

# *Changing the past*

## *An examination of the debate*

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Contemporary philosophers are in dispute about whether it is logically possible to change the past. However, the debate is not well understood. This paper is an attempt to get clearer about what motivates each side, and also about what, if anything, is ultimately at issue in the debate.<sup>1</sup>

I begin in Section 1 with a brief exposition of N.J.J. Smith's (1997) argument against the logical possibility of changing the past, followed in Section 2 by a summary of Goddu's subsequent argument in favour of the possibility.

At this point (just where things start to heat up!) the literature more or less leaves us high and dry, so I continue the debate for a while on behalf of both sides: in Section 3 I sketch some possible improvements which could be made to Goddu's defence of changing the past, then in Section 4 I outline a possible reply for Smith. In Section 5 I outline a counter-reply Goddu could make, and in Section 6 a counter-counter-reply for Smith.

In Section 7 I take stock and explore the prospects for real disagreement between Smith and Goddu (or more generally, between those against and for the logical possibility of changing the past), and finally, in Section 8, I try to identify and distinguish various ways in which the disputants might ultimately be talking past each other.

### ***1. Smith's argument***

Many people, especially authors and readers of science fiction, have entertained the idea of going

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<sup>1</sup> I will not enter into general investigation of the idea of logical modality, although this is arguably sorely needed. For example, it is commonly thought that the logical necessities are a proper subset of the metaphysical necessities - however, many philosophers would not hesitate to declare a proposition like 'This table is as long as it is' to be logically necessary, and one like 'This table is longer than it is' to be logically impossible or contradictory. However, it seems clear that it is metaphysically possible for a table to have been longer than it is in actual fact. If both these things are to be accepted, the idea that the logical necessities are a proper subset of the metaphysical will have to be abandoned. Fortunately, discussion about logical possibilities to do with time travel does not appear to crucially involve difficult cases of this kind.

back into the past, often with a view to righting past wrongs, or otherwise making things go better than they went. N.J.J. Smith in his (1997) gives a two-part argument against the logical possibility of such a scenario. Here is the first part:

Sadly, this idea is incoherent - I call it the *second-time-around* fallacy. There can be no first time around of a set of events, with the time traveller absent, followed by a second time around of the very same events, with the time traveller playing a role: for either there is no second time around; or else the second time around is a genuinely distinct series of events, to be involved in which is to avoid rather than change the original series of events. (p. 365)

This first part of Smith's argument deals with changing the past as conceived from a four (or less<sup>2</sup>) dimensional perspective. The second part pertains to the possibility of introducing a further dimension:

Suppose that times are multiplied. One might posit two temporal dimensions, saying that time is like a plane rather than a line. Then the year 1987, for example, is a line across the plane, and the time traveller can travel to a point on that line (1987 at hyper-time b) at which she prevents the Americans from winning back the America's Cup. She cannot, however, prevent the very loss which she witnessed as a young woman: at the point on the 1987 line which the time traveller experienced as a young woman (1987 at hyper-time a) Australia loses. . . . So the idea that time travellers can change the past is incoherent. If there is no bifurcation, of time or place, then there can only be contradiction, not change. Yet even if there is such bifurcation, still there can be no change, only avoidance . . . (p. 365)

Smith's argument as a whole can be thought of as a dilemma for any putative conception of changing the past: either 'times are multiplied', or they are not. If they are not, the idea of changing the past involves a contradiction. If they are, the idea of changing the past confuses *avoidance* with change. In either case, the idea is incoherent. Therefore it is logically impossible to change the past.

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<sup>2</sup> Cf. Keller and Nelson's (2001) argument for the compatibility of presentism with time travel. (Although perhaps presentism is to be thought of not as a three-dimensional perspective, but as a four-dimensional perspective wherein the fourth dimension is special.)

## **2. Goddu's argument**

In his (2003), Goddu argues for the logical possibility of changing the past. His strategy is to argue that arguments against the possibility, such as Smith's, rely on a tacit empirical assumption - that temporal instants do not themselves have temporal parts - and then to construct a model wherein this assumption does not hold. Note that it is not crucial to Goddu's argument that this is an *empirical* assumption. The central point is that it is not logically true. Goddu presumably makes the stronger claim to highlight the fact that he is not leading us toward some controversial notion of *apriori* truths which are not logically true.

Goddu uses the analogy of a video cassette recorder to explain his model. VCRs commonly have an ordinary clock which displays the time, as well as a monitor which shows how much time has elapsed on the tape in the machine - Goddu calls this 'cassette-time' (p. 21), in contrast to 'the time we live in' (p. 22), which is what is measured by the clock. If you start at the beginning of the cassette and simply make one continuous recording, never doing anything else with the cassette, then there will be, in Goddu's terminology, a 'one-to-one correspondence' (p. 22) between cassette times (i.e. moments of cassette time) and normal times (i.e. moments of normal time). Consider, on the other hand, the case where you begin by recording for a while (say one hour), before stopping, rewinding a bit (say half an hour), before recording again, this time through to the end of the tape. In this case, some of the cassette times (namely those occupying the second half-hour interval on the tape) will correspond to *pairs* of normal times.

Goddu then considers 'a hypothetical universe that has two temporal dimensions related much like clock-time and cassette-time are related' (p. 22). Thus, in addition to normal time, there is in this (type of) universe another temporal dimension, which Goddu calls 'hypertime'. (More on whether this idea makes sense in a moment.) The images and sounds on a videotape in some interval are the analogues of events in some interval. Cassette-time is the analogue of normal time, and clock-time is the analogue of hypertime. In a world of this kind where no time travel occurs, there is a one-to-one correspondence between normal time and hypertime. Travelling back in time is like rewinding the tape (or jumping back to an earlier part of the tape, if the time travel is instantaneous). So in worlds where backward time travel occurs, some normal times will correspond to more than one hypertime. Finally, going back and changing the past is analogous to rewinding and recording over

sounds and images recorded earlier.

The most important thing to note is that, on Goddu's proposal, it is logically possible for events (and objects) to be to be 'hypertemporally extended' (p. 26). Events can be extended through hypertime by having different hypertemoral parts at different hypertimes. Hence past events can change by being different at different hypertimes.

I confess that I find this model quite confusing, and I am not sure I fully understand it as Goddu intends it. Goddu himself calls the notion of hypertime 'admittedly abstract' (p. 20). Space does not permit a full investigation into Goddu's proposal, and whether it is completely coherent, but a few issues have to be mentioned.

Firstly: pending further investigation, it is not quite clear - if I may put it this way - *how timelike* hypertime is. To begin with, note that Goddu's proposal is (*prima facie*) not conducive to a *planar* representation of two-dimensional time. For hypertime is like clock-time on the VCR, and the tape may be rewound, etc. So it seems like the hypertemporal *order* in a Goddu universe involving backward time travel cannot be perspicuously represented as running orthogonal to normal time. Also, on a more impressionistic level, it is not clear what happens to the intuitive idea of the flow of time in Goddu's model. If the hypertemporal order involves "rewinding" or "jumping back" in normal time, can hypertime be said to flow? If not, then isn't it un-timelike? And if so, then can we suppose that normal time flows as well? These may be bad questions, but they serve to indicate the kind of confusion Goddu's proposal can give rise to.

Another issue with the hypertemporal order being like the order of clock-time on the VCR concerns Goddu's idea that events can be hypertemporally *extended*. Consider what it means to be spatially extended. It would appear that, on the normal idea of spatial extension, a spatially extended body occupies a *single* region of space, and no more - that is, a set of spatial points such that each one can be connected to each other by a continuous path of points in the set. Now contrast the case of "hypertemporal extension" of events in Goddu's model. Suppose hypertime  $h1$  corresponds to normal time  $n1$ ,  $h2$  to  $n2$ ,  $h3$  to  $n3$ . But now suppose that backward time travel occurs, and that  $h4$  corresponds to normal time  $n1$ . An event occurring at  $n1$ , and  $n1$  itself, will now be hypertemporally extended according to Goddu's proposal. But these  $n1$ -correspondent hypertimes

are *separated* from each other in hypertime. The first hypertemporal part of *nl* is at *hl*, the next is at *h4*. If this can be called 'extension' at all, it is not analogous to the extension of a body in space - but rather as if a single body's extension consisted of more than one region of space. (In the foregoing, I assumed for simplicity that there can be a "next" hypertime - i.e. that time and hypertime are not like the real number line - and that backward travel was jumpy rather than passing through the (normal) times in the interval between departure and arrival. A moment's reflection suffices to show that neither of these simplifications affect the point being made.)

Finally, this notion of hypertemporal order - which is implicit in Goddu's analogy between hypertime and VCR clock-time - appears to give time travel a curiously objective flavour. It would seem that a lone backward time traveller in a Goddu world would be the only object which occupies a certain interval of hypertimes *in their real order*. Hypertemporal order seems to be simultaneously a deep structural objective feature of a Goddu universe, as well as playing - for time travelling objects - something like the role of Lewis's personal time (cf. Lewis (1976)).

### ***3. Possible improvements for Goddu***

#### ***3.1. Forget about timelikeness!***

As remarked earlier, it is not clear how timelike Goddu's fifth dimension, hypertime, really is. Furthermore, Goddu's alignment of hypertime with the idea of clock-time on a VCR leads to the issues concerning hypertemporal order discussed above.

Perhaps all this trouble is unnecessary. It seems clear enough that anyone wishing to defend the logical possibility of changing the past must posit a fifth dimension. But if change consists simply in differing along a dimension, then this fifth dimension doesn't have to be timelike. (The contrary idea that change is essentially temporal - which would also be a problem for Goddu insofar as hypertime is not really timelike - will be considered in Section 4.) Goddu's discussion doesn't consider this possibility. Likewise, the part of Smith's argument which pertains to five dimensional approaches envisages the opponent as proposing that 'time is like a plane, rather than a line'. (This is also the kind of approach envisaged, before being put to one side, in Lewis's (1976).)

We may instead propose a model which consists simply of a discrete, ordered series of 4-

dimensional manifolds. In this model, the fifth dimension (call it 'D5') is neither spatial nor temporal. Using this model, we may tell stories in which a time-*and-D5*-traveller "goes back and kills his grandfather". In the 4D manifold he departs from, his grandfather lives to father one of the killer's parents, and eventually dies of natural causes. The killer, we might suppose, disappears from this manifold at the age of 30, with no reappearance there. In the 'next' manifold<sup>3</sup>, the killer appears near his young grandfather and kills him. Consider also the case of auto-infanticide: a 30-year-old departs from one manifold, and arrives in another alongside his infant self, whom he kills. One important difference between the grandfather case and the autoinfanticide case is that, in the latter, parts of two separate lifelines of the traveller appear in one manifold (the destination manifold). The post-travel part of the lifeline which began in the first manifold appears in the second manifold, as well as one entire (but short) lifeline which begins and ends in the second manifold.

So far, I have been speaking in a way which settles nothing about *how* the killer and his grandfather persist through D5, how it is that the kill-containing manifold can contain two separate "lifeline segments" of the killer, etc. This brings us to the next subsection.

### ***3.2. Endurantism about persistence through the the fifth dimension***

Goddu presents his model in perdurantist terms, in the sense that he talks about events and objects being hypertemporally extended and having hypertemporal *parts* (it is this second conjunct which makes Goddu's talk perdurantist). This yields some odd-sounding consequences, most clearly seen in the case of objects: if I change the past by killing my grandfather, it would seem that on Goddu's proposal the end result is that my grandfather as a whole has some parts which are murdered by me, and others which die in other ways (or are immortal). This sounds so odd, it might be argued, that we should question whether we are coherently using the idea of a grandfather here.

Simply by reformulating things in endurantist terms, I think we can avoid this particular problem. This point is independent of whether we adopt a Goddu model, or one more like that sketched above, but for simplicity I shall stick to the latter. To begin with, note that we commonly talk in endurantist terms about ordinary objects which persist in (normal) time. For example, we don't say that a *part* of our car is parked outside at some time - we say that the whole car is parked there. Our

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<sup>3</sup> At this point, the reader may wonder why, or with what warrant, I talk of a 'next' manifold. This is simply because the sort of model I am discussing by stipulation an ordered series of 4D manifolds. This is just done for simplicity's sake; branching and yet other structures may also be constructed.

talk implies that the whole car exists at different times. We can talk in an analogous way with respect to the fifth dimension (be it hypertime, D5, or whatever). Take the grandfather case: we don't have to say that *part* of the killer's grandfather occupies one manifold (speaking here, for convenience, in terms of the D5-model) and lives to a ripe old age, while another part lives in the other manifold and is killed, thereby suggesting the strange picture of a 'grandfather' as a kind of complex of what we ordinarily think of as persons. We can simply say that the killer's grandfather - the whole killer's grandfather, not just a part of him - grows old in one manifold, and is killed in his prime in the next.

This sort of treatment does admittedly give rise to the possibility of an object *wholly* existing in two places at the same time in the same manifold (or at the same hypertime) - e.g. in the autoinfanticide case, just before the murder. I am not sure this is a problem, but even if it is, it's a different problem. (For a contemporary discussion of existence in two locations at one time cf. Miller (2006).)

### ***3.3. Presentism about the fifth dimension?***

This is a highly speculative idea, which won't figure in the rest of this paper, but I think it is worth mentioning. Perhaps an analogue of presentism about time could be held with respect to D5 (or one's fifth dimension of choice). Thus, when a time traveller travels from one manifold to another, the manifold from which they depart passes out of existence, and the manifold at which they arrive comes into existence. This would appear to have some force against Smith's contention that one cannot change events, only avoid them.

However, the sense of such a metaphysical claim is, in my opinion, chronically unclear. If nothing else, perhaps the exploration of the idea of presentism about a non-temporal dimension could shed light on the meaning of presentism in general, and hence also about the meaning of ordinary presentism about time.

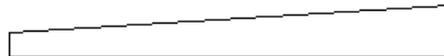
### ***4. "That's not what 'changing the past' means" - A possible reply for Smith***

This reply was suggested to me in a conversation with Smith. (I do not know whether it represents his considered view.)

Goddu or whomever, the reply goes, may well have constructed a coherent model, and anyone is free to use ordinary words with extraordinary meanings in describing the goings on in such a model. In particular, one can even use words like 'event', 'past' and 'change' so as to talk coherently about past events being extended along a fifth dimension, and the past changing insofar as such events differ along this dimension. But this is not what anyone ordinarily means by these words, and it was not what was originally meant by the idea of changing the past.

In particular, 'change' ordinarily (and in the expression of the original idea of changing the past) means something which takes place *in time*. There is a well-known apparent counterexample to this, namely that it seems natural to speak of a road's width changing as you drive along it. But perhaps this can be explained away by analogy with a waiter's saying something like 'The ham sandwich doesn't want to pay'; the change actually happens in time, but since you are driving along in space as you move through time, and since this is the more salient thing, it is natural to speak *as though* the change were happening in space. (In the ham-sandwich case, it is really the customer who doesn't want to pay, but since the ham-sandwich "goes with" the customer, and since the ham-sandwich is the more salient thing, it is natural to speak *as though* the ham sandwich were objecting to paying.)

In contrast to the road case, imagine a metal strip which is narrow at one end and wide at the other.



It would be distinctly unnatural to say that the width of the strip *changes* from left to right - except in the case where one has in view some temporal process involving movement along the strip from left to right.

If this argument about change is successful, it obviously spells trouble for the D5-based model outlined in 3.1. But, as mentioned earlier, it is also a problem for Goddu insofar as hypertime is not timelike - and it *does* appear un-timelike with respect to the way change happens in it, if change can be said to happen in it at all: if I go back and kill my grandfather in a Goddu universe, it is not as if he gradually and continuously changes - in hypertime - from *not* being murdered in the future to

*being* murdered in the future.

### ***5. Incoherence and the principle of charity - A possible counter-reply for Goddu***

Goddu, or some proponent of the logical possibility of changing the past, might simply respond here by saying 'Very well, your arguments do show the logical impossibility of changing the past according to popular ideas, and in the ordinary sense of 'change' and 'past'. But that is not my idea of changing the past, and I am quite aware that I am using words in non-ordinary senses'.

A less conversation-stopping response for the opponent would be to argue that the reply above violates a basic principle of interpretation, the principle of charity. This is particularly acute with respect to the first horn of Smith's dilemma (i.e. part one of his argument, summarized in Section 1), on which the idea of changing the past is said to involve a simple logical contradiction. Also, on the second horn (part two of Smith's argument), the idea seems to involve a confusion of avoidance with change. That is quite a confusion indeed. It is not obvious how anyone of sound mind could make these mistakes. Wouldn't it be more charitable, and therefore more plausible (other things equal), to interpret anyone who talks of changing the past in such a way that they have a chance of saying something coherent? And isn't that exactly what Goddu's proposal tries to do?

On this approach, we might say that the interpretee is using key words in non-ordinary senses. Another route would be to contest the claims in the reply above concerning the ordinary meanings of these key words, arguing instead that they remain far more open than that. The unnaturalness of the special five-dimensional usages can perhaps be explained away as coming from the simple fact that such scenarios and models are far from what we ordinarily think to be the case, rather than from any unusual *semantics*.

### ***6. Slips in cognitive modelling - A possible counter-counter-reply for Smith***

The counter-reply sketched above relies on it being opaque how an intelligent thinker could make the mistakes they would apparently have to make if Smith's argument is to apply to them. If a good explanation of this can be given, the counter-reply would be diffused, since then no great lack of charity would be imputable to Smith's argument. And it seems like there may be one to hand.

It is extremely natural for us to picture events "receding into the past" - that is, to project time into one of the spatial dimensions. The future comes toward us, the past moves away. When we represent the past moving away, the events themselves are represented statically, but *moving* away - this "movement" being represented dynamically. (A reel of film running through a projector is an approximate analogy here.) This means of representation, in the abstract, allows us to imagine alterations in the past events - these alterations being just another dynamic aspect of the model. But, assuming a four-dimensional universe, this possibility in the representation does not correspond to any possibility in the represented. And it would be easy to overlook this, by overlooking the fact that one has quite automatically adopted a means of representation which projects time into a spatial dimension. (The error consists, we might say, in not realizing that temporal processes - changes - are *no longer available* for representation, for instance by a dynamic aspect of one's model. This results in a kind of doubling up with respect to one's representation of time, in a way which leads straight to incoherence and contradiction.)

By making this kind of slip, it is possible for people of sound mind to have incoherent, contradictory conceptions of changing the past. Hence the first part of Smith's argument quite arguably does have real application, and this without being particularly uncharitable.

What about the second part? Recall, in this part Smith argues that if one 'multiplies times', one then gets further events, i.e. events which are not numerically identical to the ones one wanted to change. Can this part of the argument also be argued to deal effectively with an erroneous conception easily had by a person of sound mind? I cannot imagine how such a defence would proceed, and I am doubtful whether any good ones are available. But perhaps that doesn't matter; perhaps the erroneous conception is always the one dealt with by the first argument, and Smith's second argument just demonstrates - while holding fixed the ordinary meaning of 'event', 'change', etc. - that the idea of 'multiplying times' simply doesn't deliver this conception. If this is right, then the only fault Smith's argument could be said to suffer from is excessive thoroughness.

### ***7. Prospects for real disagreement***

It is time to break off the thread and take stock. What is at the root of this debate? Is there ultimately any real disagreement? Or have the disputants simply not yet come to understand each other? We will consider these two options, in that order, in this section and the next.

The most obvious kind of disagreement which may lie at the root of this debate, already alluded to, is disagreement about the (actual, present) meaning of key terms such as 'event' and 'change'. Perhaps Smith is ultimately right if the meanings of these terms are such that 'events do not change' is analytic, or a piece of grammar, and Goddu is right otherwise.

Or maybe the disagreement lies deeper. As already mentioned, Goddu (or some proponent of changing the past) might *grant* that the ordinary meanings are historically as Smith would have them. But it might be common ground between Smith and Goddu that these meanings can be extended, and that if we actually started travelling in a fifth dimension, we *would* probably extend them such that 'changing the past' is no longer a contradiction in terms. (Smith said something like this to me in conversation.) Perhaps Goddu could maintain that, given that such an extension gives the best way to describe the happenings in his model, we should - as a mere result of considering the model - extend our meanings now, so that our language becomes more flexible and general in its working. However, it is far from clear that this follows. We can presumably concoct all kinds of strange models which would be best described by extending ordinary terms in very strange ways - but it is not clear that we should therefore make the extension, especially given that our language is not primarily an instrument for describing such strange scenarios. Indeed, adopting this sort of policy in general would presumably lead to all kinds of conflicts (between different sorts of meaning-extension for different sorts of strange scenario), and would also have the potential to make our language very cumbersome when it comes to describing the ordinary run of things.

Perhaps the fundamental issue in the debate about changing the past can be thought of as concerning this issue of whether, or in what circumstances, we should modify the meanings of terms in light of unusual or hitherto-unexamined scenarios. That would be an interesting result, and would constitute a significant advance for the debate, since this issue doesn't have anything in particular to do with time travel.

It is noteworthy, but not really surprising, that these possible disagreements both have to do with meaning and concepts. The possible misunderstandings considered in the following section are also obviously of this character. And yet Smith and Goddu have not *explicitly* concentrated much of their discussion on semantic and conceptual matters. It looks as though by doing so, *as well as*

talking about "the things themselves", greater clarity could have been reached. This is a slightly unfashionable thing to say, due to the understandable contemporary reaction against the sterility of orthodox post-war linguistic philosophy. But what I am advocating is not ordinary language philosophy. 'Extraordinary language philosophy' would be closer to the mark - but also potentially misleading, insofar as it connotes a lack of interest in the *things* which answer to our talk.

### **8. Prospects for disambiguation**

I now conclude this paper by considering a few ways in which the disputants about changing the past might be talking past each other.

The most obvious way in which this might happen is for the disputants to simply be using words like 'event' and 'change' in different senses. Perhaps if this is cleared up, there will be no disagreement left. This is probably over-optimistic, but there are more subtle ways for the disputants to be talking at cross purposes.

The notion of a *general metaconcept* - a concept of some *type* of concept - can be used to make this clear.<sup>4</sup> We have (indefiniteness aside) particular concepts of change, of events, etc. But we might recognize the existence of *other* concepts which also deserve to be called concepts of change, of events, and so on. A literalistic way of cashing this out would be to say that these are different concepts which have the same objects. But the notion of change (for example) as an *object* is, if not illicit, at least unlikely to be helpful in this connection. This is where general metaconcepts come in. We can cash out our recognition of 'other concepts of change' by saying that we have a *general metaconcept of change* - a concept which has various concepts in its extension: *our* (default) concept of change, as well as some other concepts, which we may or may not have in our repertoire.

With this idea on board, at least two further prospects for disambiguation become apparent:

(1) Undetected difference of semantic level: on Smith's side of the debate, disputants are urging the impossibility of 'changing the past' according to our particular concepts of change, events, and so

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<sup>4</sup> Thanks to Timothy Scriven for making the utility of this notion in this connection apparent to me. I have used the term 'general metaconcept', rather than simply 'metaconcept', to contrast the intended notion with that of a concept of a *particular* concept - an individual metaconcept.

on, whereas on Goddu's side, disputants are urging the possibility of 'changing the past' according to *at least one* set of concepts falling under our metaconcepts of change, events, and so on.

(2) Undetected divergence at the meta-level: the issue is metaconceptual on both sides, but the two parties are, unbeknownst to each other, simply operating with different metaconcepts.

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