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SIMILARITY, CONTINUITY AND SURVIVAL

Might an object go out of existence at a certain time and come into existence at some later time? In this article I defend an affirmative answer, largely by attacking what seem to me to be the most powerful arguments for a negative answer.

The question is of importance for a general account of the identification and reidentification of particulars. However, much of the recent discussion has concerned its application to problems of personal identity. It has been claimed, for example, that, in the absence of spatio-temporal continuity, the similarity between a person who went out of existence at a given time and a person who came into existence at a later time—similarity of bodily appearance, personality traits, skills, apparent memories, etc.—might guarantee their identity. This claim has a direct bearing on many other issues—such as whether doctrines of resurrection are logically coherent.

This article deals with the identity through time of *continuants,* such as persons, trees and tables. The concept of a spatially located continuant is the concept of something which is extended in three spatial dimensions and which continues through time. It has spatial but not temporal parts. If a continuant exists at a particular time, with all the spatial parts that it has at that time, then the *whole* object exists at that time.

I. *Two theses concerning identity and similarity*

Graham Nerlich discussed a case C_1, in which 'A ceases to exist at t_1 and an exactly similar thing or person B begins to exist at t_2'. (I assume that the phrase 'begins to exist' is used in such a way as not to beg the question whether a thing can begin to exist more than once.) Nerlich said:

> In claiming that we have in C_1 a case of identity without continuity, one is claiming that the other conditions realised in C_1 *are sufficient* for identity, and the only conditions realised here seem to be the similarity of A and B. . . . The distinction between identity and exact similarity, at present a real one, becomes quite vacuous if we

> accept the conditions obtaining in C_1 as sufficient. For 'identical' now means no more than 'exactly similar' means. . . . If when he asserts identity in C_1 he does mean to assert more than exact similarity, then *what* more does he mean to assert? And which feature realised in C_1 supports this move, whatever it is?[1]

Nerlich here seems to be straightforwardly denying the thesis:

(1) Exact similarity is a logically sufficient condition of identity.

However, (1) is not a happy formulation of what Nerlich intends to deny. No doubt, if A is identical with B then every predicate which is true of A is true of B, and vice versa: this flows from the Indiscernibility of Identicals. (1) looks like the converse principle, the Identity of Indiscernibles. Clearly Nerlich's topic is not this, but rather conditions for the survival of one object at different times.

What is involved in the assertion that B is exactly similar to A? If it implies that every predicate which is true of A is true of B, and vice versa, then it is *epistemically posterior* to the judgment that B existed prior to t_2, and indeed, the judgment that B is identical with A. The following, let us suppose, are predicates true of A: 'weighed 60 kg at t_0', 'fought in World War II', 'is a parent' and 'is the (one and only) husband of Mrs. A.' The original case C_1 was evidently intended as one in which B has at t_2 the same height, weight, colour, beliefs, personality traits, etc., that A has at t_1. I cannot give a general rule for completing the 'et cetera', but will talk vaguely of 'physical and psychological characteristics'—where, by stipulation, having-weighed-60 kg-at-t_0 and being-a-parent are not physical or psychological characteristics; I shall also use the dyadic predicate 'is characteristically similar to'. It seems that discussion of similarity and identity of continuants will involve quantifying over *characteristics,* or, alternatively over *states.*

No one is likely to maintain that, in general, if the state that an object x is in at one time is characteristically similar to the state that an object y is in at another time, then x is identical with y. For one thing, there might be some time at which x and y exist side by side. Even if there were not, x and y might be different objects going through quite dissimilar careers, except that x's state at one time happened to be characteristically similar to y's state at another time. What, then, is the thesis that Nerlich intends to deny when he says, 'exact similarity cannot be a logically sufficient condition of identity'?[2]

Let us say that a state is an *initial state* of an object if the object is in that state at a time when it begins to exist, and let us say that a state is a

[1] G. C. Nerlich: '"Continuity" Continued', *Analysis* 21 (1960) pp. 22f. Hereinafter cited by title and page number only. Nerlich informs me that the word 'move' in the last sentence is a misprint for 'more'.

[2] G. C. Nerlich: 'Sameness, Difference and Continuity', *Analysis* 18 (1958) p. 147.

terminal state of an object if the object is in that state at a time when it ceases to exist; it is an open question whether an object might have several initial and terminal states. Let 'xSy' abbreviate the following predicate: 'there is a terminal state v of x and an initial state w of y such that v is exactly characteristically similar to w and x is in state v before y is in state w, and x and y do not exist at different places at the same time'.

I shall call the following the *weak sufficiency thesis:*

(2) There is some sortal term which is true of some continuant and which is such that its substitution for the schematic predicate letter 'F' in the following schema yields a true sentence:

$$\Box\,(x)(y)[(Fx.Fy.xSy) \supset x = y]$$

I shall construe what both Graham Nerlich and Bernard Williams say as committing them to denying the weak sufficiency thesis. Williams writes:

> The relation '. . . being in all respects similar to, and appearing somewhere at some time after the disappearance of, the individual . . .' is many-one, and could not suffice to do what a criterion of identity is required to do, viz., enable us to identify uniquely the thing that is identical with the thing in question.[3]

The weak sufficiency thesis is of interest in its own right, and an evaluation of it is helpful in considering the thesis that spatio-temporal continuity is a logically necessary condition of the identity of spatially located continuants. One can, of course, deny the latter without thereby committing oneself to the former.

Has anyone in fact held the weak sufficiency thesis? R. G. Swinburne claims that close qualitative similarity is sufficient for the identity through time of persons.[4] He does not make an explicit statement like (2), but he seems best interpreted as a defender of it, taking 'is a person' for the letter 'F'. John Hick and J. M. Shorter adopt closely related views.[5] Shorter maintains that if cases like C_1 become common and if certain other features obtained, then one would extend one's concept of a person in such a way that one could say truly that B was the same person as A.

I shall argue that neither Nerlich nor Williams has established the falsity of (2).

[3] B. Williams: 'Bodily Continuity and Personal Identity', *Analysis* 21 (1960) p. 45.

[4] R. G. Swinburne: *Space and Time* (1968) pp. 22f.

[5] J. Hick: 'Theology and Verification', *Theology Today* 17 (1960) pp. 12-31, and J. M. Shorter: 'More About Bodily Continuity and Personal Identity', *Analysis* 22 (1962) pp. 79-85.

II. *First argument against weak sufficiency thesis: Alleged collapse of identity assertion into similarity assertion.*

In the passage quoted above, Nerlich said that if one took the conditions realised in case C_1 as logically sufficient for identity, the distinction between identity and exact similarity would become 'quite vacuous'. Does the weak sufficiency thesis involve a collapse of the notion of identity into that of my relation *S*? (The letter '*S*', originally introduced as an abbreviation of a predicate, here serves as the name of a relation. Such versatility is in the interests of brevity and should not lead to confusion.) Someone might argue as follows. If the holding of *S* between *F*'s is logically sufficient for (entails) identity of *F*'s, then by transitivity of entailment, everything entailed by the identity assertion is entailed by the assertion that *S* holds. So the assertion that identity holds has collapsed into the assertion that *S* holds.

Now this last sentence is ambiguous between:

(3) Of 'two' *F*'s, *a* and *b*, the assertion 'Identity holds between *a* and *b*' has collapsed into the assertion '*S* holds between them'.

(4) The assertion '*a* and *b* are *F* objects such that identity holds between them' has collapsed into the assertion '*a* and *b* are *F* objects such that *S* holds between them'.

Nerlich's charge gets most of its impact when understood along the lines of (3). But there is no reason to suppose that (3) follows from the weak sufficiency claim. For

$$\Box\,(x)(y)[(Fx.Fy.xSy) \supset x = y]$$
$$\text{and } Fa.Fb$$

do not jointly entail $\Box\,(aSb \supset a = b)$

The holder of the weak sufficiency thesis is quite free to say that '$a = b$' entails '*a* and *b* live just as long as each other' whereas '*aSb*' does not.

The weak sufficiency thesis does not even have (4) as a consequence. Let us define '*x* is an evod of *y*' as '*x* and *y* are numbers and either *x* and *y* are both even or *x* and *y* are both odd'. Then the holding of the relation *being an evod of* between *numbers greater than 5 and less than 8* is logically sufficient for the identity of those numbers. But clearly the assertion '*a* and *b* are numbers greater than 5 and less than 8 and such that they are identical' is not synonymous with the assertion '*a* and *b* are numbers greater than 5 and less than 8 and such that one is an evod of the other'. Different claims are being made.

III. *Argument from requirement of difference in grounds (epistemological)*

Williams concedes that the judgment of identity does not collapse into that of similarity but urges a further argument.

> Where there is a difference in the consequences, in this sense, of two judgments, there should all the more be a difference in their

> grounds, for it is unreasonable that there should be no more grounds for applying one of a pair of judgments to a situation rather than the other, and yet one judgment carry consequences not carried by the other.[6]

This point is present, in less explicit form, in the question which ends the passage from Nerlich, 'And which feature realised in C_1 supports this move, whatever it is?'

In evaluating Williams' argument one must distinguish between 'grounds' as an epistemological notion, in which case the grounds of an assertion is the evidence for it, and 'grounds' as a semantic (or metaphysical) notion, in which case the grounds of an assertion are what makes the assertion true.

Suppose we interpret 'grounds' along the former lines. Then even if one entirely accepted Williams' reasoning in the passage quoted, it would not establish a conclusion about what could be the case, but only about what we could be justified in asserting to be the case. To claim otherwise would be to adopt some form of verificationism. However, Williams' reasoning is mistaken.

One should note at the beginning that it is not a question of making the assertion of identity *rather than* the assertion that S holds. It is a question of making the assertion of identity *as well as* the assertion that S holds.

Suppose that all the evidence one has about an object a is E, and consider in its light two assertions $A1$ and $A2$.

(E) a is an unmarried adult human being and is at present incapable of giving birth to children.

($A1$) a is an unmarried male.

($A2$) a is a bachelor.

(Neither $A1$ nor $A2$ is entailed by E. The evidence for each of $A1$ and $A2$ would be weakened by leaving out any of the terms of E.) There is no more evidence, in the sense of further items of evidence, for asserting $A2$ in the situation as well as $A1$, than there is for asserting $A1$ alone, and $A2$ carries consequences not carried by $A1$, e.g. that a is human. Nevertheless the assertion of $A2$ as well as $A1$ is *not* unreasonable. This case constitutes a counter-example to Williams' principles.

Moreover Williams' argument does not in fact bear on the weak sufficiency thesis at all. For according to the weak sufficiency thesis there *will* be more evidence available than is required merely to establish that two objects stand in relation S. The extra evidence, which allows us to go on to assert identity, will be a statement that the objects are both F.

[6] 'Bodily Continuity and Personal Identity', p. 45.

IV. *Argument from requirement of difference in grounds* (*semantic*). Suppose now that one interprets 'grounds' as a semantic notion. Williams' objection can be expressed as follows. When there is a difference in the consequences of two judgments—as there is with an identity assertion and a similarity assertion—there should all the more be a difference in what there is in the world to make each true. For it is unreasonable that there should be nothing more in the world to make true one of a pair of judgments rather than another, and yet one judgment carry consequences not carried by the other.

This objection depends upon the following principle: At least some assertions are made true by something in the world. One may characterise the alleged 'something in the world' in neutral terms as a 'truthmaker' of the assertion. There are various candidates for the role of truthmakers: facts, states of affairs, material objects, features, etc. Maybe we should not assume that the role of truthmaker is performed by some *one* kind of thing for all assertions. But for simplicity's sake I shall consider facts as the leading candidates.

Now there is indeed a sense in which at least some assertions can be said to be made true by the facts. One can introduce the schema '(It is a fact that p) $\equiv$ p' and go on to say that the sentence 'Grass is green' is made true (-in-English) by the fact that grass is green. By the same token, one can say that 'aSb' is made true by the fact that aSb, and that 'a and b are identical' is made true by the fact that a and b are identical. This is all quite harmless as far as the weak sufficiency thesis is concerned. For all these moves are trivial. What is needed is a theory of facts and of the relation *making true* in which these notions actually do some work.

Tarski's theory of truth may be said to tie the truth of sentences to the world. At least for certain formalised languages, Tarski defines truth in terms of a relation (satisfaction) holding between sentences and sequences of objects. But this theory does not involve facts. I do not see that Williams can use it to provide his argument with firm foundations.

Could there be developed a theory which offered a genuine explanation of the truth of sentences in terms of their relations to facts? There is none available at present, and the outlook is gloomy.

Even if Williams' objection had been supported by a workable truthmaker doctrine, it still would not have refuted the weak sufficiency thesis. I introduce the following definitions. The fact that p is a complete truthmaker for a judgment A if and only if the fact that p is actually making A true. The fact that p is a proper part of the fact that q if and only if Q entails P but P does not entail Q (where 'P' and 'Q' are replaced by names of the sentences that replace 'p' and 'q'). M is a minimal complete truthmaker for a judgment A if and only if M is a complete truthmaker for A and there is no proper part of M which is a complete truthmaker for A.

Consider now Williams' objection as formulated at the beginning of this section. He may be saying either that

(5) If every minimal complete truthmaker for A is a minimal complete truthmaker for B, then A cannot have consequences lacked by B

or that:

(6) If every proper part of every minimal complete truthmaker for A is a proper part of a minimal complete truthmaker for B, then A cannot have consequences lacked by B.

The need to speak of *minimal* complete truthmakers arises because, e.g. every complete truthmaker for 'a is red' is presumably also a complete truthmaker for 'a is coloured', yet the former judgment has consequences not carried by the latter.

Whether or not principles (5) and (6) are true, neither of them bears adversely on the weak sufficiency thesis. It is not being claimed by anyone that the fact that aSb is a minimal complete truthmaker for '$a = b$'. And on the one hand, while the fact that $Fa.Fb.aSb$ is perhaps claimed to be minimal complete truthmaker for '$a = b$', it is not a minimal complete truthmaker for 'aSb'. Thus (5) is not a source of difficulty. On the other hand, while the fact that $Fa.Fb$ is claimed to be a proper part of a minimal complete truthmaker for '$a = b$', it is very doubtful that it is a proper part of any minimal complete truthmaker of 'aSb'.

The judgments '$Fa.Fb.a = b$' and '$Fa.Fb.aSb$' are, according to the weak sufficiency thesis, such that every minimal complete truthmaker for the former is a minimal complete truthmaker for the latter. The judgments differ in meaning but do not carry different consequences (cf. end of section II). There is no difficulty here for the weak sufficiency thesis.

V. *Argument that a sufficient condition of identity must rely on a one-one relation.*

Williams offers a further argument when he says

> The principle of my objection is, very roughly put, that identity is a one-one relation, and that no principle can be a criterion of identity for things of type T if it relies only on what is logically a one-many or many-many relation between things of type T . . . the relation '. . . being in all respects similar to, and appearing some time after the disappearance of, the individual . . .' is many-one, and could not suffice to do what a criterion of identity is required to do, viz., enable us to identify uniquely the thing that is identical with the thing in question.[7]

However this does not constitute a cogent objection to the weak sufficiency thesis. It is true that the relation S is not what Williams calls a 'one-one relation'. This may preclude one's saying, of two F objects a and b, that:

[7] Ibid., p. 45.

$\Box\ (aSb \supset a = b)$

But it no way prevents one making the assertion which the weak sufficiency thesis purports to license, namely:

$\Box\ [(Fa.Fb.aSb) \supset a = b]$

Similarly *being an evod of* is not a one-one relation, e.g. the number 3 has many evods: 5, 7, 9, ... Nevertheless it is true that

$\Box\ [((5 < a < 8).(5 < b < 8).(a \text{ is an evod of } b)) \supset a = b]$

Nerlich and Williams have other reasons for denying the weak sufficiency thesis. These form the topic of the next few sections.

VI. *Identity and continuity*

When it is said that spatio-temporal continuity is a logically necessary condition of identity, just what is the claim? Even if one understands one's variables to range only over concrete objects, one needs to provide careful explanations before declaring, for example, that

$\Box\ (x)(y)(x = y \supset x \text{ is spatio-temporally continuous with } y)$

The holder of the weak sufficiency thesis, as much as anyone else, can agree that, for continuants or occurrents x and y, then x and y are spatio-temporally *coincident* as long as either exists.

One doctrine which Nerlich, Williams and others seek to maintain is the following: If x is identical with y and x exists at time t and y exists at time t^1, then every time between t and t^1 is a time at which either x or y exists. That is, replacing 'y' by 'x', if x exists at time t and at time t^1, then x exists at every time between t and t^1. I shall call this doctrine 'N'.

Statements are made of the form 'the F object which exists at p_1 at t_1 is spatio-temporally continuous with the F object which exists at p_2 at t_2'. The predicate 'is spatio-temporally continuous with', as applied to concrete objects, has several uses. What I shall call the weak sense may be informally explained as follows. A continuant x is spatio-temporally continuous with a continuant y if and only if for all places p and p^1 and for all times t and t^1, if x exists at p at t and y exists at p^1 at t^1 then every time between t and t^1 is a time at which either x or y exists, and there is a continuous spatial path connecting p and p^1 such that every point on that path is at some time between t and t^1 occupied either by x or by y. The expression 'continuous spatial path' may be left for clarification by mathematicians.

Anyone who denies that spatio-temporal continuity is a logically necessary condition of identity of spatially located continuants will regard 'is spatio-temporally continuous with' (on the above account) as a non-reflexive relation. x and y might be spatio-temporally coincident as long as either existed, but not spatio-temporally continuous.

Some writers seem to be working with a stronger sense of 'is spatio-temporally continuous with'. For example, Williams must have such a stronger sense in mind when he says that 'in a case of fission, such as that of an amoeba, the resultant items are not, in the strict sense, spatio-temporally continuous with the original.[8] It may be assumed that spatio-temporal continuity in the weak sense is a necessary condition of spatio-temporal continuity in the stronger sense.

On either account, the existence of spatially scattered continuants such as archipelagos, lounge suites, and flocks of sheep refutes the thesis that spatio-temporal continuity is a logically necessary condition of the identity of spatially located continuants. It might be claimed that every spatially scattered continuant has proper parts which are not spatially scattered at a given time, and that the spatio-temporal continuity of *these* is a logically necessary condition of the identity of the whole. But this is very doubtful, especially when one remembers that the main candidates for the status of non-scattered objects are subatomic particles.

I shall keep on speaking of the doctrine that 'spatio-temporal continuity is a logically necessary condition of the identity of spatially located continuants', but what will really be under discussion is doctrine *N*. Note that explanations are needed of what is involved in an object's existing at a given time. Suppose that a watch is disassembled, cleaned and then reassembled. Suppose that it is agreed that the reassembled watch is identical with the original one. Did the watch exist during the period in which it was scattered all over the workshop? If one says 'no', then some modification of *N* is needed. If one says 'yes', then interesting questions arise concerning conditions for the survival of objects of disassembled states. For example, does my shredding a document count as destroying it only because no one in fact retrieves and glues together the bits of paper? I think so.

If spatio-temporal continuity is a logically necessary condition of the identity of continuants, then the weak sufficiency thesis is false. That is, provided that one assumes that there is no substitute for '*F*', true of some continuants, which turns into a true sentence the schema '$\Box\ (x)(y)\ [(Fx.Fy.xSy) \supset x$ is spatio-temporally continuous with $y]$'. However one can deny the necessity of spatio-temporal continuity for identity, without thereby embracing the weak sufficiency thesis. Many people see the role of *causal dependence* as central to identity through time. Letting xCy hold when there is some package of causal relations between states v and w of x and y respectively, it might be maintained that

$$\Box\ (x)(y)\ [(Fx.Fy.xSy.xCy) \supset x = y]$$

For example, the resurrection on the last day is a case in which God's causal activity, linking the ante-mortem post-resurrection persons, is crucial for one's ascriptions of personal identity.

VII. *Identity-claims and the possibility of duplication*

Williams argued that bodily identity is a logically necessary condition of personal identity. He considered a man Charles who comes to behave in a manner appropriate to Guy Fawkes. He said:

[8] Ibid., p. 48.

> If it is logically possible that Charles would undergo the changes described, then it is logically possible that some other man should simultaneously undergo the same changes; *e.g.* that both Charles and his brother Robert should be found in this condition. What should we say in that case? They cannot both be Guy Fawkes; if they were, Guy Fawkes would be in two places at once, which is absurd. Moreover, if they were both identical with Guy Fawkes, they would be identical with each other, which is also absurd. Hence we could not say that they were both identical with Guy Fawkes. We might instead say that one of them was identical with Guy Fawkes, and that the other was just like him; but this would be an utterly vacuous manoeuvre, since there would be *ex hypothesi* no principle determining which description was to apply to which. So it would be best, if anything, to say that both had mysteriously become like Guy Fawkes, clairvoyantly knew about him, or something like this. If this would be the best description of each of the two why would it not be the best description of Charles if Charles alone were changed?[9]

Earlier he said: 'The criterion of bodily identity itself I take for granted. I assume that it includes the notion of spatio-temporal continuity, however that notion is to be explained.' This argument constitutes an objection to identifying A with B in Nerlich's case C_1 (introduced in Section I).

Suppose for the sake of argument that in cases of actual duplication the original continuant does not survive.[10] Does it follow that one must also deny that identity is preserved through time in cases of spatio-temporal discontinuity but with no actual duplication? J. M. Shorter holds that it does not follow. He says:

> For many concepts the criteria we actually employ are appropriate only given a certain general background. Assuming one background a certain criterion may be logically necessary and sufficient. For a different background, not that criterion but a different one may be necessary and sufficient.[11]

Thus perhaps our present concept of identity through time simply presupposes that duplication does not occur: given this presupposition, some relation such as S—i.e. without spatio-temporal continuity—may be logically sufficient. This position should be distinguished from that of someone who holds that the entire quest for logically necessary and sufficient

[9] B. Williams: 'Personal Identity and Individuation', *Proceedings of the Aristotelian Society* 57 (1956-7) pp. 238f.

[10] This assumption is a controversial one, which has been denied e.g. by C. B. Martin: *Religious Belief* (1959) p. 101; by A. N. Prior: 'Time, Existence and Identity', *Proceedings of the Aristotelian Society* (1965-6) pp. 183-92; and by John Perry; 'Can the Self Divide?', *Journal of Philosophy* LXIX (1972), pp. 181-200.

[11] J. M. Shorter: 'Personal Identity, Personal Relationships and Criteria', *Proceedings of the Aristotelian Society* (1970-1) p. 185.

conditions is a mistaken one, and who speaks only of defeasible criteria—in one of the many senses of that term.

However, Shorter's way of putting it is unsatisfactory. Whether or not one statement is logically sufficient for another cannot depend upon the truth of some third, contingent statement. Rather, a 'uniqueness clause' should be written into the very specification of the conditions which are said to be logically sufficient. For example, someone might reject the weak sufficiency thesis but claim that:

(7) $(x)(y)\ [(Fx.Fy.xSy.(z)(xSz \supset z = y)) \supset x = y]$

This may be dignified with the title, 'modified weak sufficiency thesis'.

One argument for the use of such uniqueness clauses is as follows. Suppose that it is agreed that in a case of fission neither of the resulting objects is identical with the original object. Then if one is attempting to specify logically sufficient conditions for the identity through time of *F*'s, one must give conditions which are satisfied in a normal non-fission case but are not satisfied by the pair consisting of the original object and the second resulting object. How can this be done?

Williams suggests that

> In a case of fission, such as that of an amoeba, the resultant items are not, in the strict sense, spatio-temporally continuous with the original. The justification for saying this would be that the normal application of the concept of continuity is interfered with by the fact of fission, a fact which would itself be discovered by the verification procedure tied to the application of the concept. There would be a motive for saying this, moreover, in that we might want to insist that spatio-temporal continuity, in the strict sense, was transitive.[12]

However this proposal seems quite *ad hoc;* the alleged 'justification' is simply a pointing to Williams' very difficulty. If the post-fission amoebas are not spatio-temporally continuous with the original amoeba, then it would seem that the block of marble that exists before the sculptor begins his work cannot be spatio-temporally continuous with the block of marble that constitutes the finished statue. It would also seem that the patient who exists before the surgeon begins to operate cannot be spatio-temporally continuous with the patient who has just had both legs amputated. This last consequence must be especially embarrassing for Williams, for it follows that either spatio-temporal continuity is *not,* after all, logically necessary for personal identity, or else the patient does not survive the operation.

If Williams' view is unsatisfactory, are there any other proposals? The problem is a serious one. One might think of such factors as memory-claims, personality, spatio-temporal continuity and some kind of causal conditions as responsible for my identity through time; but if I divided,

[12] 'Bodily Continuity and Personal Identity', p. 48.

surely each resultant person could stand in all of these relations to the original person.

If no other adequate suggestions are forthcoming, then we will have good reason to adopt the method of the defender of (7), *viz.,* do it trivially by writing in a uniqueness clause. David Wiggins objects to such a procedure. Firstly, citing the principle that if p is logically sufficient for q then the conjunction of p and r is logically sufficient for q, he argues that if some condition is logically sufficient for an identity statement then it must be logically sufficient for it even in a case of duplication.[13] But while this argument does have force against Shorter's position, it is simply not applicable to the current suggestion.

Secondly, Wiggins says that

> . . . on the view then propounded there would have to figure among the grounds for '$a = a^1$' a proposition of unlimited generality about the whole universe, viz, that there was no competitor *anywhere* to be found, nor presumably *at any time* any competitor which would not be fitted into the history of a without a breach of transitivity. I do not believe that '$a = b$' has such a close resemblance to a general proposition.[14]

However there is no difficulty here. Someone following (7) might, e.g. offer '$Fa.Fb.aSb.(z)(aSz \supset z = b)$' as grounds for '$a = b$'. The former is, perhaps, a 'proposition of unlimited generality about the whole universe'. But how does it follow that '$a = b$' is a general proposition, or bears a close resemblance to one? It might be said that if '$a = b$' entails a general proposition, then it must itself be general. But in the first place this is a *non sequitur:* 'Socrates is mortal' entails such statements as 'for all x, x is such that Socrates is mortal' and 'For all x, if x is red then x is coloured', but this does not show that 'Socrates is mortal' is general. In the second place, '$Fa.Fb.aSb.(z)(aSb \supset z = b)$' is not being offered as a *necessary* condition for '$a = b$', but merely as a sufficient condition. Certainly one who regards 'All men are mortal and Socrates is a man' as grounds for 'Socrates is mortal' is not thereby committed to the view that 'Socrates is mortal' is a general proposition.

Wiggins also suggests that there is a 'suspicion of circularity' in the procedure under discussion. But statements like (7) are not purporting to define the term '=', but to give logically sufficient conditions of identity of F's; and undoubtedly one could have independent grounds for the truth or falsity of the uniqueness clause.

[13] D. Wiggins: *Identity and Spatio-Temporal Continuity* (1967), footnote 47; see erratum on page viii of 1971 reprint. I have construed Wiggins' 'is grounds for' as 'is logically sufficient for'.

[14] *Loc. cit.*

VIII. *Nerlich's argument from possibility of setting objects side by side*

Nerlich raises further objections to the use of uniqueness clauses in cases of spatio-temporal discontinuity. Discussing case C_1, in which 'A ceases to exist at T_1 and an exactly similar thing or person B begins to exist at T_2', he says:

> Now, that *in fact* only B comes into existence later, cannot be claimed as the further condition required to make $C1$ conditions sufficient. For Mr. C. B. Martin proposed, as a criterion for identity or non-identity in $C1$, that the *possibility* of A's having continued to exist until T_2 so as to be there when B begins to exist, would entail that they were not identical; that is, allowing that if A had continued to exist then it could later have been set beside B is allowing that A and B are different. Coburn claims that since we have a reason for asserting identity in $C1$, we have just the same reason for denying the possibility that A might have continued so as to exist beside B. That is, he makes the identity statement a condition of the falsity of the counterfactual conditional stating this possibility. But the identity statement in $C1$ is in quesion on *this* issue: does it assert more than that A and B are exactly similar things? All that is true in $C1$ *as so far described* are the following statements . . . : An object exists from T_1 till T_2 when it ceases to exist. Later, at T_3, an object comes into existence exactly similar to the object existing from T_1 to T_2. Now, given *just this,* is the possibility open of there being two exactly similar objects existing at T_3, supposing that no object had ceased to exist at T_2? Well, obviously the logical possibility is open. There is no contradiction between the statements given in $C1$ and the counterfactual which states the possibility. So there is the logical possibility of side-by-sideness and I'm inclined to think that this is all one really needs.[15]

In an earlier article he puts the points as follows:

> An object exists from T_1 to T_2 when it ceases to exist. Later, at T_3, an object comes into existence exactly similar to the object existing from T_1 to T_2. . . . The truth conditions of counterfactual conditionals are notoriously difficult to give a satisfactory account of, but I can see no hope of an account on which the following conditional is *falsified* by the above assumptions. *If the object at T_1-T_2 had continued to exist until T_3 it could then have been set beside the object which began to exist at T_3.* . . . There is but one straightforward case in which the counterfactual can be shown not to apply and that is where it fails to be a counterfactual, i.e., where the object at T_1-T_2 is continuous with the object at T_3. . . . So this counterfactual

15 '"Continuity" Continued', p. 23. Nerlich refers to C. B. Martin: 'Identity and Exact Similarity', *Analysis* 18 (1958) pp. 83-7, and to R. C. Coburn: 'Bodily Continuity and Personal Identity', *Analysis* 20 (1960) pp. 117-20.

> provides a powerful argument for the view that continuity is a necessary condition for identity.[16]

It is indeed necessarily true that nothing is set beside itself. More problematic is the thesis that the possible setting side by side of two objects is a logically sufficient condition for their numerical distinctness. I begin by arguing in a largely *ad hominem* vein that this latter thesis is worthless to Nerlich as a foundation for his argument.

Consider the case in which the counterfactual conditional does not apply because the object at T_1-T_2 is continuous with the object at T_3. We have an object C which exists at place P_1 from time T_1 at least until time T_3, and a characteristically similar object D which exists at place P_1 at least from time T_3 onward. I say 'at least' because the very issue is whether D, being C, existed at T_1 and T_2. The question arises: even though C was *in fact* continuous with D, could it have moved from P_1 to P_2 and so have been set beside D which remained at P_1? If so, then $C \neq D$. On the information given so far, there seems to be no reason why it could not.

Under what circumstances would it be the case that C could not have been set beside D? Well, it could not if $C = D$, but this is no help. What is needed is an independent specification of these circumstances, so that then one can go on to say that $C = D$ or that $C \neq D$ as the case may be. Someone might suggest that C could not be set beside D if in certain ways D were causally dependent upon C or D and C were both causally dependent upon some third object. But if this is all that can be said, then Nerlich has no argument for the necessity of spatio-temporal continuity: for the causal condition might also be satisfied in the case of discontinuity. Moreover, in the first passage quoted above, Nerlich says that the mere *logical possibility* of side-by-sideness is sufficient for diversity; and the causal condition will not preclude this. We are dealing with a *logical* 'could not'.

Suppose that there are certain conditions K such that, when a requirement of spatio-temporal continuity is added to them, Nerlich regards the resulting conjunction as logically sufficient for the identity through time of physical objects; and suppose also that Nerlich judges that $C = D$, where C and D satisfy this conjunction, and that $A \neq B$, where A and B satisfy conditions K but are spatio-temporally discontinuous. Nerlich must argue that both the counterfactual 'If A had continued to exist until T_3, it could have been set beside B' is true, and the statement 'C could have moved from P_1 to P_2 and so have been set beside D which remained at P_1' is false.

I suspect—and the onus is on Nerlich to remove the suspicion—that this cannot be done without appealing to the fact that, after all, conditions K plus spatio-temporal continuity *are* logically sufficient for identity, i.e.

[16] 'Sameness, Difference and Continuity', pp. 146-7.

without relying trivially on the truth of '$C = D$' and the (alleged) falsity of '$A = B$'. This means that the thesis that the mere logical possibility of setting two objects side by side (assuming that they are not actually side by side) is a sufficient condition of their numerical distinctness, even if true, cannot be used to decide cases in the manner that Nerlich envisages.

Consider again the doctrine that

(7) $\Box\ (x)(y)[(Fx.Fy.xSy.(z)(xSz \supset z = y)) \supset x = y]$,

and consider a case which satisfies the following description:

(8) a exists from T_1 to T_2 when it ceases to exist, and b comes into existence at T_3, and $Fa.Fb.aSb.(z)(aSz \supset z = b)$.

One still has to face directly Nerlich's argument:

> Given *just this*, is the possibility open of there being two exactly similar objects existing at T_3, supposing that no objects had ceased at T_2? Well, obviously the logical possibility is open. There is no contradiction between the statements given in [the description of the case] and the counterfactual which states the possibility.

Is there a contradiction? It is a trivial *de dicto* matter that (8) is logically incompatible with 'a continues to exist until T_3 and a is set beside b'. And while (8) is logically compatible with the *de dicto* modal truth, 'It is logically possible that a continues to exist until T_3, and a is set beside b', this proves little, since '$a = b$' is also logically compatible with the latter.

Nerlich's counterfactual seems to be a *de re* modal assertion. The semantics of such statements are still obscure. Nerlich might be construed as asserting the logical consistency of

(9) In the actual world, a exists from T_1 to T_2 when it ceases to exist, and b comes into existence at T_3, and $Fa.Fb.aSb.(z)(aSz \supset z = b)$, and there is a possible world in which a continues to exist until T_3 and is set beside b.

However the consistency of (9) will be an objection to (7) only if

(10) In the actual world, $a = b$, and there is a possible world in which a continues to exist until T_3 and is set beside b

is inconsistent. But (10) is inconsistent only if

(11) In the actual world, $a = b$

entails

(12) $a = b$ in every possible world in which either a or b exists.

The claim that (11) entails (12) is a controversial one, which the defender of (7) might plausibly deny.

Is (9) logically consistent? It does not seem possible to derive a *formal contradiction* from (9). But neither does it seem possible to derive a formal contradiction from (10). There remains the question of whether (9) and (10) are necessary falsehoods.

What is the position of the defender of (7)? He maintains that the counterfactual condition, 'if a had continued to exist until T_3, it could have been set beside b' is false. His reason is that $a = b$. He will say that it simply begs the question to object that it is obvious that (10) is necessarily false but (9) is not. This seems a reasonable attitude to take —especially since, as I argued above, accounts which *include* spatio-temporal continuity as necessary are in a similar boat.

I conclude that the arguments of Williams and Nerlich do not establish that spatio-temporal continuity is a logically necessary condition of the identity of spatially located continuants.

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