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## The Problem(s) of Change Revisited

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### ABSTRACT

Two recurrent arguments levelled against the view that enduring objects survive change are examined within the framework of the B-theory of time: the argument from Leibniz's Law and the argument from Instantiation of Incompatible Properties. Both arguments are shown to be question-begging and hence unsuccessful.

### 1. Introduction

Some philosophers hold that physical objects persist through time by *enduring*, i.e. by being wholly present at successive times as numerically the same entity, and that they continue to endure although their intrinsic and relational properties change.<sup>1</sup> However, the claim that enduring objects survive change has been argued to be untenable by several distinguished philosophers. Two arguments here have been considered particularly decisive: the argument from Leibniz's Law and the argument from Instantiation of Incompatible Properties.<sup>2</sup> In this paper I shall argue that these arguments only succeed in establishing that endurance and change are incompatible by deploying premises that beg the question against the idea that there is endurance through change. In discussing the arguments I address only intrinsic change, but I think that similar reasoning applies to relational change. Furthermore, I take the B-theory of time for granted – not because I am a committed B-theorist (I am not), but because those who press the arguments into service are typically B-theorists and I wish to discuss the arguments within their preferred framework. Thus, in what follows, all times are

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<sup>1</sup> See e.g. Prior (1976), Haslanger (1989), Hinchliff (1996), Mellor (1998), Zimmerman (1998), and Wiggins (2001). These philosophers agree, at any rate, that objects continue to endure if the changes are minor or continuous; their views may differ, however, when it comes to large and discontinuous changes.

<sup>2</sup> In the literature one finds both of these arguments being alluded to with the phrases “the problem of change” or “the problem of temporary intrinsics”; but since we are confronted with two distinct arguments, it is best to give them different names.

to be understood as being ontologically on a par, properties such as being past, present or future are to be rejected, and verbs and copulas are to be regarded as tenseless.<sup>3</sup>

## 2. *The argument from Leibniz's Law*

I begin by presenting the argument from Leibniz's Law as it is typically stated;<sup>4</sup> I then discuss it critically.

Consider a persisting object, e.g. a candle, and let it be claimed that the candle persists by enduring. We hold, hence, that there is a candle wholly present at some time  $t$  and that there is a candle wholly present at some later time  $t'$ , and that the candle wholly present at  $t$  is numerically identical with the candle wholly present at  $t'$ . Suppose this enduring candle changes, intrinsically, between  $t$  and  $t'$  in respect of shape: at  $t$  it is straight and at  $t'$  it is bent. Suppose, furthermore, that we accept Leibniz's Law as a principle governing the relation of numerical identity, as virtually all philosophers do. We now arrive at a contradiction. For the application of Leibniz's Law here yields the result that the candle wholly present at  $t$  – call it “ $c$ ” – and the candle wholly present at  $t'$  – call it “ $c'$ ” – are not numerically identical.

Leibniz's Law says that:

If  $a$  and  $b$  are numerically identical, then whatever is true of  $a$  is true of  $b$  and whatever is true of  $b$  is true of  $a$ .

But in the candle example something is true (or so the argument goes) of  $c$  which is not true of  $c'$ , and vice versa. It is true of  $c$  that it is straight, but this is not true of  $c'$ . So, by *modus tollens*, we have to conclude that  $c$  and  $c'$  are not numerically identical. Hence we have a contradiction. And if we must choose between Leibniz's Law and the idea that objects persist by enduring, it is the latter that has to go.

This argument, I maintain, is question-begging. It proceeds by asserting that it is *not* true of  $c'$  that it is straight. But why should proponents of endurance through change grant this? Leibniz's Law incorporates no restriction on the truths concerning the entities under scrutiny. All truths regarding the entities are relevant; in our case, all tenseless truths. Now, because upholders of endurance explicitly deny the reality of temporal parts, or stages, of persisting objects, they will insist (or should do) that the name “ $c'$ ” is not to be understood as

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<sup>3</sup> For discussion and criticism of the arguments when a tensed theory of time is presupposed, see Merricks (1994), Hinchliff (1996), and Zimmerman (1998). It should be noted that philosophers who adopt a tensed theory of time often accept the arguments if the B-theory of time (the tenseless theory) is granted.

<sup>4</sup> Cf. Armstrong (1989, 3), Jubien (1997, 72–73), and Sider (2001, 4–5); the argument is also frequently encountered in face-to-face discussions of endurance through change.

an expression picking out a temporal part, or stage, localized only at  $t'$ . In their view, the referent of “ $c$ ” is an *enduring* object – namely, our enduring candle.<sup>5</sup> And the enduring candle is *ex hypothesi* located *both* at  $t'$  and at  $t$ . And at  $t$  it is indeed straight. Hence, according to the advocates of the view that the candle persists through its changes by enduring, it is false to say of  $c'$  that it is not straight:  $c'$  is straight, as it is straight at  $t$ .

Remember that the copula here is to be understood as a tenseless one, i.e. not temporally restricted, encompassing the tensed “was, is or will be”. And just as the truth of the present tensed “Jon is playing football in the garden” entails the truth of the present tensed “Jon is playing football”, so the truth of the tenseless “the candle is straight at  $t$ ” entails the truth of the tenseless “the candle is straight”. An activity, or property exemplification, can truthfully be said to be going on, using the present tense or speaking tenselessly, without it being specified exactly *where* – i.e. at what spatial or temporal location, respectively – the activity or property exemplification is taking place. In the case of Jon, as long as he is (present tense) playing football *at some place or another*, the present tensed “Jon is playing football” is true. In the case of the candle, as long as it is (with the tenseless “is”) straight *at some time or another* in B-time – i.e. somewhere in the B-series – the tenseless “the candle is straight” is true. In order for the tenseless “the candle is straight” to be false it would have to be the case that the candle is never, at any point in the B-series, straight. But it is a premise of the alleged *reductio* that the candle is straight at  $t$ . Thus, *given* that the expression “ $c$ ” picks out an enduring entity, as endurance theorists maintain, and *given* that the enduring entity is straight at  $t$ , as an explicit premise of the argument has it, the tenseless “ $c'$  is straight” has to be regarded as true, not false.<sup>6</sup>

Consequently, upholders of endurance through change ought to insist that what is true of  $c'$ , given that it is the enduring and changing candle they say it is, is that it is (tenseless “is”) *both* bent and straight; or more specifically (and informatively) that it is straight at  $t$  and bent at  $t'$ . But they should say this of  $c$  as well – not surprisingly, since in

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<sup>5</sup> The reference of “ $c$ ” was fixed with the help of a definite description, i.e. “the candle wholly present at  $t$ ”. (It was presumed, of course, that there are no other candles at  $t'$  – otherwise spatial coordinates, or some other determining information, would have to be included in the description). According to the defenders of endurance, and according to the argument from Leibniz’s Law up to the crucial “it is not true of  $c'$  that it is straight”, the entity that fits the description is wholly present at  $t$  as well, i.e. is an entity that also fits the description “the candle wholly present at  $t'$ ”. Thus, according to the adherents of endurance through change,  $c'$  is *not* a short-lived “candle” (i.e. temporal part or stage) localized only at  $t'$ .

<sup>6</sup> The suggestion (raised by an anonymous reviewer) that advocates of the argument from Leibniz’s Law, in asserting “it is not true of  $c'$  that it is straight”, only intend to say that it is not true of  $c'$  that it is straight at  $t'$  would in effect render the argument from Leibniz’s Law unavailable to its own advocates – assuming, of course, that they would not want “it is true of  $c$  that it is straight” to be read as claiming that it is true of  $c$  that it is straight at  $t'$ ! (The latter reading, which is quite peculiar taken by itself, is pretty bizarre given the set up of the argument.)

their view “*c*” picks out the very same enduring candle. But then there is no conflict with Leibniz’s Law. Everything that is true of *c* is true of *c*’, and vice versa.

The argument from Leibniz’s Law is therefore not sound according to the endurance through change account. By presuming that it is true of *c* that it is straight and that it is *not* true of *c*’ that it is straight, the argument presupposes that we are dealing with two *different* entities – in effect, with stages, or temporal parts, trapped at *t* and *t*’, respectively – and that is to beg the question against those who insist that objects endure through change.<sup>7</sup>

Perhaps it will be complained that if there is only one “eternal” and unchanging set of tenseless truths regarding the candle, then the candle does not really change. Note, however, that if one levels this kind of charge, which goes back to McTaggart, one is flirting with a tensed theory of time. On the standard B-theoretical view of change, which stems from Russell, truths about the candle do not have to change in order to be truths about how the candle changes. If it is true of the candle that it is straight at *t* and bent at *t*’, then, on the standard B-theory of change, the candle changes between *t* and *t*’.<sup>8</sup>

### 3. *The argument from Instantiation of Incompatible Properties*

As we have seen, endurance theorists hold of our candle that it is wholly present at *t* and that it is wholly present at *t*’, and that it is both straight and bent – or more specifically that it is straight at *t* and bent at *t*’. Some philosophers object, however, that saying that an object is both straight and bent amounts to predicating incompatible properties to that object. And nothing, they say, can have or instantiate incompatible properties. David Lewis, for example, writes: “Nothing can have the two incompatible shapes, bent and straight. How does having them at different times help?” (Lewis, 1988, 65); and David Armstrong, considering an object which is hot at *t* and cold at *t*’, concurs: “how can strictly the same thing have incompatible properties?” (Armstrong, 1997, 100) These are rhetorical questions designed to highlight the absurdity of the idea that enduring objects survive change in B-time. The thinking behind

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<sup>7</sup> As a comparison, suppose we hold that the expressions “the Morning Star” and “the Evening Star” pick out the very same enduring object, namely Venus. If someone were to say that it must be false that the Morning Star is identical with the Evening Star since something is true of the former which is not true of the latter – namely, *being visible in the morning* – we should answer by saying that he is begging the question. *Given* that “the Evening Star” and “the Morning Star” pick out the very same enduring object, as we say they do, it *is* true of the Evening Star that it is visible in the morning. Again, suppose that we are realists concerning universals, and that someone were to insist that it must be false that the property at *s*, instantiated by object *a*, is the same property as the property at *s*’, instantiated by object *b*, since something is true of the property at *s* which is not true of the property at *s*’ – namely, *being instantiated by object a* – we should answer that *given* that we are concerned with one and the same universal, as we say that we are, it *is* true of the property at *s*’ that it is instantiated by object *a* – to suppose otherwise is to beg the question, to rule against our claim that we are concerned with a universal.

<sup>8</sup> Cf. Mellor (1998, 84).

them, however, seems to be roughly as follows: If objects endure through change in B-time, incompatible properties inhere in one and the same object. But since the properties are incompatible, it would appear that they cannot inhere in one and the same object. For if they were to do this, they would be compatible, both being true of the same subject. Hence, given that the properties are incompatible, as everyone agrees, we ought to conclude that objects cannot endure through change in B-time.

Again, it seems to me that we are confronted with an argument, albeit one that is only hinted at, which is based on a question-begging premise. The B-theorist who holds that objects endure through change will *not* (or should not) agree that the two shapes bent and straight (or the two temperatures hot and cold) are, as insinuated, incompatible period – i.e. incompatible with no further qualification. He can agree that the two shapes (or the two temperatures) are contraries, period. But he will insist that they are incompatible only under certain circumstances – namely when they are instantiated by one and the same object *at a single moment in time*.<sup>9</sup> In cases like that of the candle, the proponent of endurance through change will, of course, deny that these circumstances obtain. He will say, about the enduring candle, that it is straight at  $t$  and bent at  $t'$  – i.e. agree that it instantiates straightness at  $t$  and bentness at  $t'$ . In a sloppier, less informative way of speaking, this agreement might be expressed with the sentence “the enduring candle is straight and bent”. The last sentence, the upholder of endurance through change will insist, is only problematic when it is read in present tense. But again, here our fundamental language is tenseless. If the enduring object exemplifies straightness at  $t$  then it is true of it that it is (tenseless “is”) straight. And if the enduring object exemplifies bentness at  $t'$  then it is true of it that it is (tenseless “is”) bent. Since both of the conjuncts in the tenseless sentence “the enduring object is straight and bent” are true, the compound sentence is true. And hence both properties can be tenselessly predicated of the same object. Moreover, notice that it does not follow from the truth of the tenseless “the enduring object is straight and bent” that the enduring object exemplifies straightness and bentness *always*, i.e. that it is straight and bent *at all times*. For example, our

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<sup>9</sup> Perhaps the incompatibility should be restricted further. An adherent of endurance may be inclined to allow that an object can be both straight and bent, or hot and cold, at a single moment  $t$  – at least in a derivative sense – if the object (e.g. our candle) has a straight spatial part (its main body) and a bent spatial part (its wick) at  $t$  or if it has a hot spatial part (its wick) and a cold spatial part (its main body) at  $t$ . Perhaps, then, it should be said that an endurance theorist regards the properties as incompatible only when they are instantiated by an object in a *non-derivative* way at a single moment in time. Notice, however, that perdurance theorists actually ought to restrict the incompatibility of the properties in an analogous way in order not to fall prey to their own argument (although they should leave out the time restriction if they want their argument to have any force – if only of a question-begging nature – against the endurance account). They ought to say that the properties are incompatible only when they are instantiated by an object in a non-derivative way; otherwise how could a single four-dimensional perduring object (as opposed to its non-identical temporal parts) have the incompatible properties?

enduring candle is *not* straight at  $t'$  and it is *not* bent at  $t$  (i.e. it is not the case that the candle is straight at  $t'$  and it is not the case that the candle is bent at  $t$ ).

Thus, since B-theorists who endorse endurance through change hold that the properties are incompatible only when they are instantiated by one and the same object simultaneously, they should answer Lewis's question "How does having them at different times help?" by saying that if "having them at different times" means instantiating the properties at different times, then having the properties at different times helps because bent and straight are *not* incompatible, but rather compatible, when they are had at different times. To say, or imply, that they are incompatible and so cannot be true of the same subject even when their instantiations occur at different times is, once again, to beg the question against the claim that enduring objects survive change.

It should perhaps be mentioned here that some philosophers have taken Lewis's and Armstrong's objection a step further and argued that B-theorists who endorse endurance through change end up asserting something straightforwardly contradictory. It is claimed that B-theorists who hold that an enduring object is both straight and bent are committed to saying that the object is  $F$  and non- $F$ , which is deemed contradictory (e.g. Merricks, 1995, 526–527). B-theorists do indeed have to say of an enduring and changing object that it is (say)  $F$  and non- $F$ ,<sup>10</sup> but the idea that this involves a formal contradiction is the product of confusion about scope. There is an immense difference between saying "the object is  $F$  and non- $F$ " and "the object is  $F$  and not-(the object is  $F$ )". All that is being said, formally speaking, when it is said that the object is  $F$  and non- $F$ , is that the object is  $F$  and ( $G$  or  $H$  or  $I$ ... etc.), where  $G \neq F$ ,  $H \neq F$ ,  $I \neq F$ . Hardly a contradiction. And if "non- $F$ " is, pragmatically, to indicate a property that is a contrary of  $F$  (and not just any property differing from  $F$ ), as is the case with our pair straight and bent, B-theorists will still be in a position to say that the object is  $F$  and non- $F$  without contradicting themselves. However, since contrary properties cannot be instantiated by one and the same object at the same time, they should clarify their position by adding that if the object is non- $F$ , then not-(the object is  $F$  at all times). Contradiction would ensue were B-theorists obliged to say that the object is  $F$  and not-(the object is  $F$ ), or that the object is  $F$  at  $t$  and not-(the object is  $F$  at  $t$ ), but they do not have to say any of these things. To deny that the object is  $F$  would be to deny that the object is *ever*  $F$ . But since B-theorists explicitly agree that the object *is*  $F$  at some time, they are not obliged to say that it is not the case that the object is  $F$ .

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<sup>10</sup> Notice, however, that B-theorists have to say this of a perduring and changing object as well!

Finally, for the purpose of clarification, I should add that I do not think that expressions such as “is straight at *t*” need to correspond to peculiar time-indexed properties, such as *being-straight-at-t*. On the contrary, I have assumed above that we are dealing with intrinsic properties as ordinarily understood, i.e. as non-relational and “plain” features without any times as constituents. Times have to enter the picture only as the temporal locations at which the token instantiations of the intrinsic properties take place (cf. Johnston, 1987; Lowe, 1988; Haslanger, 1989; and Mellor, 1998). Lewis does indeed complain that an endurance theory according to which a genuinely intrinsic property, such as a determinate shape, is instantiated *at* a time “has wrongly done away with shapes as intrinsic properties that can be had *simpliciter*” (1988, 66).<sup>11</sup> But what exactly does he mean by that?

There appear to be three possibilities. First, if Lewis is complaining that endurance theorists cannot say “the object is straight” without having to add a time clause, then he is wrong, as I have argued above. If, on the other hand, the complaint is about the priority of tenseless sentences with a time clause over *simpliciter*-sentences lacking such a clause, then, again, it is question-begging. The language of perdurance does indeed reverse the priority, but to object that endurance theorists have it the other way round is not to bring forth a “decisive objection” but merely to note a difference and indicate a preference. Finally, if Lewis’s objection is metaphysical and he is in effect alleging that endurance theorists have to treat property instantiation as a *temporal* phenomenon involving not just a thing and a property but a time as well (cf. Lewis, 1988, 66, n. 1; 2002, 5), then the objection is, once more, question-begging. It is an openly embraced presumption – not an unwelcome and unexpected consequence – of the endurance account that we are dealing with a phenomenon that takes place in time: physical objects persist through time, and they exemplify their properties in time *at* times of their temporal journeys. And notice that the fact that times are being presupposed here as locations of the token instantiations no more entails that the instantiations are three-place relations than the spatial locations of the instantiations turn the instantiations into five-place relations. Token instantiations can remain dyadic relations (if they are indeed relations) even though they occur at specific times.<sup>12</sup> And in fact, I would

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<sup>11</sup> Notice that this charge is different from the argument from Instantiation of Incompatible Properties. It is, in effect, some kind of follow up or back up objection. As I see it, it is not specifically concerned with change but rather with instantiation as such, e.g. the instantiation of a single property.

<sup>12</sup> Cf. Lowe (1988, 74). And even if instantiation were to turn out to be a three-place relation (at least) on the endurance account, *that* fact (i.e. the fact that there are *three* or more entities related) would hardly make instantiation into something that alienates the object from the property. If there is indeed a problem with instantiation as a relation (cf. the much debated Bradley regress), then it is present already in the two-place version. But as far as I can see, endurance theorists are not even obliged to view instantiation as a dyadic relation: the alternative views (admittedly vague and speculative) that it is a “non-relational tie”, or “nexus”, etc.,



submit that even a perdurance theorist ought to grant that the instantiation of a property by a temporal part – no matter whether such instantiation is a relation or not – involves a time in the sense that it occurs at a time, namely the time at which the temporal part is located. To deny that a time is involved in the innocent sense of location would be to regard instantiation as a completely *atemporal* phenomenon, taking place within a timeless, Platonic realm. I take it that that is a position no one would want to be saddled with. For one thing, there would hardly be an issue of objects having *temporary* intrinsics! (On this reading, then, the complaint actually begs the question against both the endurance and the perdurance account.)

I think it is safe to say that, however it is interpreted, Lewis's complaint fails to reveal a serious flaw in the view that enduring objects exemplify their properties at times.

#### 4. Conclusion

I conclude that both the argument from Leibniz's Law and the argument from Instantiation of Incompatible Properties are unsuccessful. Both beg the question against the view that enduring objects survive change. The first argument does this by asserting that something is true of *c* which is not true of *c'* (and vice versa). The second argument (in its original, Lewis-Armstrong version) does it by taking for granted that intrinsic properties such as straight and bent, and hot and cold, are incompatible, period. However, the fact that these arguments have been shown to be question-begging does not, of course, establish that the thesis that there is endurance through change is straightforward. Even if the two arguments fail, one may still, among other things, worry about the metaphysical *nature* of an alleged enduring and changing object (a worry that applies to tensed contexts as well). What exactly is it that the different times are supposed to have in common when an enduring and changing object is claimed to be (or to have been) wholly present at those times? Obviously, not all of the properties of the changing object, since not all of them are present at every time the object is wholly present. And it may even be that not a single property (except for trivial "properties" such as self-identity) is present at every time that the object is wholly present (e.g. if all the properties which the object began with are eventually lost while new ones are acquired). If the defenders of endurance through change are postulating substrates, haecceities, or bare or thin particulars, then I think it is reasonable to ask whether the doctrine of endurance, which is supposed to be

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are available to them. In view of this we should note that, if to have a property *simpliciter* is to have or instantiate a property *non-relationally*, then enduring objects may very well have properties *simpliciter* – although at times.

the common-sense view of persistence, is in the end highly counterintuitive and extravagant.<sup>13\*</sup>

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<sup>13</sup> Hugh Mellor has confirmed in discussion that he is postulating thin particulars, but he denies that they are extravagant. An aversion to bare or thin particulars may have been a motivating factor in Lewis's unsuccessful argument from the Instantiation of Incompatible Properties. The proposed diagram in Lewis (1988) may be thought to suggest as much, although strictly speaking it does not involve a thin or bare particular, but only a shapeless particular (or "blob"). However that may be, it should perhaps be mentioned here, very briefly, that there may be reason to worry about the metaphysical nature of enduring objects even if they are not supposed to change – if they are held to be enduring in B-time, that is. In B-time the enduring object is multiply located and hence repeated within the time dimension. Does not the enduring object thereby appear to be some kind of concrete universal (cf. Carter and Hestevold, 1994)? Of course, this worry is an independent issue. Our present concern is with arguments against *change* in enduring objects in B-time, not with arguments against endurance in B-time *per se*. I hope to be able to discuss arguments of the latter sort in a future paper.

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