calls 'state-of-'fairs-ism', or SOFism. In SOFism, "*what is the case* depends on the time under consideration."[67] Haslanger gives us a more explicit explanation of what types and tokens of states of affairs are; types of states of affairs are relations between object and properties. Tokens of states of affairs are the exemplification or obtaining of types of states of affairs at times. The problem of change is then the problem of contradictory types of states of affairs being instantiated at different times. This is Forbes position.

But there is an outstanding question, which Haslanger tries to address. The 'at t' phrase is supposed to modify 'the poker is hot' in such a way that it governs which token(s) of a type of state of affairs are relevant for the evaluation of (1). But this governance cannot be to indicate what the *domain* is of the phrase 'the poker is hot at t', for to do so would be to restrict the individuals that are relevant for its evaluation. But the poker is the subject of (1) and the poker exists at t' and isn't hot. What the 'at t' phrase must do is indicate (i.e. restrict) the *context* of the claim, not what things it is talking about. How can we explain this?

Haslanger gives us one possibility. Drawing on Barwise and Etchemendy's 'Austinian' understanding of propositions, she suggests that an (Austinian) proposition is a claim about a situation in the real world belonging to a type of situation. We therefore have two aspects to the proposition; the situation in the real world and the type of situation it is claimed to fall under. Saying that the poker is hot at t, then, is to say of some specific situation at t (determined by context and other cues) that it belongs to the type **the poker being hot**. Saying later at t' that the poker is cold is to say of a different specific situation at t' that it belongs to the type **the poker being cold**. The function of the phrases 'at t' and 'at t'' then is to specify which situation is picked out by the speaker. This is how 'at t' governs the phrase 'the poker is hot'; it indicates which concrete situation is being claimed to belong to the type of state of affairs **the poker**

[67] Haslanger (2003) p342-343

being hot. Haslanger thus develops Forbes's picture and shows one way to consider temporal modification as operating on the obtaining of states of affairs.

This complicated machinery is a development from Forbes, but can be seen as following from Haslanger's (1989); it is a way of cashing out the thought that instantiation is two-placed between objects and properties but that time has essential work to do in propositions expressing such an instantiation. Haslanger notes that SOFism is committed to understanding ordinary language statements about objects and properties as making claims about what situations obtain and what their types are. This might seem revisionary. But it does allow for basic predication in types of states of affairs; the type **the poker being hot** is simply a matter of a relation between the poker and the property *hot*[68], but the tokens of these types and their relation to the types is time-relative. It seems, then, that we have a slightly clearer understanding of what Forbes's account amounts to. It also suggests what Haslanger may have been reaching for in her earlier paper.

2.5 How strict adverbialism solves the problem

Let us sum up our conclusions from the discussion so far. We noted that there are solutions to the problems of change which are called adverbial. Our condition for a solution to be adverbial was that it takes the temporal element in sentences such as (1) and (2) as governing the relationship between the object referred to by the sentence and the property ascribed to it. We then examined Johnston's position and its interpretations. We concluded that it failed the definition and that it was not strictly adverbial. Other 'adverbial' positions of a similar vein are likewise only nominally adverbial. We then sought an example of strict adverbialism. Lowe's account is strictly adverbial, but consciously applies only to the semantic problem of change. Some exegesis was necessary, and Haslanger's early article provided this. We turned to Forbes for a metaphysical version of adverbialism, expanded in Haslanger's later article. For the sake of

[68] This is the *prima facie* view. Other alternative will be considered in chapter 4.

clarity, we should here show how the semantic and metaphysical versions of the problem of change are solved by the adverbialist theories we have presented.

Recall the semantic problem of change. How does 'at t' function in the sentences below such that they don't violate the principle of non-contradiction?

(1) The poker is hot at t

(2) The poker is cold at t'

This amounts to the query how the meanings of (1) and (2) are to construed such that they don't entail the following sentences

(5) The poker is hot

(6) ¬ The poker is hot

The adverbialist solution to this is to attach the temporal element of (1) to the rest of the sentence as a modifier. (1) then makes essential reference to a time[69]. The meaning of (1) can be parsed as 'the poker is-at-t hot', and the proposition (1) expresses doesn't entail the proposition expressed by (5).

Let's see why this is so. (1) means that the poker is-at-t hot, that the poker's being hot obtains at t. We argued in the previous chapter for an interpretation of (5) as meaning that the poker is timelessly hot. This is understood as the claim that the poker *just is* hot. It seems that (1) can be true without (5) being true. For the poker's being hot at t can be true without the poker *just being* hot. *Just being* hot, or being hot *simpliciter*, is for the poker to have the property *hot* in a way that does not depend on time. But it is plausible to think that states of affairs like **the poker being hot** cannot obtain without obtaining at a time. If what (1) means is

[69] Though how this is so is up for interpretation (as we saw in Haslanger (1989) above).

that **the poker being hot** obtains at t, then it can be true without the poker being hot in a time-independent way. So **the poker being hot** obtaining at t doesn't entail that **the poker being hot** obtains timelessly, as (5) claims it is. The law of non-contradiction is not violated by a poker both being-at-t hot and being-at-t' cold.

The metaphysical problem of change comes from combining (1) and (2) with the principle of the indiscernibility of identicals, the persistence of the poker and the incompatibility of the properties *hot* and *cold*. This, we argued, gave us a more challenging problem. The indiscernibility of identicals tells us that identical things share all properties[70]. But the poker in (1) is identical to the poker in (2), so the poker in (1) has the property *cold* (as well as having the property *hot*). But *hot* and *cold* are not compatible; the nature of the properties is that no one thing can have both.

To solve this problem, we need to be able to explain how the world is such that (1) and (2) are true along with the plausible claims about identity, persistence and the properties *hot* and *cold*. Whatever it is that makes them compossible will give us an understanding of what change is. The adverbialist solution to this problem that Forbes and Haslanger give us is something like the following:

> There are types of states of affairs and tokens of states of affairs. Token states of affairs obtain at times. Propositions such as those expressed by (1) and (2) provide two things, a historical or actual state of affairs and a type of state of affairs. The propositions claim that former state of affairs is a token of a certain type of states of affairs. The function of the temporal element in (1) is adverbial; it modifies the having of *hot* by the poker. The poker is hot tly, it is-at-t hot. What this means is that that (1) expresses a proposition that the type of state of affairs **the poker being hot** obtains (has a token) at t. In other words, (1) points to a real situation at t and says of it that it is of the type **the poker being hot**. But (2) tells us that

[70] It is more accurate but less clear to say that one thing, which is identical, has all its properties.

another, different, real situation at t' belongs to the type **the poker being cold**. These types are incompatible. One and the same poker can have tokens of incompatible types at different times. The poker at time t *is* such that there is a token of the type of state of affairs **the poker being cold** (as the combination of (2) and the indiscernibility of identicals tells us), but this does not contradict the fact that there is a token of the type of state of affairs **the poker being hot** because the tokens are *at different times*. It is the temporal reference of the sentences that make them compossible. Change is having tokens of incompatible types of states of affairs (though, of course, at different times). Time solves the problem in general because tokens of the incompatible types only obtain at times. Time solves the problem in particular instances by being part of the mechanisms that pick out a concrete situation that is the token of the type.

It is worth a brief aside to tie this to the principle of the indiscernibility of identicals. What does the adverbialist have to say about that? Well, one and the same poker in (1) and (2) does have incompatible properties. But its having of these properties is not unqualified. The poker has-at-t *hot* and has-at-t' *cold*. And while *hot* and *cold* are genuinely incompatible, one and the same thing can have-at-t *hot* and have-at-t' *cold*. The assumption (10) that 'p^1 is hot' and 'p^1 is cold' cannot both be true was incomplete. It should, instead, claim that 'p^1 tly is hot' and 'p^1 tly is cold' are not able to both be true. In the language of types and tokens, the type **p^1 being hot** and the type **p^1 being cold** cannot both have tokens at the same time. The problem of change is solved.

It seems, then, that we have a combined adverbialist position that solves both the semantic and the metaphysical problem of change. We have found a substantial version of strict adverbialism. Having found one such account, we shall identify it with adverbialism. This is somewhat inaccurate, as there may be other types of strict adverbialism that are not equivalent

to the picture we have presented. However, no other strictly adverbial solution is forthcoming. For the sake of simplicity, then, we shall equate this type of strict adverbialism with strict adverbialism in general. In the next section we shall consider criticisms of this particular theory.

Chapter 3: Criticisms of Adverbialism

In the previous chapter we sought a genuinely adverbial solution to the problem of change. We concluded that we had found one. Now, we shall move on to look at the problems that have been raised for adverbialism. At this stage it is worth noting a couple of methodological points. Adverbialism in general, and the 'strict' adverbialism we have advocated in particular, has not received similar levels of examination as the other potential solutions: presentism, temporal parts and relational properties. Because of this, in some places we shall have to expand brief suggestive remarks found in the literature.

3.1 Lewis's criticisms

We shall begin with David Lewis, who criticises adverbial solutions to the problem of change in a number of places. He considers adverbialism a development of the relational view, so his criticism of it tends to stem from what he thinks is wrong with temporally relativising the properties of objects. We shall look at two of Lewis's articles for his views on adverbialism; a footnote in his (1988) reply to Lowe and a more substantial critique in the (2002) 'Tensing the Copula'.

Initial criticism

When Lewis introduced the problem of temporary intrinsics in his *On the Plurality of Worlds* he rejected the relational properties solution because he saw it as effectively denying that there are such things as intrinsic properties. This remains the substance of his issue with what he calls the 'adverbial variant' in his (1988). In footnote 1 he states the following:

> "The adverbial variant avoids my complaint that shapes are not relations. It puts the relationality not in the shapes themselves but in the having of them: there is a three-place relation of instantiation...I ask: what does standing in some relation to straightness have to do with just plain being straight? And the variant still claims that to be shaped is to stand in relation to other things, *inter alia* to times. I say it still amounts to a denial that things have temporary intrinsics."[71]

We have, in our previous section, rejected the claim that adverbialism is to be understood through a three-placed instantiation relation. Such a theory was not strictly adverbial. But despite our difference with Lewis on this point, is there anything to worry a strict adverbialist in what he says here?

The one strictly adverbialist position we found in the literature took the temporal element in sentences such as (1) and (2) to be functioning in roughly the following way: (1) and (2) speak of types of states of affairs obtaining at certain times, and the temporal modifiers specify which at which times they obtain. Lewis's question 'what does standing in some relation to straightness have to do with just plain being straight?' in this context is something like 'what do types of states of affairs obtaining have to do with objects just having properties?'. What an object *just* having a property is depends on what is meant by 'just having'. In formulating the semantic problem we identified 'the poker *just having* the property *hot*' with 'the poker having the property *hot* timelessly'. If this is what Lewis means, then the question is really 'what do types of states of affairs obtaining have to do with objects having properties timelessly?'

The adverbial answer comes in two stages. The first is simply to reject the question as it stands; objects don't have properties timelessly, they have them at times. Therefore there is nothing for the obtaining of types of states of affairs to 'have to do with'. Objects don't just have properties in the sense of having them without having them at a time. So what Lewis must mean is something more like 'what does the obtaining of types of states of affairs have to do with objects having properties in a basic, time-insensitive way?' Answering this question will require us to take a stand on a number of issues like what states of affairs are, how they are constituted,

[71] Lewis (1988) p66

how they relate to properties and objects and what, exactly, properties and objects are too. Here we have the second stage of the adverbial reply, because we can demonstrate that the adverbial position is capable of answering this question. We will do so by assuming a standard account of the contentious issues and showing that this can explain what the obtaining of types of states of affairs has to do with objects just having properties.

If types states of affairs are akin to facts and are abstract objects composed of concrete particulars having properties (conceived as universals), then there is clearly an intimate connection between the obtaining of states of affairs and objects having properties. A type state of affairs obtains (has a token) when the object and poker are such that the object has the property. An object having a property is the obtaining of a state of affairs. An object *just having* a property is a type of state of affairs *just obtaining*, i.e. obtaining in a basic, time-insensitive way. The relationship between object and property in the type of state of affairs is not modified by a temporal reference. *Pace* Lewis, the adverbialist doesn't claim that having a property is to stand in a relation *inter alia* to times. The basic relationship exemplified by a poker being hot is captured by the relationship between the poker and the property *hot* in a type of state of affairs **the poker being hot**[72].

Later criticism

Lewis's earlier criticism focused on a three-placed instantiation relation, and so does his later (2002). There he describes Johnston's nominal adverbialism as the attempt to bring monadic intrinsic properties back into an endurance account of change whilst holding onto the insight that time functions relationally. In response to this, Lewis repeats a similar line to the above; "I protest that there is still nothing in the picture that has *bent* or *straight simpliciter.*"[73] Lewis thinks that nominal adverbialism still makes object and properties related in a problematic

[72] More or less the same reply may be given by other compositional conceptions of states of affairs. The non-compositional accounts will have to give a different answer to the question 'what does the obtaining of states of affairs have to do with objects having properties?'

[73] Lewis (2002) p5

way. He claims objects must have their properties *simpliciter* (whatever this means) and not relationally, because of the threat of Bradley's regress[74]. Properties being had relationally cannot be the most basic way it is possible for properties to be had.

As above, despite the fact that it is Johnston that Lewis has in his sights we shall see whether his criticism applies to strict adverbialism. Bradley's regress in this context can be put as follows: assume all having of properties is relational. An object has a property because it bears a particular relation (call it R) to that property. But how does the object have that particular relation to the property? The object has R by having a relation to R. This relation (R') is had by the object by having another relation (R'') and so on[75]. At any level, we have a 'having' that must be explained in terms of another relation that the object has. There is therefore no complete explanation of how the object has the property.

The issue here is that doing away with a primitive connection between objects and the properties they instantiate leaves an explanatory gap of how exactly objects can be bound to anything. The connection between objects and properties seems to have become just another relation, in which case it can't do its job. This is a problem for Johnston because it seems he is required to hold that there is no non-relational having, no 'having *simpliciter*'.

But we should make a point here in defence of nominal adverbialism. While we do not have space to consider the issue, Bradley's regress is not universally considered damning. Some consider it an infinite regress, but not vicious[76]. Others dispute whether it is a regress at all[77]. These are certainly avenues worth exploring, though we cannot here. The nominal adverbialist may be able to save her theory from Bradley's regress. Perhaps what can be said for Lewis's

[74] If 'having *simpliciter*' is having in a non-relational way then it clearly rules out objects having properties relationally. If 'having *simpliciter*' is the most basic level of having, then Lewis's claim is that having *simpliciter* is not relational having. Bradley's regress comes in his (1892) ch 3.
[75] See Armstrong (1978) p106-107. Armstrong argues against the idea that "a particular is composed of a substratum related in a certain fashion to properties".
[76] E.g. Gaskin (1995)
[77] E.g. Maurin (2009)

critique, though, is that it shows that, for a nominal adverbialist, understanding having in a non-relational way is not an option[78].

But the strict adverbialist is not constrained in this way. For even if having is best thought of as some non-relational tie, as Lewis suggests, there is no obvious conflict with the strict adverbialist picture. Strict adverbialism merely says that, when a sentence like (1) ascribes a property to an object, we are given two things. One is an actual state of affairs in the world, and the other is a type of state of affairs. The propositions expressed by sentences like (1) state that the actual state of affairs belongs to the type. An object having a property can then be understood however we like; and however we understand it will feed into how we understand a type of state of affairs. For if having is a non-relational tie, then the type of state of affairs involved in (1) and (2) contain a non-relational tie that exists between an object and a property. But if, *pace* Lewis, having is relational, then a type of state of affairs like those in (1) and (2) contains a relation holding between an object and a property.

The strict adverbialist is not committed to having as a relation, but she is entitled to it if she so chooses. In fact, then, she is in exactly the same position as Lewis and the temporal parts theorist. Lewis's criticism of Johnston does not apply to strict adverbialism.

In the final section of his paper, Lewis briefly considers Haslanger's (1989) approach. He takes Haslanger to be suggesting that

> "To explain how you can be bent at t_1, not only do we need to mention the monadic intrinsic property *bent*; we also need to mention the proposition that you have this property *simpliciter*, and we need to say of this proposition that it obtains at t_1. By 'proposition' Haslanger here means something that can obtain at some times and not at others"[79].

[78] But see Lombard (2003) sect. III and IV for a Johnstonian reply to Lewis.
[79] Lewis (2002) p11

So far, this seems a reasonable presentation of the strict adverbialist picture. What is lacking is an explanation of 'proposition' that invokes types of states of affairs. But this is precisely what Lewis misses when he goes on to say

> "What is a proposition that obtains at some times and not at others? It seems to behave exactly like a property of times, so let us take it to be just that. It 'obtains' at just those times that have it. If so, the proposition Haslanger mentions is the relational property *being-a-time-t-such-that-you-have-bent-at-t*."[80]

From here Lewis makes short work of Haslanger's position. The property *being a time t such that X is F* is a structured property because if it were not then the property *F* would not be 'back in the picture', i.e. had *simpliciter*. If it is a structured property, then it must be constructed out of its parts. But these parts can't include some relation of instantiation (like having-at), because objects are supposed to have properties *simpliciter* (and, for Lewis, having *simpliciter* is non-relational having). So what the structured property must be made of is an enduring object X having *simpliciter* a non-relational property *F* at a time t. But this group of concepts is exactly what the adverbialist is supposed to be explaining. It is no explanation to say that objects have properties at times by the times having properties *being such that the objects have the properties*.

Luckily for the strict adverbialist, this is not what Haslanger is saying. By neglecting states of affairs, Lewis neglects the explanatory tool to which the adverbialist appeals. An adverbialist position does give a positive explanation of how objects have properties at times, as we showed in the previous chapter. The adverbialist's account of the obtaining of the proposition that X has (*simpliciter*) *F* isn't that the proposition is a relational property. It is that the proposition speaks of a type of states of affairs and that this type of states of affairs has a token at some particular time. Because Lewis does not see this explanation, his criticism is flawed.

[80] Ibid

3.2 Lombard's regress

Although it avoids Bradley's regress, Lombard thinks that strict adverbialism is prone to a different regress. According to adverbialism, there is a basic two-place exemplification relation between objects and their properties. In Haslanger's SOFism (published in the same year as Lombard's paper) this basic relation is in the type of state of affairs, for example **the poker being hot**. Lombard suggests there is a second move, which is that there is *another* two-placed relation holding between these states of affairs and times. This relation is the obtaining-at relation, so that certain states of affairs are said to obtain at certain times. It is this that allows the adverbialist to maintain a primitive notion of instantiation but also affix time. Lombard proposes that this is what Lowe means when he says we need to take the adverbial status of time seriously.

Given this analysis, what is Lombard's worry? Lombard suggests that whatever reasons we have for taking exemplification as dyadic are also reasons to consider *obtaining* a simple property:

> "If there is good reason why just plain exemplification should be thought of as two-termed, then there should be a good reason to think that obtaining is a simple property of states of affairs, and not as a relation between states of affairs and times; after all, could it not be said that some states of affairs just plain obtain?"[81]

This is a slightly confusing passage. The most satisfying interpretation of it seems to be that states of affairs have the property *obtains*. If, as the strict adverbialist contends, exemplification is a dyadic relation then the states of affairs just have the property *obtains*; time is not involved. Lombard seems to take (1) as expressing something like the following:

(13) There is (*simpliciter*) **an exemplifying by the poker of hotness**, and it obtains at t

[81] Lombard (2003) p175-176

The regress is constructed in the following way. When the adverbialist says that a state of affairs obtains at a time, she means that the state of affairs has *simpliciter* the property *obtains*, and has this property at some time. If **s** is the state of affairs **the poker being hot** then (1) states that:

(14) **s** obtains at t

So **s** has *simpliciter obtains.* But there is a state of affairs which is the obtaining of **s**. Call this state of affairs $\mathbf{s^1}$. (14) then implies that $\mathbf{s^1}$ exists, and that $\mathbf{s^1}$ obtains at t. We then have the following:

(15) $\mathbf{s^1}$ obtains at t

Applying the same reasoning, $\mathbf{s^1}$ has the property *obtains* at t. That is, there is a state of affairs **the obtaining of** $\mathbf{s^1}$ which obtains at t. Let $\mathbf{s^2}$ stand for this state of affairs:

(16) $\mathbf{s^2}$ obtains at t

We can apply the same reasoning and have a regress. Each level contains an 'at t' phrase that needs to be understood adverbially.

Lombard's essential point here seems to be that treating time as truly adverbial means that it cannot be a relatum of some relation. Instead it should modify the way in which properties are had by entities. But states of affairs are entities and they have the property *obtains*. The states of affairs have the property *simpliciter* because exemplification is a dyadic relation. Time is not involved. And what is produced when entities have properties are states of

affairs, which obtain at times[82]. States of affairs having *obtains* are themselves new states of affairs. This new level of states of affairs are also entities which have the property *obtains simpliciter*. And this engenders more states of affairs. The regress continues.

Lombard thinks that stopping the regress will at some stage require us to say that the 'at t' phrase should not be construed as strictly adverbial. Why not say this at the first, exemplification stage?

> "To prevent this regress, one must say, at some point, something like the following:
>
> > No, 'at t' is here not to be taken seriously as adverb (in Lowe's sense of modifying a verb), but rather as part of a relational predicate 'obtains at t'; that is, one must take 'obtains at' to express a relation between states of affairs and times. But if one is eventually going to take that step, one might as well take it with 'exemplifies'.
>
> And then one gets the exemplification solution with Lewis's gloss: 'exemplifies' expresses a three-termed relation holding among things, their properties, and the times at which they have them."[83]

So, according to Lombard, there is no advantage to the strictly adverbial position and some disadvantages.

Reply to the regress

However, there are two good reasons not to bow to Lombard's regress. (a) his argument for it is flawed, and (b) the fully-worked out strictly adverbial position is not susceptible to it anyway. Let's look at these in turn.

The argument for the regress can be challenged in two ways. We can try to show that there is, in fact, no regress or we can try to show that the regress isn't vicious. A challenge of the first sort comes when we consider Lombard's view of obtaining. He treats *obtains* as a property (at least on our interpretation). *Obtains* is supposed to be a property of states of affairs. But the most perspicuous way of thinking of obtaining is as something states of affairs *do*, not something

[82] This assumes if a state of affairs **s** obtains there is another states of affairs **s'** which is **the obtaining of s**. For the sake of his argument, we shall grant this to Lombard.
[83] Ibid p177

they *have*. And putting it like this helps us see that states of affairs obtain at times. An analogy can be drawn with the case of concrete particulars and existence. We say that a particular exists, not that it has the property *exists*. For if it exists at some time t but not at t' then we ought not to say that it has the property *exists* at t and lacks it at t', for there is nothing at t' to lack the property. Similarly, to say that a state of affairs has the property *obtains* at some time t can be misleading.

The interpretation Lombard gives of (1) is

(13) There is (*simpliciter*) **an exemplifying by the poker of hotness**, and it obtains at t

But what (1) means rather is that, at t, the state of affairs **the poker being hot** obtains. If *obtains* is a property, it is a property that states of affairs have by obtaining. The relationship between the state of affairs and the property is thus not primitive. The fact that exemplification is a dyadic relation doesn't give us reason to think that the obtaining of states of affairs is a simple property they *just have* independently of times.

Perhaps Lombard could reply by suggesting that we have misinterpreted his position. But it is not clear what else he could mean. He sometimes speaks of *obtains-at* as a relation, not a property:

> "It cannot be that t is merely a relatum of the "obtains at" relation; for otherwise, why not just have t be a relatum of the exemplification relation in the first place?"[84]

But if he is thinking of *obtains-at* as a relation this just seems misguided. The reason we don't want time as a relatum in a three-placed exemplification relation is because instantiation isn't the sort of thing that can have a three-placed relation. This is the reason t is not a relatum in the exemplification relation. Time can be and is a relatum in the *obtains at* relation, and no states of

[84] Ibid p176

affairs 'just plain obtain' without obtaining at a time[85]. We could stop the regress after the first level. Pending a further explanation of the position, it seems that Lombard hasn't successfully established the regress.

The second way the regress might be dealt with would be showing that, even if there was a regress, the regress is not vicious. Lombard argues for the viciousness of the regress in the following two places:

> "The reason that this regress is vicious is that Lowe insists that 'at t' be treated as a genuine adverb modifying a verb, and that time should not be treated as a relatum of some relation."
>
> "And the regress is vicious, since (i) 'at t' will always appear in the result of a Lowe- type analysis and will always need to be "taken seriously" as an adverb, and (ii) every new step introduces a new entity."[86]

The first of these quotations we discussed above; Lowe (or the strict adverbialist) does not insist that time can never be a relatum in some relation. Rather the insistence is that time can never be a relatum in a three-placed instantiation relation. This is not because time isn't the sort of thing to enter into relations, but because of the dyadic nature of instantiation. In the second passage quoted, the same mistake is evident in (i) and (ii) assumes that new states of affairs arise in each step of the regress. This assumption is perhaps justifiable, but would need to show that the obtaining of the state of affairs **s's obtaining** is not identical to the obtaining of the state of affairs **s**. Lombard hasn't done this. We therefore still need to be convinced that the argument is vicious.

For all these reasons, we conclude that Lombard's regress is not a threat. But the second line of defence (b) is also still open to us. This is that Lombard, whilst aiming for Lowe, misses

[85] Perhaps we could allow that some states of affairs do just plain obtain, but that these states of affairs can never be about temporary properties of an object.
[86] Ibid p176 and p177 respectively

our type of strict adverbialism[87]. Lombard is right that there is a two-stage conceptual movement. We have types of states of affairs, and at this level there is a basic relationship between object and property. The second movement is that this basic relationship of instantiation obtains at certain times by situations in the world belonging to that type. It is not quite that the *obtains-at* relation holds between states of affairs and times (as Lombard might be suggesting). Rather, the *being-a-token-of* relation holds between specific states of affairs and types of states of affairs. The temporal element in the sentences is part of what gives us the specific state of affairs, but it is not a relatum. Or, to put it in another way, types of states of affairs obtain at times not by having a relation to those times but by having a relation to things going on at those times (i.e. the token states of affairs). Time is not a relatum, it is part of what specifies a relatum. (13), then, is not the clearest way of expressing what it going on in the strictly adverbialist picture. A better expression is:

(17) There is a type of state of affairs that is (*simpliciter*) an **exemplifying by the poker of hotness**, and it has a token at t.

We can then explain the token/type relationship without need for temporal reference. Lombard cannot insist that time modify this relation, and hence the regress cannot be begun.

It seems that the threat of Lombard's regress is not particularly significant. Even if his criticism applied to the version of adverbialism under consideration, it still carries little force. We can turn to another critique of adverbialism, which focuses on Haslanger's (1989) suggestion and finds it wanting: Fraser MacBride's in his 'Four New Ways to Change your Shape'.

[87] What follows might seem a little unfair on Lombard as he was aiming at Lowe's suggestion that we take 'at t' seriously as an adverb. But even Lowe's suggestion can be read so as to accord with the comments that follow.

3.3 MacBride's criticism

MacBride's conclusion is that "either Haslanger's theory collapses into [nominal adverbialism] or it incurs additional commitments that make it an otherwise very unattractive theory to accept."[88] Why does he think so? He interprets her theory as the following three propositions:

(a) The 'basic possession' of a property by an object is time-independent and intrinsic. The poker 'just has' the property *hot* in some basic sense.

(b) The instantiation of a property by an object[89], however, holds (or obtains) in a time-relative way. The obtaining of the basic possession is relative to a time. This solves the problem of change.

(c) (a) and (b) don't amount to the relational properties theory, as the 'primary instantiation' of a property by an object is intrinsic.

These three claims seem an accurate representation of the outline of Haslanger's theory. But again, with hindsight, we can see that the way to complete the theory is to appeal to states of affairs, specifically the obtaining of types of states of affairs by having tokens at times.

MacBride, like Lewis, is unaware of this. He proposes that "[t]he problem with Haslanger's theory is that it does not make clear what is meant by 'basic'."[90] He further suggests that any way of making sense of this basic possession will not succeed. For any interpretation should show why the time-independent instantiation must necessarily obtain by holding relative to a time. And "[a]n ontologically perspicuous view of why, necessarily, instantiations only hold relative to a time would treat them, not as intrinsic, but as three-placed relations linking

[88] MacBride (2001) p83

[89] We are taking sentence three of the second paragraph of p83 to be a typographic error. There it reads "the instantiation of an object by a property". In the final sentence of the same paragraph there is a similar ordering.

[90] MacBride (2001) ibid

properties, individuals and times."[91] In other words, an explanation of the reason that basic instantiations only obtain in a temporally relative manner would commit us to exactly the sort of nominally adverbial relation that we were trying to avoid. Is this so? Let us test the hypothesis by using our state of affairs explanation.

Basic instantiations only hold relative to times because what it is for an object to have a property is for a real state of affairs to belong to a type. The 'basic possession' of a property by an object is that property (F) and that object (x) composing a type of state of affairs **x being F**. This is the primitive connection between them; that they together make up a certain sort of situation. But obviously a type of state affairs cannot obtain in a time-independent way[92]. A state of affairs obtains at a time. Tokens of incompatible states of affairs can obtain at different times, and so the problem of change is solved.

This explanation upholds (a), (b) and (c), and furthermore it *doesn't* treat instantiation as a three-placed relation. It has a two-fold approach; basic instantiation in types of states of affairs and particular tokens belonging to these types. In no way does this collapse into a nominally adverbialist picture. Nor is the connection between basic instantiation and time-relative obtaining "inexplicable, a brute relation between distinct existences (instantiations and times)."[93] MacBride, like Lewis, misunderstands the theory.

3.4 Criticisms from change

3.4.1 Merricks

We can now turn to another worry for adverbialism. It has been suggested with varying degrees of strength that adverbialism cannot properly capture change. First, let us look at Merricks. He suggests that it is a desideratum of a solution to the problem of change that

[91] Ibid
[92] Perhaps states of affairs that describe necessary truths would obtain independently of time. But here we are considering temporary intrinsics.
[93] MacBride (2001) Ibid

> "A solution to the problem should allow for genuine change of the sort found when an object exemplifies a property at one time in one way and lacks it at another in the same way."[94]

This desideratum is designed to preclude the adverbialist solution; Merricks is attacking the notion that time functions like an adverb of manner by talking of the way that an object exemplifies a property[95]. He wants objects to *just have* incompatible properties at different times without this having to be governed by what time it is. The adverbialist cannot satisfy the desideratum. A solution is adverbial only if time modifies the having of properties by objects.

What is the motivation for this desideratum? The adverbialist is committed to claiming that, if the poker is tly hot at any time, then it is tly hot at all times. Merricks is not happy with this commitment. He is not happy with it because the fact that the poker is tly hot is not a fact that can change. Merricks suggests that "[t]he possibility of such a change is, I think, something worth preserving."[96]

But why? Perhaps we can suggest that what Merricks is reaching for is something like McTaggart's concept of change. McTaggart claims that "there can be no change unless facts change."[97] As is well known, McTaggart's facts change by changing distance from the moving present. If this is what Merricks means, then it would seem that Merricks is presenting as a desideratum that the adverbial theory accept something like the A-theory of change[98]. This is a substantial request. It does not sit well with our methodology, as we were happy for solutions to the problem of change to provide their own accounts of what change is.

Another possible reason Merricks might have for his desideratum is his claim that the adverbialist cannot allow the having *simpliciter* of properties. Perhaps, then, Merricks proposes

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[94] Merricks (1994) p169

[95] We shall see in our last criticism that the adverbialist should not see time as functioning like an adverb of manner.

[96] Merricks ibid

[97] McTaggart (1927) p15

[98] The A-theory fits well with Merricks' approach because he is a presentist. But presentism is itself a solution to the problem of change, so would make any other solution to the problem obsolete.

this desideratum to capture some intuition like Lewis' that objects should be able to *just have* properties in a temporally-insensitive way. If so, then we have dealt with the issue above. Whatever Merricks's reasoning behind the desideratum is, he needs to argue for it. As it stands, we have no real challenge to the adverbial position.

3.4.2 Rodriguez-Pereyra

Rodriguez-Pereyra also does not think the adverbialist allows sufficient space for change. He sees this as a fatal flaw, not a failure to satisfy a desideratum. In his (2003) he takes adverbialism to be a variant of the relational properties solution, and prosecutes it with the same charge. The criticism is, simply, that change requires things to have *incompatible* properties at different times, but that the relational properties view doesn't uphold this necessary incompatibility.

We can see how this applies to nominally adverbial theories: a poker, the property *hot* and t are in a three-placed instantiation relation at t, and the poker, the property *cold* and t' are in a three-placed instantiation relation at t'. For there to be incompatibility, then these two relations should not be able to hold at the same time. But the relations involved can and do hold at the same time. As Merricks says above, if the poker is tly hot it is tly hot at all times. At t and at t' both relations hold. The nominally adverbial position succumbs to the criticism. Does the strictly adverbial position?

It seems not. There are genuinely incompatible states of affairs being described by our sentences (1) and (2). Being hot and being cold are truly mutually exclusive, no one thing can be both at the same time. Derivatively, the types of states of affairs **the poker being hot** and **the poker being cold** are also incompatible. The two types of states of affairs cannot both obtain at the same time.

But what is *not* incompatible is two situations in the world involving one object at different times belonging to different types of states of affairs. There is nothing wrong with

tokens of two incompatible states of affairs obtaining at different times. If there were something wrong with it, then no incompatible states of affairs could happen even at different times. This would make the phenomena of change impossible. So the strict adverbialist avoids the criticism. Rodriguez-Pereyra's definition of change is having incompatible properties or relations at different times. It seems that the strictly adverbial position fits this, as tokens of the types involved cannot obtain at the same time.

3.5 Criticism from adverbial entailment

We have looked at a few of the criticisms in the literature and found none of them convincing. It is worth presenting a worry of our own, and seeing whether we can work through it[99].

What is the worry? First we must recall our formulations of the problem. The semantic problem of change was to explain the meaning of sentences like (1) and (2) such that they didn't entail (5) and (6):

(1) The poker is hot at t

(2) The poker is cold at t'

(5) The poker is hot

(6) ¬ The poker is hot

The metaphysical problem of change was how to render (1) and (2) compossible with (8), (9) and (10) (we named the poker of (1) p^1 and the poker of (2) p^2):

(8) $p^1 = p^2$

(9) If x = y then any property of x is a property of y and *vice versa*

[99] A version of this criticism is to be found in Oderberg (2004) p696-699

(10) 'p^1 is hot' and 'p^1 is cold' cannot both be true.

The adverbialist metaphysical solution denies that from (1) and (2) we can conclude 'p^1 is hot' and 'p^2 is cold'. It also takes (10) to mean "'p^1 tly is hot' and 'p^1 tly is hot' cannot both be true". The metaphysical problem of change arises when we overlook these two points.

Let us first see the criticism applied to the adverbialist solution to the semantic problem. Consider the following example of an adverbial sentence, where 'softly' is the adverb;

(18) Sally spoke softly

'Softly' modifies the way in which Sally spoke. If (18) is true, then it is certainly true that Sally spoke. Sally speaking softly requires that Sally speak. (18) entails

(19) Sally spoke

But this is exactly the sort of entailment that adverbialism was supposed to counter in the semantic case. It is not just this example where the entailment is found. In general, from a sentence of the form 'A Fs gly', where 'gly' is an adverb, it seems to follow 'A Fs'. Let us call this principle the principle of adverbial entailment. If we want time in our sentences to be adverbial then

(1) The poker is hot at t

Becomes 'The poker is hot tly' where 'tly' is an adverb. Applying our principle of adverbial entailment, (5) then follows.

We can put this differently. The truth conditions for (18) are not the truth conditions for (19), because if Sally spoke loudly then (19) and not (18) would be true. But the truth conditions of (18) are parasitic on (19), they are the set of the truth conditions for (19) with the addition of the condition that Sally's speaking be soft. The way in which something is the case entails that that thing is the case. So, the poker being hot tly entails that the poker is hot.

In the metaphysical case there is a parallel criticism. We can deduce from (1), (2), (8) and (9) that p^1 is tly hot and is t'ly cold. We also have a temporally relativised incompatibility between the properties *hot* and *cold* such that 'p^1 tly is hot' and 'p^1 tly is cold' cannot both be true. But the principle of adverbial entailment would allow us to drop temporal reference from these sentences and derive the following claims:

p^1 is hot

p^1 is cold

'p^1 is hot' and 'p^1 is cold' cannot both be true

The metaphysical problem has reappeared and the adverbial solution is no solution at all.

The worry presented here would deprive the adverbialist solution of any force against either of the problems of change. The only option seems to be to deny that the principle of adverbial entailment applies here. But this seems to admit that the 'adverbialist' solution is not adverbial at all. How can we avoid this consequence?

Reply

I think the best reply is to look more carefully at what adverbs are and therefore at what it is for a solution to be adverbial. There is more than one type of adverb. Adverbs such as the one found in (18) are adverbs of manner; they modify the meaning of the verbs in their sentences. The principle that 'A Fs gly' entails 'A Fs' seems to be acceptable for adverbs of

manner. But there are other types of adverb. An example comes from adverbs of quantification[100]:

(20) Tom usually wears a shirt

(21) Tom wears a shirt

To see whether (20) entails (21) we need to settle on an interpretation of (21). For there are at least four options:

i) Tom is currently wearing a shirt

ii) Tom always wears a shirt

iii) Tom wears a shirt at least once

iv) Tom timelessly wears a shirt

Interpretations (i) and (ii) are not entailed by (20), but (iii) is. (iv) is obscure, and it is not clear whether it is entailed. But (i) is plausibly the most natural reading of (21) and there are cases where it is false and (20) is true. On a Saturday, for example, Tom may not be wearing a shirt despite habitually wearing one Monday to Friday. There are many other examples where these ambiguities arise. Consider adverbs of place, such as 'in the living room'. A statement 'it is loud in the living room' may or may not entail 'it is loud' depending on how this latter statement is interpreted. So we can see that there are different types of adverb, and that the principle of adverbial entailment doesn't apply in an unrestricted sense to all of them.

But we need to ask what type of adverb the adverbialist thinks 'at t' is. We mentioned in sect. 2.1 that there were two ways for a theory to be adverbial. The first of these took time to act like an adverb of manner and modify the copula. According to this picture, time alters the

[100] See Higginbotham (1998)

way in which objects have properties. This interpretation will not do, as it falls prey to this criticism. But there was a second alternative. This took time to act as a sentential adverb and modify the whole of the sentence containing it. Time then alters the obtaining of the having of a property by an object. It is this alternative that we took, and this alternative can deal with this criticism. To show this, we need to look more carefully at what the 'at t' adverbs are like.

A particularly helpful example has already been mentioned: modal adverbs. (23) is not entailed by (22):

(22) Felix the cat is possibly hungry

(23) Felix the cat is hungry

What *is* entailed by (22) is that there is at least one possible world where Felix is hungry. What *is not* entailed is that Felix the cat is hungry in the actual world. 'Possibly' and 'necessarily' are the most familiar modal adverbs, but while modal adverbs such as 'at w' are less frequently used, they are equally permissible. In fact, these are a better analogy for our case as they specify worlds where statements are true much like the temporal adverbs of the form 'at t' specify when statements are true.

A further good example comes when we look at other temporal adverbs.

(24) In November the leaves are golden

(25) The leaves are golden

The only interpretation of (25) that follows from (24) is the interpretation that the leaves are golden at some time. What does not follow is that the leaves are golden now, or that they are always golden or that they are timelessly golden (whatever this means). The modal and temporal types of adverbs are the best analogues for the adverbialist's claim about 'at t'. And in

these cases, the principle of adverbial entailment fails. The adverbialist can therefore support the claim that dropping temporal reference is inadmissible in cases like (1) and (2).

This is plausible. We are explicitly saying that 'at t' is not an adverb of manner, and so we have formulated adverbialism without taking advantage of the locution 'in a t way' to describe what is meant by treating some time t as an adverb in a sentence.

Does this refinement of strict adverbialism cohere with the picture we have set out? It seems so. Time functions as part of the mechanisms that pick out an actual state of affairs. It is adverbial in the sense that, when a type of state of affairs **s** has a token at a time t, **s** obtains tly. Time is not altering the manner in which the rest of the sentence is true, but locates where the claim of the rest of the sentence takes place; 'at t' is a sentential adverb, it doesn't modify the copula. In this way, the analogy with the modal case remains strong; modal adverbs specify the worlds at which the items under consideration are located and temporal adverbs specify the times at which the relevant situations of certain types are to be found. Furthermore, this picture makes temporal adverbs such as 'at t' of the same character of more common temporal adverbs like 'yesterday' and 'on Tuesday'. It seems that adverbialism can withstand this critique.

As we come to the end of our discussion of the criticisms of adverbialism we can see that none of them presents a serious worry. However, part of the reason adverbialism is hard to criticise is that it is difficult to see what, precisely, is being claimed by the theory. Despite our earlier discussion of strict adverbialism, there is more work to do. Specifically, we have left mysterious the contents and constitution of types of states of affairs, the contents and constitution of token states of affairs and their exact relationship. Up to this stage, we have been using an intuitive grasp of these issues but we should now take the time to spell them out. What this amounts to is examining the metaphysical and ontological consequences of adverbialism; what does it say about the world if adverbialism is true? Examining this question may well bring up problems we have not here had to consider. It is to this question, then, that we now turn.

Chapter 4: Consequences of Adverbialism

4.1 Initial observations

The adverbial theory developed from Lowe, Haslanger et al. survived the attacks on it in the previous chapter. Here we are looking to flesh out what the world would have to be like if it were true. In doing so, it is hoped that we will get a firmer grasp of what claims the theory is making and how exactly we are to interpret them.

Austinian SOFism

In Haslanger (2003), though she is careful to present her approach as only one style of SOFism, Haslanger's starting point is a claim about statements and propositions. This claim is that statements and propositions are 'Austinian', as Barwise and Etchemendy put it. What they mean by this is that statements provide us with two things, the first is a situation (some demarked part of the world) and the second is a type of situation to which this actual situation belongs. A statement *A* expresses the proposition that s_A is of type T_A[101]. We shall follow Haslanger in considering the terms 'situation' and 'state of affairs' as interchangeable[102]. This form of adverbialism, at least, is therefore committed to the following claims about propositions:

(i) Statements provide two things, a real (token) state of affairs and a type of state of affairs

(ii) Propositions say of a real (token) state of affairs that it belongs to a type of state of affairs

[101] Barwise and Etchemendy p29

[102] C.f. Haslanger (2003) p345 fn 33. Barwise and Etchemendy (1987) p75 tells us that situations are sets of states of affairs: 'a set of states of affairs (a "situation")'. Like Haslanger, we shall ignore this distinction as it does not bear on our discussion.

It is reasonable to assume that there is at least one true proposition. If so, from (ii) we also have the claims below:

(iii) Token states of affairs exist

(iv) Types of states of affairs exist

(v) Token states of affairs can belong to types of states of affairs

Our project, then, should be to work out exactly what (i)-(v) mean, and whether they are reasonable.

Barwise and Etchemendy's Austinian interpretation of propositions sets it against a 'Russellian' view. The latter is a more intuitive understanding:

> "[P]ropositions are thought of as having constituents corresponding to the subject matter of the claim. For example, a statement made with the sentence 'Claire has the ace of hearts' expresses a proposition about Claire, the ace of hearts, and the relation of having, a claim that is true is the facts that make up the world include Claire's having the ace of hearts."[103]

By contrast, the position encapsulated by (i) and (ii) suggests that the proposition expressed by a sentence 'Claire has the ace of hearts' is that the situation the sentence picks out belongs to the type **Claire has the ace of hearts**. These Austinian propositions, significantly, are contextual; "on the Austinian view the very act of making a statement always brings in another feature, one not tied to any explicit indexical element in the sentence."[104] Every statement we can make and every proposition a sentence can express refers to some particular situation. A situation in this context can be very broadly construed, as would have to be the case in the sentence, 'All swans are white'.

[103] Barwise and Etchemendy (1987) p26-27
[104] Ibid p29

This understanding of statements and propositions commits one to another thesis, namely

(vi) Propositions cannot change their truth-value, i.e. propositions exist eternally

This follows because Austinian propositions are about specific situations, and those situations do not change type. If a situation is of a certain type at one time, it is of that type at all times. The proposition that a token situation is of a certain type exists at all times and is true at all times; it is changeless. An adverbialist who takes this line, then, must be an eternalist about propositions.

The Austinian approach provides the adverbialist with a clear set of commitments. But there is still a question pending– what are states of affairs? This is a contentious and substantial issue. Without answering it, commitments (i)-(v) are incomplete. To this question, then, we shall now turn.

4.2 States of affairs: types and tokens

States of affairs are an ontological category. That is, they are a type of thing that exists. It is generally held that when there is a true sentence like 'John is tall', the corresponding state of affairs is parsed as **John being tall**[105]. States of affairs are often considered truth-makers; they are often thought to be the things that make sentences true. The existence of **John being tall** is why 'John is tall' is true[106]. States of affairs can be equated with facts: the state of affairs **John being tall** is the fact that John is tall. This gives us some handle on the concept of states of affairs.

What the adverbialist is committed to is the existence of token and types of states of affairs and their relationship. We should, therefore, explain what tokens and types of states of

[105] Or **John's being tall**. This isn't a significant terminological difference.

[106] If one is a maximalist about truth-makers, one holds that there is a state of affairs corresponding to every true sentence. Non-maximalists, on the other hand, deny this and hold that some true sentences have no truth-makers and hence no corresponding states of affairs.

affairs are. To do so we need to briefly look at the type/token distinction. Intuitively, types are general categories of things, whereas tokens are specific, concrete things that are instances of these categories. An example might be particular animals and animal species. In some woodland it might be that there are 10 species of mammal and 500 individual mammals. In such a case, the following two sentences are both true

There are 10 mammals in the woodland

There are 500 mammals in the woodland

But in the former sentence 'mammals' refers to types of mammal, whereas in the latter 'mammals' refers to tokens of these types (or, what amounts to the same thing, tokens of the type 'mammal').

4.3 Token states of affairs: two compositional accounts

So, what are token states of affairs? Tokens in general are non-repeatable[107] and cannot have instances, i.e. are particulars. Token states of affairs, therefore, are particulars[108]. The paradigmatic sort of particular is a concrete particular. Concrete particulars are the furniture of the spatio-temporal world, like cats and tables, solar systems and neutrinos. There may also be abstract particulars, though their existence is contentious. If they do exist, abstract particulars are abstract objects that are particulars, like, perhaps, numbers.

Whether or not tokens can be abstract is also a matter of debate. Linda Wetzel, for one, equates tokens with concrete particulars[109]. But it seems there can be a token of the type of

[107] Assuming non-circular time. Perhaps 'have unique space-time location' is more accurate, though this seems to rule out abstract particulars.

[108] Although token states of affairs are particulars, in the rest of the paper we shall reserve the term 'particular' for objects such as animals, particles and numbers. We shall especially use 'concrete particular' to refer to those sorts of things that can instantiate basic properties like *red* or *small*.

[109] Wetzel, L (2008) sect. 1.1 and 6

state of affairs **2+2=4**. And **2+2=4** appears abstract. If both of these claims are true then we can have abstract token states of affairs.

Perhaps the best we can do here is not pre-judge the issue. We shall not rule out abstract particulars and abstract tokens, but do not insist on them either. In what follows we shall be largely concerned with concrete tokens of states of affairs. But our claims should apply to abstract token states of affairs, if any such exist[110].

A seemingly natural way to think of concrete token states of affairs is as being composed of the furniture of the world, whatever this furniture might be. This seems natural because **John being tall** at some time and place appears to have to do with John and whatever the property *tall* is. Abstract token states of affairs (if they exist) are naturally thought of as being made up of abstract objects. **2+2=4** seems to involve the numbers 2 and 4, the mathematical function + and the equivalence relation. This natural position on the constitution of token states of affairs can be called compositionalism.

The alternative, non-compositionalism, maintains that token states of affairs cannot be understood in terms of more basic constituents. Non-compositionalism holds that concrete token states of affairs are concrete parts of the spatio-temporal world and are not made up of particulars or any other concrete entities. This seems to imply one of three things. Either (i) states of affairs and concrete particulars exist independently and there are many more concrete things than we imagined or (ii) concrete particulars are composed somehow of token states of affairs or (iii) concrete particulars don't exist[111]. In each of these cases, token states of affairs are token states of affairs, and this is all there is to say. While these are all coherent positions, they do not seem particularly appealing.

There are different sorts of compositionalism. Standard compositionalism states that token states of affairs are composed of two irreducible sorts of thing: particulars and properties.

[110] At any rate, it seems as though abstract particulars would not be able to suffer intrinsic change, so would not be of interest to an adverbial solution to the problem of change.
[111] There is a parallel situation in the case of abstract tokens of states of affairs.

What we may call nominalist compositionalism takes a nominalist, reductionist view of properties and hence views token states of affairs as composed, ultimately, only of one sort of thing: particulars. More unusual types of compositionalism are also available; one might think that token states of affairs are composed only of properties, or that they are composed of some other entities. We shall outline standard compositionalism and one version of nominalist compositionalism as an example of the nominalist compositionalist picture in general. We shall do so with the aim of explaining what the claims (i), (ii), (iii) and (v) are saying.

Non-mereological composition

First, however, we need a brief digression to clarify just what composition is supposed to be. The composition of states of affairs by objects and properties is not a case of simple mereological composition. The existence of a property and the existence of a particular does not constitute a state of affairs; in order for there to be a state of affairs there needs to be a certain connection between the two. To show why this is so, consider an object A which does not have the property *F*. If this is so, there should not be a state of affairs **A being *F***. A just isn't *F*. But suppose another object B exists and is *F*. It is then true both that A exists and *F* exists. In terms of pure mereology, there then exists a sum of only A and *F*. If states of affairs are considered such mereological sums, then **A being *F*** would be a genuine state of affairs. From this example, we can see that the composition of states of affairs by properties and particulars must be of a non-mereological kind. The adverbialist who takes a compositional view of states of affairs is thus committed to:

(vii) There is non-mereological composition

This is not an insubstantial commitment[112].

[112] Lewis, for one, rejects non-mereological composition. See Lewis (1991)

Standard compositionalism

We can now turn to the compositional accounts. Standard compositionalism claims that a token state of affairs is constituted by things falling under two other ontological categories; particulars and properties. In addition to claiming that properties make up a separate ontological category, standard compositionalism claims that properties are not reducible to anything in another ontological category[113]. The basic token state of affairs **John being tall** at some time and place obtains just in case, at that time and place, John exists and has the property *tall*. According to this approach, basic token states of affairs are composite entities made up of more ontologically basic kinds of thing[114]. The 'thesis of concrete compositionality' (CC) and the 'constitution principle' (CP) together capture this well:

(CC) (a) If *a* is any concrete particular and *F* is a property *a* has, then [*a*] and *F* are constituents of the [token] state of affairs consisting in *a* having *F*; and
(b) If an *n*-place relation *R* holds among concrete particulars $a_1...a_n$, then $a_1...a_n$ and *R* are all constituents of the [token] state of affairs consisting in *R*'s holding among those relata[115].

(CP) If *a* is a constituent of *S*, then *S* exists only if *a* exists[116]

If this is our interpretation of token states of affairs, then (iii) entails (CC), (CP) and the existence of both particulars and properties. (i) claims that one of the things statements provide us with are composite entities that are made up of particulars and properties. (ii) claims that these composite entities have a relation of belonging to types of states of affairs. (v) claims that entities composed of particulars and properties are capable of bearing this relation to types of states of affairs. As these interpretations show, adverbialism is compatible with this conception of token states of affairs. In fact, it seems a cogent view.

[113] An obvious way of maintaining this would be to claim that properties are universals, but this is not the only way.
[114] There are more complicated token states of affairs, but these are composed of basic token states of affairs.
[115] Wetzel, T (2008) p5. We have substituted *a* for *A*, as it seems to have been a typographical error.
[116] Ibid and also Fitch (1994)

Resemblance nominalist composition

However, there are those who are not comfortable with the commitments of standard compositionalism. In particular, it is contentious to claim that properties exist and are not reducible to any other sort of thing. Nominalist compositionalism rejects this claim and instead considers token states of affairs to be composite entities solely composed of particulars[117]. There are many ways to flesh out this picture. As an example, we shall look at resemblance nominalism. Resemblance nominalism is obviously not the only type of nominalism. But, hopefully, seeing how adverbialism fares under this version of nominalism will show that it is flexible enough to admit a number of different conceptions of ontology.

Normally, we say that a and b resemble each other because they are *F*, or because they share some property *F*. Resemblance nominalism reverses this and says, rather, that a and b are *F* (or have the property *F*) because they resemble each other. What makes it the case that a has some property *F* is that a resembles the set of particulars that are *F*. "In general, what makes F-particulars have property F is that they resemble each other, what makes G-particulars have property G is that they resemble each other, and so on."[118] Particulars have a certain group of resemblance relations that constitute their properties. Our ontology, then, only need admit particulars for us to make property-ascriptions.

Resemblance nominalism obviously relies on a notion of resemblance. Rodriguez-Pereyra characterises it as follows:

> "An objective, ontological, primitive, reflexive, symmetrical, non-transitive, and transtemporal 'relation' that comes by degrees and can obtain between no more than two entities"[119]

[117] The nominalist may or may not accept the existence of tropes.
[118] Rodriguez-Pereyra (2002) p53
[119] Ibid p62

'Relation' here is in quotes because there is no entity corresponding to the resemblance relation between particulars, there are only the particulars themselves. The most important point here seems to be that resemblance is primitive; it cannot be reduced to anything else. Either a and b resemble, or they don't. There is no more information to be given. What makes a and b resemble each other is just a and b; "That is, there are no resemblances– only resembling particulars"[120].

Given this theory, what are token states of affairs? We have an ontology of concrete particulars bearing basic relations of resemblance to one another. The only things are candidates for constituting token states of affairs are particulars. Resemblance nominalism has it that a token **John being tall**, which exists at some time and place, is made up of John himself and the collection of tall things to which John bears the primitive relation of resemblance. It is composed of a particular and resembling particulars. Specifically, the state of affairs **John being tall** is a complex token state of affairs that can be understood as a conjunction of the more basic token states of affairs **John resembles Jack, John resembles Jane, John resembles Jennifer...** such that for any tall thing x, the token state of affairs **John resembles x** is included in the list[121].

This interpretation of token states of affairs reads (i), (ii), (iii) and (v) as below:

(i_R) Propositions refer to two things, a conjunction of basic token states of affairs about resemblance between particulars and a type of state of affairs

(ii_R) Propositions say of a conjunction of basic token states of affairs about resemblance between particulars that it belongs to a type of state of affairs

(iii_R) Conjunctions of token states of affairs about resemblance between particulars exist

(v_R) Conjunctions of token states of affairs about resemblance between particulars can belong to types of states of affairs

[120] Ibid p121

[121] There are questions for the resemblance nominalist here. How restricted is the collection of things John is tall in virtue of resembling? Does John resemble only tall people? Perhaps John resembles the Empire States building more than he resembles a bungalow.

Thus, if one takes a resemblance nominalist compositionalist position on token states of affairs and one is an adverbialist, one is commit to the above four claims[122].

We have only looked at two accounts of what token states of affairs might be. Both of these accounts were compositionalist, as this seemed *prima facie* more plausible than non-compositionalism. The two accounts seem sufficient to indicate that adverbialism is flexible; one can interpret (i), (ii), (iii) and (v) depending on one's views of states of affairs, properties and particulars.

4.4 Types of states of affairs: abstract and necessary

We shall now look at what types of states of affairs might be. A good question to start with is: What are types in general? Types are not the same sorts of things as tokens, so they are not particulars. Particulars are usually contrasted with universals, so types have often been equated with them. But this is not the only alternative[123]. It is clear, though, that types can have more than one token; they are capable of having multiple instances. This implies that they do not have unique spatio-temporal location and that they are repeatable. A natural view that accommodates this is that types are "necessarily existing abstract entities existing outside spacetime"[124]. Is it right to say that types of states of affairs are abstract objects, and that they exist necessarily? And, if so, what does this mean for the claims of adverbialism?

A type of state of affairs is capable of having multiple instances. It cannot therefore have unique spatio-temporal location. The two remaining options are that types of states of affairs

[122] We have not yet discussed types of states of affairs. But the nominalist cannot allow that they are universals, as this makes her position inconsistent. She will have to give a different account of what types of states of affairs are.
[123] See Wetzel L, (2008) sect 4.1. Are there things that are neither universals nor particulars? If the universal/particular distinction is not exhaustive, it cannot map perfectly onto the concrete/abstract distinction, which is.
[124] See Wetzel, T (2008)

are multiply located or that they have no location. The former option suggests that a type of state of affairs is present if a token of that type is present, and the second option takes types of states of affairs as abstract entities. This second option is more usually taken.

The former, Aristotelian suggestion may not work for types of states of affairs. There is a plausible principle we shall call the composition thesis:

C. If A and B occupy the same spatio-temporal location then either A constitutes B or B constitutes A[125]

Imagine that there is a type of state of affairs that has only one token. Suppose the poker is hot only once. Then the token **the poker being hot** and the type **the poker being hot** seem coextensive: they have the same spatio-temporal location[126]. But which constitutes which?

It seems to make little sense to say that the type of state of affairs constitutes the token. A type of state of affairs doesn't appear to be a basic entity that other things can be made up of. So it must be that the type of state of affairs is constituted by the token. Types of states of affairs cannot be classes or sets because these are abstract. Types of states of affairs, then, could be sums of the tokens that they have. But the problem with this position is that it makes the explanatory role of types redundant. If a type is constituted by its tokens, then we cannot answer the question: why is this particular state of affairs of a type **s**? And if no answer can be given to this question, then types themselves seem a pointless ontological multiplication.

A second argument for the claim that types of states of affairs are abstract for the adverbialist focuses on the particular role they serve in the adverbial picture. Commitment (i) states that propositions provide both tokens and types of states of affairs. The former are some

[125] Some deny that A and B can occupy the same spatio-temporal location without being identical. If this is so, then the Aristotelian interpretation is impossible. See Sider (2001) ch 5

[126] They would not be identical, as the type but not the token would have the property *could have been multiply located*. The point here is that considering types to be multiply located allows the conceptual possibility that a type is uniquely located.

demarked sections of the real world, picked out by what Austin calls 'demonstrative conventions'. The latter are referred to by 'descriptive conventions' of a language. When I express a proposition by using the sentence 'John is tall', for example, the conventions of English determine that I am talking about a type of situation **John being tall**. But how could the *descriptive conventions* of a language provide us with a concrete thing? Parts of language certainly can and do refer to concrete entities. But it seems strange to assert that the descriptive conventions of a language pick out something that exists in space and time. Types of states of affairs therefore seem not to be located wherever and whenever their token are.

If types of states of affairs cannot have multiple or unique spatio-temporal location, they cannot have spatio-temporal location at all. They must be abstract. These arguments thus support the standard view of types. The adverbialist is committed to types of states of affairs as abstract entities, and hence to:

(viii) Abstract objects exist

This is another significant ontological commitment.

The second branch of our earlier question was whether types of states of affairs have necessary existence. Types in general are not contingent on any particular token for their existence: the type 'human' would still have existed even if Socrates hadn't. This is true for any particular human that we replace Socrates with. But they may be contingent on the existence of at least one of their tokens. The existence of the type would then itself be contingent. Would this generic dependence work in the case of types of states of affairs?

It seems not. We have argued above that types of states of affairs are abstract objects. Thus the claim we are considering is that abstract types of states of affairs are generically dependent on the existence of at least one of their tokens. Tokens of states of affairs are

concrete and contingent. But types of states of affairs, being abstract, are outside the spatio-temporal realm and are acausal. The generic dependence of types on tokens cannot therefore be causal. But the claim is then that the existence of a token of a type of state of affairs is a necessary condition for the existence of something else outside space, time and the causal network. This relationship between token and type would be extremely mysterious. Given that we have a good alternative, the reasonable conclusion is that types of states of affairs have necessary existence.

(ix) There are necessarily existing entities

4.5 Types of states of affairs: compositional or non-compositional?

We still have not been given a full explanation of what types of states of affairs are however. As with the case of token states of affairs, we need to ask whether types of states of affairs are compositional or non-compositional. A compositional account would suggest that types of states of affairs are composed out of more basic entities. A non-compositional account, by contrast, takes types of states of affairs not to be composed of anything else.

Compositional

Starting with the compositional account, we can consider the two versions mentioned in our discussion of token states of affairs; standard compositionalism and resemblance nominalist compositionalism. Standard compositionalism suggests that types of states of affairs are composed of properties and particulars tied together in a certain way. It is this conception that we implicitly relied upon in presenting adverbialism; a type of state of affairs would be a sum of a property and an object, where the object and property compose the type in a non-mereological way. Resemblance nominalist compositionalism, by contrast, suggests that types of states of affairs are conjunctions of more basic types of states of affairs which in turn are

composed solely of particulars. For example, the type of state of affairs **John being tall** is a complex state of affairs. It is a conjunction of the types **John resembling x**, where x stands for any appropriate tall thing. Thus, ultimately, types of states of affairs are composed only by particulars.

There is a big problem for both of these compositionalist accounts applied to types of states of affairs. We have said above that types of states of affairs are abstract objects that necessarily exist. But both accounts claim concrete particulars (at least partly) compose the states of affairs types. How can an abstract, necessarily existing object have a concrete particular as a part? It seems *prima facie* that concrete particulars cannot constitute, even partly, an entity that is entirely abstract[127]; the concrete particulars have spatiotemporal location. Furthermore, the contingency of the existence of each particular undermines the claim that they can compose necessarily existing objects. How might a compositionalist reply?[128]

It is difficult to see what the resemblance nominalist could say. Part of the motivation for nominalism is the desire to avoid abstract objects, so it does not sit well with (viii). But the standard compositionalist might suggest that types of states of affairs are composed by types of particulars, not specific particulars. The type of state of affairs **the rose is red** might have as components the property *red* and the type of particular *rose*. Thus the type **the rose is red** would have a token whenever and wherever any rose was red.

But this faces a serious problem. The adverbialist cannot take the concrete particular out of the picture. To show why, we need to return to our examples of change.

(1) The poker is hot at t

(2) The poker is cold at t'

[127] By talking of an entity that is entirely abstract we are ruling out entities like the sum of a chair and the number 3. How to apply the concrete/abstract distinction to such a sum is not clear, but it is certainly not entirely abstract.

[128] One good reply might be to flatly deny that concrete particulars can't compose abstract objects. See Zalta (1993)

Adverbialism tells us that (1) and (2) do not lead to semantic or metaphysical problems though they constitute change. The current proposal, that types of states of affairs don't include concrete particulars, interprets (1) and (2) as saying the following:

(1a) There is a token state of affairs in the world at t that belongs to the type **a poker is hot**

(2a) There is a token state of affairs in the world at t' that belongs to the type **a poker is cold**

But (1a) and (2a) could both be true without (1) and (2) being true. And (1a) and (2a) could both be true without there being any change. Because (1a) and (2a) do not have to be about the same poker. Imagine we have two unchanging pokers that exist at both t and t', called h-poker and c-poker. H-poker is hot at both t and t' and c-poker is cold at both t and t'. In such a case, (1a) and (2a) are true but (1) and (2) are not true and we don't have change. So this proposal for the composition cannot be acceptable to the adverbialist.

Non-compositional

It seems, then, that composition is not a promising route for types of states of affairs. An adverbialist should therefore understand types of states of affairs as non-compositional. There are a variety of non-compositionalist views. But, essentially, the claim is that types of states of affairs are not made up of anything; they are primitive and basic. There are two worries that arise for this approach.

The first occurred above; if concrete particulars don't at least partly compose type of state of affairs, how can we have incompatibility? Types of states of affairs must capable of genuine incompatibility if they are to distinguish cases of change from cases which aren't

change. In the non-compositionalist account this incompatibility must just be a basic property of the type of states of affairs given by (1) and (2), as there is nothing else that could ground it. This has a further consequence. In pairs such as (1) and (2) there are two token states of affairs that together constitute a change. These tokens must belong to incompatible types. These types must be specific enough that a token state of affairs involving a different poker being cold at t' is not incompatible with the type given by (1). There must therefore be a type of state of affairs for every property that any particular can have. For every particular there will be a set of types of states of affairs that are not composed of it but correspond to the concrete situations that the particular can compose. We then have a vast number of types of states of affairs[129].

The second worry is that (v) states that token states of affairs belong to types of states of affairs. Compositionalism seemed the best option for token states of affairs. So a compositional token state of affairs belongs to a non-compositional type of state of affairs. An example: **the poker being hot** obtaining at some time and place is a token state of affairs most plausibly thought to have something to do with the poker that exists at that time and place and the property *hot* (however this is construed). This token is an exemplification or instance of the type **the poker being hot**, which is non-compositional. The instance of the type is composed of the poker and *hot* but the type itself is primitive. It seems odd that a type can in this way differ so significantly from its tokens.

Consider another type and token; the word type 'bear' and a token of this type (for example the one in this sentence). If a token of the type is composed of particular pixels or collections of inks, that doesn't imply that the type is composed of particular pixels and collections of ink. But if every token of that word type is composed of four separable letter tokens, then the type is composed of four separable letter types. Every token of the type **the poker being hot** is composed of the poker and, on the standard compositionalist view, the

[129] If non-actual token states of affairs have corresponding types of states of affairs then the number of types is massively multiplied.

property *hot*. Analogy suggests that the type should be composed of the type of particular 'the poker' and the type of property '*hot*'. The non-compositionalist cannot allow this.

What is emerging is that the commitment that the adverbialist has to both token states of affairs and abstract types of states of affairs is very substantial. But not only this, she is committed to a connection between them that seems very hard to explain. (v) is far from innocuous. Perhaps the best course for the adverbialist is to either maintain a compositionalist account of both concrete and abstract states of affairs, or maintain a non-compositionalist account of both concrete and abstract states of affairs. The former will struggle to explain how abstract entities can be composed of particulars, and the latter will struggle to explain how token states of affairs are not reducible to particulars (and, perhaps, properties). Our discussion of the issue has highlighted the complications that the adverbialist will have to address.

4.6 Instantiation

There are other consequences of adverbialism that are less immediately obvious. One of these flows from (v) above, the commitment that adverbialism has to the way in which tokens and types of states of affairs relate. Adverbialism says that real situations in the world, which are referred to by temporal cues among others, are of types. So far, so good. But we should ask what (v) has to do with property instantiation. If a poker is hot at some time t, we say that, at t, the poker instantiates the property *hot*. How does the poker instantiating *hot* relate to the types/token claim?

Our answer to this will depend on whether we are compositionalists or non-compositionalists about states of affairs. If we are compositionalists, we will say something like the following:

> The instantiation of properties by particulars is what grounds the existence of token states of affairs. The non-mereological composition of states of affairs is parasitic on instantiation. In other words, the state of affairs represented by **object having property** is a token state of affairs at some time and place iff the object and property both exist at that time and place *and the object has that property at that time and place*. Types of states of affairs describe a type of situation in which an object has a property. The type has a token just in case the object has the property. Instantiation of a property by an object *just is* the token state of affairs **object having property** belonging to the type **object having property**. Instantiation consists in both (a) the tie between the parts of a type of state of affairs and (b) the *obtaining-at* relation a type of state of affairs exemplifies by having a token. We have not said what ties the object and property together in a type of state of affairs, but that can be whatever your favoured view of instantiation is.

The compositional account seems coherent, and places no restrictions on theories of property instantiation. What might a non-compositionalist say?

> The instantiation of properties by objects is not what grounds token states of affairs, nor types of states of affairs. These exist and have the type/token relationship in a primitive way, not by being composed of entities involved in an instantiation relation. Instantiation, therefore, can be considered in two ways. If we reduce particulars and properties to states of affairs, instantiation is the obtaining of a token state of affairs of a certain type. This is not the same as the compositionalist's picture, because states of affairs are all there are; instantiation does not involve any fundamental tie between properties and objects. The second option is to consider particulars and properties as completely unrelated to states of affairs. Instantiation is then something concerning a different set of entities and has nothing

to do with the obtaining of states of affairs or the relation between token and types of states of affairs.

This account, too, seems coherent. The reductionist option makes significant claims about what instantiation might be, whereas the anti-reductionist position makes no such commitments.

4.7 Change

Another less apparent consequence of adverbialism is the concept it provides us of change. When presenting the problem of change, we were careful to make no assumptions about the nature of change. We said that whatever solves the problem will have something to say about what change is. Or, in other words, what makes the following two sentences true in an unproblematic way explains change:

(1) The poker is hot at t

(2) The poker is cold at t'

If adverbialism is true, change has to do with whatever adverbialism says about these sentences. What does adverbialism say about these sentences? Well, in (1) a proposition is expressed that states that some particular historical situation in the world at t belongs to the abstract type of state of affairs **the poker being hot**. And (2), likewise, talks about a state of affairs at t' that is of the type **the poker being cold**. This suggests a definition of change: change is the world being such that some state of affairs obtains at some time, and a different state of affairs obtains at a different time.

But this is clearly an inadequate conception of change, as it is far too broad. The type of situation **the poker being hot** obtaining at t and then the type **the poker being black** obtaining at t' is clearly not a case of change. Even more obviously, **the poker being hot** having a token at t

and **the coals being cold** having a token at t' is not change. The adverbialist account of change needs to rule these examples out.

In order to rule out the first case, we need to point to some incompatibility between the types of states of affairs that successively obtain. In order to rule out the second case, we need to identify some persisting thing which undergoes the change.

Why are the pair of types of states of affairs **the poker being hot, the poker being cold** incompatible, whereas **the poker being hot, the poker being black** are not? We cannot appeal to the fact that no particular situation can belong to both of the first pair, because no particular situation can belong to both of the second pair. Perhaps a more promising route is to suggest that **the poker being hot** and **the poker being cold** cannot have tokens at the same time, whereas **the poker being hot** and **the poker being black** can. In other words, there is a metaphysical impossibility in the existence of two states of affairs at the same time that are of the two types **the poker being hot** and **the poker being cold**. There is no such impossibility in cases that do not count as change. We then have a condition that distinguishes these two examples along the right lines.

Why does the existence of tokens of **the poker being hot** and **the poker being cold** at successive times constitute a change whereas **the poker being hot** and **the coals being cold** at successive times doesn't? A natural answer would appeal to the poker itself as the subject of the change and to insist that change requires a persisting object. We would then have a condition that specified that change only occurred when a single particular is a component of incompatible types having tokens successively[130]. Whilst this answer might seem promising, it is not available to the non-compositionalist; for such a theorist there is no particular composing the types of states of affairs. A better reply to the worry is to look again at the incompatibility condition of the previous paragraph. Incompatibility is there being a metaphysical impossibility in the types of states of affairs having tokens at the same time. **The poker being hot** and **the coals being cold**

[130] As we have noted above, this particular would have to be concrete to undergo intrinsic change.

in our example are have successive not concurrent tokens. But there seems no impossibility in **the poker being hot** and **the coals being cold** having tokens at the same time. They are therefore not incompatible, and our previous condition rules this example as not a case of change.

We might, however, have independent reasons for wanting to assert that the same thing must be involved in both token states of affairs that amount to a change. The adverbialist position is supposed to provide an endurantist account of persistence through time. There should, then, be something doing the persisting. On a compositional understanding of states of affairs, concrete particulars would seem to be the best candidates. What can a non-compositionalist say? Perhaps the subjects of change could be regions of space. According to this suggestion, the change described by (1) and (2) is explained in something like the following way:

> In one region of space at t a state of affairs obtained that belongs to a certain type **poker being hot**. In the same region of space at t' another state of affairs obtained whose type was **poker being cold** and these two types are incompatible.

What it is that is changing is the types of states of affairs in a spatial region. The spatial region is the thing that persists through change in the states of affairs which obtain in it.

However, this picture will not do. For it cannot account for what is happening while a poker changes temperature whilst moving through space. The only way to accommodate such cases would be to allow that *sums* of regions space over time can be proper subjects of change. But it seems there is no way to specify the regions through which the poker moves without mentioning the poker. If pokers are not the subjects of change, they shouldn't be necessary to a specification of what the subject of a change is. It seems, then, that the non-compositionalist about states of affairs who is an adverbialist will have real trouble explaining persistence. We

might therefore be persuaded that adverbialism commits one to a compositionalist account of states of affairs.

4.8 Conclusions

What, then, can we conclude? We have nine theses that are derived from adverbialism:

(i) Propositions refer to two things, a concrete situation and a type of situation

(ii) Propositions say of a concrete situation that is belongs to a type of situation

(iii) Token states of affairs exist

(iv) Types of states of affairs exist

(v) Token states of affairs can belong to types of states of affairs

(vi) Propositions cannot change their truth-value, i.e. propositions exist eternally

(vii) There is non-mereological composition

(viii) Abstract objects exist

(ix) There are necessarily existing entities

(vii) is a commitment for the compositionalist about states of affairs, but not for the non-compositionalist.

We also considered the implications of adverbialism for instantiation and change. The nature of instantiation, for an adverbialist, depends on whether states of affairs are compositional or not. Change commits the adverbialist to genuinely incompatible types of states of affairs, whose concurrent obtaining is metaphysically impossible. This multiplies the number of types of states of affairs. Furthermore, the non-compositionalist account of states of affairs struggles to make space for a persisting subject of change. If persistence and change are taken as primitive data, then adverbialism seems to commit us to a compositionalist view of states of affairs.

It seems the adverbialist has a range of ontological and metaphysical commitments that is significant both in number and content. This is not surprising, as the alternative solutions to the problem of change each also make substantial commitments. But we can now see what it is that the adverbialist is saying about the world, and this makes it easier to determine the strength of her theory. An evaluation of this strength will depend on the comparison between the alternative solutions, and will depend on our metaphysical and ontological preferences. But at least it is clearer what the adverbialist is bringing to the balancing scales.

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