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Non-branching Clause

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Abstract The central claim of the Parfitian psychological approach to personal identity is that the fact about personal identity is underpinned by a "non-branching" psychological continuity relation. Hence, for the advocates of the Parfitian view, it is important to understand what it is for a relation to take or not take a branching form. Nonetheless, very few attempts have been made in the literature of personal identity to define the "non-branching clause." This paper undertakes this task. Drawing upon a recent debate between Anthony Brueckner and Harold Noonan on the issue, I present three candidates for the non-branching clause.

Keywords Fission · Non-branching · Parfit · Personal identity · Psychological approach

The psychological approach to personal identity holds that a person existing at one time is identical to a person existing at another time just in case they stand in a certain appropriate psychological relation. One problem of this approach is that in a typical case of fission, a pre-fission subject seems to stand in a perfectly appropriate psychological relation to both post-fission offshoots; but, of course, she cannot be identical to both. As a champion of the psychological approach, Derek Parfit has responded to this problem by arguing that the fact about personal identity consists in the holding of a psychological relation that does not take a "branching" form (1984: 262-63). On this view, the pre-fission subject is not identical to either offshoot because the psychological relation holding between them does take a branching form.

For those who follow Parfit on this solution, then, it is pressing to accomplish two tasks: (1) clarify the psychological relation that underlies personal identity and (2) define what it is for that relation to take a non-branching form. Parfit has already done successful work for the first task. He calls the desired psychological relation

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the R-relation, and says that the R-relation is "psychological connectedness and/or psychological continuity, with the right kind of cause,"[1] (1984: 215 ff.) where psychological connectedness is "the holding of particular direct psychological connections" (1984: 206) such as (1) memory connections; (2) psycho-behavioral connections involving acts that carry out previous intentions; and (3) the continuation of beliefs, desires, and other mental states. Psychological continuity is "the holding of overlapping chains of *strong* [psychological] connectedness," (1984: 206) where strong psychological connectedness consists in the holding of "enough" number of direct psychological connections.[2]

In contrast, the second task—defining "the non-branching clause"—has been curiously neglected in the literature of personal identity. A notable exception is the debate between Anthony Brueckner (2005) and Harold Noonan (2006) as to whether the Parfitian psychological approach can analyze the non-branching clause in a non-circular manner. A possible analysis of the non-branching clause is proposed by Noonan at the end of their debate. In this paper, I shall point out several devastating problems in his proposal. Subsequently, I shall introduce three candidates for the non-branching clause, each of which is immune to the problems for Noonan's proposal as well as further complications.

1 Noonan's Proposal and Its Problems

Brueckner and Noonan use the person-stage framework in setting up the discussion.[3] Following them, let us symbolize the relations that represent strong psychological connectedness, psychological continuity, and copersonality, respectively, as follows:

$xCy =_{\text{df}}$ x is strongly psychologically connected to y with the right kind of cause,
$xRy =_{\text{df}}$ Either (1) xCy or (2), there are overlapping C-chains linking x to y,[4]
$xIy =_{\text{df}}$ x and y are both stages of a single continuant person,

where x and y range over person-stages (Brueckner 2005: 294-96, Noonan 2006: 163). Several notes are in order. First, in defining the C-relation, they stipulate that psychological connectedness is temporally non-directional. On this stipulation, C is symmetric. That is, for any given person-stages x and y, necessarily, xCy iff yCx. In

[1] According to Parfit, the right kind of cause may be (1) the normal cause (that requires the continued existence of the same brain), (2) any reliable cause, and (3) any cause (1984: 204-9). Parfit prefers the third view. Respecting Parfit, I will present my arguments from the perspective of the third view. However, similar arguments could easily be made *mutatis mutandis* in taking the other views as well.

[2] Parfit says that there exist enough psychological connections when "the number of direct connections, over any day, is *at least half* the number that hold, over every day, in the lives of nearly every actual person" (1984: 206). I find this account unprincipled. For instance, it does not explain what counts as enough connections (for strong psychological connectedness) holding between two relata apart from each other by a time *other than* a day's stretch of time. For our purposes, however, we may assume that there is a plausible criterion of counting enough number of psychological connections holding between two relata with *any* temporal distance. For further discussion, see Brueckner 1993: 2.

[3] Parfit has not presented his view using the person-stage framework. However, with the conceptual maneuver that I will soon introduce, the kind of person-stage framework employed by Brueckner and Noonan can faithfully represent the core of the Parfitian view.

[4] Here, (2) roughly means the following: There is a sequence of person-stages such that (a) the sequence starts with x, (b) it ends with y, and (c) each stage is C-related to its adjacent stage(s) in the sequence (i.e., each stage is C-related both to the immediately preceding stage in the sequence (if there is one) and to the immediately following stage in the sequence (if there is one)).

addition, I take it that the *C*-relation is reflexive, which I think is plausible, as illustrated by the fact that my current stage seems to be strongly psychologically connected with itself. Then, for any person-stage *x*, necessarily, *xCx*. Note, however, the *C*-relation is not transitive. For instance, we may suppose that my current stage is linked by a series of strongly psychologically connected stages to some earlier stage of mine when I was five, where my current stage hardly contains any *direct* psychological connections to that 5-year-old stage.

In contrast, the *R*-relation is the ancestral of *C*, and is thus transitive. In the preceding example, my current stage is *R*-related, though not *C*-related, to my 5-year-old stage, since supposedly there exists overlapping chains of strongly psychologically connected stages linking the two stages. Also, given the symmetry and the reflexivity of *C*, the *R*-relation is symmetric and reflexive as well. In short, *R* is an equivalence relation.

Finally, there are a few things to note about the *I*-relation. Brueckner and Noonan borrow the notion of the *I*-relation (defined as above) from David Lewis (1976: 21-23). However, it is important to note that the kind of person-stage framework given by Brueckner and Noonan is, in some significant respects, different from a typical perdurantist person-stage view such as the one given by Lewis. For instance, unlike Lewis, they take *I* to be an equivalence relation to better serve the Parfitian view. Thus taken, the *I*-relation (holding between two person-stages) perfectly mirrors the identity relation (holding between two continuant persons), which is almost unanimously considered as an equivalence relation, in the sense that the following is true of *I*:

> (*) For any person-stages *x* and *y*, *xIy* iff the person of whom *x* is a stage is identical to the person of whom *y* is a stage.

Lewis, on the other hand, has been explicit in rejecting (*), for he does not endorse what is presupposed in (*): namely, for each person-stage, there exists only one continuant person whom it is a stage of (1976: 23). As a result of rejecting (*), he denies the transitivity of *I*. Let A be a pre-fission stage, and B and C be distinct, simultaneous post-fission stages that are equally psychologically continuous with A. In this regular fission case, Lewis holds that A is *I*-related to both B and C (i.e., A*I*B and A*I*C), but B and C are not *I*-related to each other (i.e., ~(B*I*C)), though (given the symmetry of *I*) these results violate the transitivity of *I*. He sees this case as the one where two distinct continuant persons share the pre-fission stages, i.e., the person of whom A and B are stages and the person of whom A and C are stages overlap before the fission. By contrast, Brueckner and Noonan follow Parfit in disapproving of the overlap. On Parfit's view, it is best to describe the case as the one where the pre-fission subject is replaced by two distinct post-fission offshoots (and thus, three continuant persons are involved in total).[5] Employing the *I*-relation as used by Brueckner and Noonan (rather than by

[5] Though Parfit says that this is "the best description" of fission, his official view is that whether the pre-fission subject is identical to a post-fission offshoot is an empty question to which no determinate answer can be given. See his 1984: 254-60 and 1971: 4-10. It has been pointed out, however, that Parfit need not (and in my view, should not) appeal to this indeterminacy claim. Instead, he could have consistently argued that the pre-fission subject is determinately distinct from either of the offshoots, though "what matters" to the pre-fission subject is preserved in each offshoot. For further discussion, see Brueckner 1993: 8-9. I believe that such observation is tenable and that the advocates of the Parfitian view should not accept the indeterminacy claim. In order to make the Parfitian view as strong as possible, I will then ignore Parfit's indeterminacy claim and assume that the Parfitian theorists would hold that the pre-fission subject and either of the offshoot are determinately non-identical.

Lewis), Parfit's view can now be restated as: ~(A*I*B) and ~(A*I*C) (i.e., the person of whom A is a stage is identical to neither the person of whom B is a stage nor the person of whom C is a stage). This restatement sustains the transitivity of *I*, for it coheres with the claim that ~(B*I*C). This illustrates that the person-stage framework as used by Brueckner and Noonan, with their presumption that *I* is an equivalence relation, adequately represent Parfit's interpretation of a fission case (though not Lewis's). Since my primary concern is to examine the Parfitian psychological view, I shall follow Brueckner and Noonan in taking *I* to be an equivalence relation.

With the terminology introduced in the aforementioned definitions, Parfit's claim that personal identity consists in non-branching psychological continuity can now be restated as follows: xIy iff (i) xRy, and (ii) there is no branching between x and y. The problem is that it is surprisingly difficult to clarify the notion of branching occurring in (ii) in a non-circular manner. To see this point, consider the following remark of Parfit: "A future person will be me if he will be R-related to me as I am now, and no different person will be R-related to me" (1984: 267). Within the person-stage framework, Brueckner interprets Parfit's remark as follows:

(3) xIy iff (i) xRy, and
(iia) there is no stage z such that either (a) [xRz, and ~(yIz)], or (b) [yRz, and ~(xIz)]. (2005: 298)

He notes that this analysis of the *I*-relation is blatantly circular, for the proposed non-branching clause—(iia)—is defined in part with reference to the *I*-relation. Consider a different proposal:

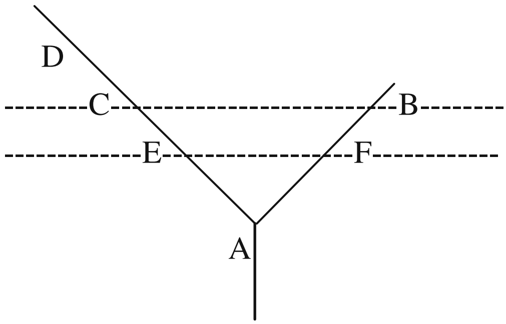
(8) xIy iff (i) xRy, and
(iif) there is no stage z such that either (a) [xRz, y is simultaneous with z, and y's body is distinct from z's body], or (b) [yRz, x is simultaneous with z, and x's body is distinct from z's body]. (Brueckner 2005: 300)

The problem for this proposal, Brueckner notes, is that it is a "significant departure" from the kind of *psychological* reductionism Parfit embraces, for here an important fact about personal identity is analyzed in part with reference to one's *body*. The challenge for the Parfitian psychological theorist then is to fill out the non-branching clause without mentioning the *I*-relation, exclusively using the terms that would not hurt the spirit of psychological reductionism.

Brueckner examines one attempt:

(5) xIy iff (i) xRy, and
(iic) there is no stage z such that either
(a) [xRz, y is simultaneous with z, and $y \neq z$] or
(b) [yRz, x is simultaneous with z, and $x \neq z$]. (2005: 298)

He maintains that (5) is *epistemologically* circular. This is because one must advert to the *I*-relation in determining the *non-identity* of post-fission stages (2005: 298-99). Noonan rejects this claim on the ground that the question about the identity of simultaneous person-stages can be settled without knowing whether they are *I*-related to each other (2006: 165-66). Nevertheless, he argues that (5) fails for a different reason. Consider a variation of the regular fission case where one branch ends earlier than the other (Following Noonan, call it *the Unbalanced Fission*), diagramed as below:



(The dotted lines indicate the simultaneity of person-stages.)

Regarding the Unbalanced Fission, Noonan says, "(5) yields the result that A and D are *I*-related, but neither is *I*-related to B or C—the original person has two beginnings of existence" (2006: fn. 5). The source of the problem is that according to (5), A is not *I*-related to C, but *is I*-related to D, which implies the absurd result that the person of whom A is a stage comes into existence twice in her life: at some time near her birth, and at the moment when the right branch ends.

To solve this problem, Noonan revises (5) as follows (Call it (5N)):

(5N) *xIy* iff (i) *xRy*, and
(iiN) there is no pair of distinct, simultaneously occurring person-stages *u* and *v* such that *u* is *R*-related to *x* and *y*, and *v* is *R*-related to either *x* or *y*. (2006: fn. 5)

(5N) will deliver the results that ~(A*I*D) and that ~(A*I*C). Hence, the previous problem involving the Unbalanced Fission is solved.

However, further problems reveal the implausibility of (5N). (5N) entails that no person-stage in the Unbalanced Fission bears the *I*-relation to any person-stage. This result in turn yields two unacceptable consequences. First, (5N) violates the reflexivity of *I*, i.e., according to (5N), *no one is identical with oneself* at any given time in the Unbalanced Fission. To illustrate, take A as the value of both "*x*" and "*y*" in (5N) and see whether it yields that A*I*A. Then any pair of distinct, simultaneously occurring person-stages (to abbreviate, call a pair of distinct, simultaneous stages a *DS pair* from now on) in the Unbalanced Fission would falsify (iiN), for both stages in that pair would be *R*-related to A; hence, (5N) yields that ~(A*I*A).

Second, (5N) yields that no two *distinct* person-stages are *I*-related to each other in the Unbalanced Fission. For instance, (5N) yields that ~(E*I*C), since, e.g., E and F would be a DS pair such that E is *R*-related to E and to C, and F is *R*-related to E and to C as well (since, e.g., F*R*A, A*R*E, and A*R*C). Indeed, by similar reasoning, (iiN) would be falsified by *any* two distinct stages taken as the values of *x* and *y*. Then no person-stage bears *I* to any distinct person-stage; hence, *no one persists* in the Unbalanced Fission.[6] (The

[6] Note that (5N) yields a desirable result that no one persists *through* the fission. The problem is that (5N) yields that no one persists before or after the fission. In other words, (5N) yields the problematic result that no one persists during *any* given amount of time in the Unbalanced Fission.

problems introduced in this and preceding paragraphs are not limited to an unbalanced fission. The same problems will occur in a regular fission as well. That is, (5N) entails that in a regular fission, no stage, before or after the fission, bears I to itself or any other stages; so reflexivity is violated and no one persists before or after the fission).

The source of all these problems is that there are DS pairs that falsify (iiN) with respect to any given relata of the I-relation. This in turn is, in part, due to the fact that the R-relation can hold *backwardly*. For example, taking E and C as values of x and y (respectively), E and F would be a DS pair that falsifies (iiN) partly because F is R-related to E and to C *due to the fact that F is R-related to some pre-fission stage*—e.g., *FRA*. For this reason, it is tempting to pose a temporal restriction on the R-relation in formulating the non-branching clause so that the restricted relation would not hold backwardly.

As the first step of formulating that relation, suppose we symbolize the relation that expresses *the forward or reflexive strong psychological connectedness* as follows:

$xLy =_{\mathrm{df}}$ (1) xCy, and (2) x is either simultaneous with or temporally prior to y.

As noted, R is the ancestral of strong psychological connectedness. In other words, R is the ancestral of forward or backward or reflexive strong psychological connectedness. Suppose we define *the ancestral of the forward or reflexive strong psychological connectedness* as follows:

$xC^*y =_{\mathrm{df}}$ Either (1) xLy, or (2) there are overlapping L-chains linking x to y.[7]

The C^*-relation, like the R-relation, is transitive. However, C^*, unlike R, cannot hold between two stages across the diverging branches, for the L-chains can never go backwardly. For example, in the Unbalanced Fission, F is not C^*-related to E because ~(FLE) and there are no overlapping L-chains linking from F to E; by contrast, F is R-related to E since, e.g., FRA and ARE. Now, employing the C^*-relation, one might try to revise (5) as:

(5A) xIy iff (i) xRy, and
(iiA) there is no stage z such that either
(a) [xC^*z, y is simultaneous with z, and $y \neq z$] or
(b) [yC^*z, x is simultaneous with z, and $x \neq z$].

(5A) yields that ~(AIC) and that EIC in the Unbalanced Fission. Taking A and C as the values of x and y, B is the stage that satisfies (a), for AC^*B, C is simultaneous with B, and B≠C; since (a) is satisfied, (iiA) is falsified. Hence, ~(AIC). With E and C taken as the values of x and y, B is the only stage simultaneous with and distinct from C (the value of y) in the diagram, but E (the value of x) is not C^*-related to B, and thus (a) is not satisfied; also, F is the only stage simultaneous with and distinct from E (the value of x) in the diagram, but C (the value of y) is not C^*-related to F, and thus (b) is not satisfied; hence, no stage can satisfy either (a) or (b), which satisfies (iiA); since ERC (and so (i) is satisfied as well), EIC. Also, (5A) yields that any two distinct pre-

[7] Here, (2) roughly means the following: There is a sequence of person-stages such that (a) the sequence starts with x, and (b) it ends with y, and (c) each stage (except y) is L-related to the next stage in that sequence.

fission stages are I-related to each other: Taking any two distinct pre-fission stages as the values of x and y, no stage can satisfy either (a) or (b); hence, (iiA) will be satisfied. Hence, (5A) secures the desired result that someone persists after the fission and before the fission (but no one persists through the fission).

Another merit of (5A) is that it sustains the reflexivity of I. For example, it yields that CIC and that AIA. Taking C as the values of both x and y, B is the only stage simultaneous with and distinct from C in the diagram, but C is not C^*-related to B, and thus neither (a) nor (b) is satisfied. So, CIC. Also, with A taken as the value of both x and y, no stage in the diagram is simultaneous with and distinct from A, and every stage simultaneous with and distinct from A that is not represented in the diagram is such that A is not C^*-related to it; hence, no stage can satisfy either (a) or (b), which satisfies (iiA); hence, AIA. The preceding results show that (5A) solves all the problems posed for (5N).

Note, however, (5A) yields that AID in the Unbalanced Fission. Taking A and D as the values of x and y, no stage in the diagram is simultaneous with and distinct from D (the value of y), and every stage simultaneous with and distinct from D that is not represented in the diagram is such that A (the value of x) is not C^*-related to it; hence, (a) is not satisfied; similarly, no stage in the diagram is simultaneous with and distinct from A, and every stage simultaneous with and distinct from A that is not represented in the diagram is such that D is not C^*-related to it; hence, (b) is not satisfied; since no stage can satisfy either (a) or (b), (iiA) is satisfied; so, AID. It has already been shown that (5A) entails that ~(AIC). Since (5A) entails that ~(AIC) and that AID in the Unbalanced Fission, it faces the same problem that Noonan posed for (5): The original person has two beginnings of existence.

Furthermore, note that (5A) entails that CID in the Unbalanced Fission. With C and D taken as the values of x and y, no stage in the diagram is simultaneous with and distinct from D (the value of y), and every stage simultaneous with and distinct from D that is not represented in the diagram is such that C (the value of x) is not C^*-related to it, and thus, (a) is not satisfied; also, B is the only stage simultaneous with and distinct from C (the value of x) in the diagram, but D (the value of y) is not C^*-related to B, and thus, (b) is not satisfied either; then, (iiA) is satisfied, and hence, CID. It has already been shown that (5A) yields that AID and that ~(AIC). Then, since (5A) yields that AID, and that CID, and that ~(AIC), (5A) violates the transitivity of I (given the symmetry of I).

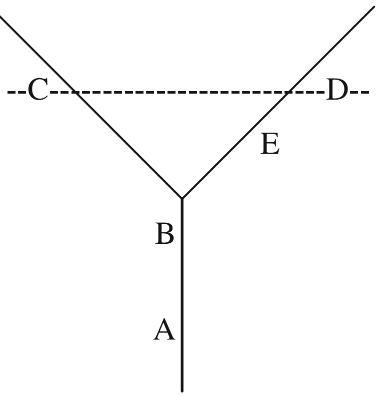
To get round these problems, (5A) may be revised as follows:

(5B) xIy iff (i) xRy, and
(iiB) there is no DS pair u and v such that
(a) either xC^*u or yC^*u, and
(b) either xC^*v or yC^*v.

(5B) delivers the following results in the Unbalanced Fission: ~(AIC) [also, ~(AIB)], CID, and ~(AID). Here are the proofs. Taking A and C as the values of x and y, any DS pair in the diagram would be a DS pair that satisfies both (a) and (b); hence, (iiB) is falsified; so, ~(AIC). Similarly, it can be shown that ~(AIB) and that ~(AID). Finally, with C and D taken as the values of x and y, no DS pair that satisfies (a) can satisfy (b); hence, no DS pair can satisfy both (a) and (b); then, (iiB) is satisfied; so, CID. These results illustrate that (5B) avoids all the problems posed for (5A): since (5B) yields that ~(AID), it does not imply that the original subject has two beginnings of existence; also, since (5B) entails that ~(A*I*D), and that C*I*D, and that ~(A*I*C), it honors the transitivity of *I*.

2 Temporal Condition, the Delayed Fission, and the Transitivity Problem

As opposed to (5N), (5B) yields a desired result that someone persists *after the fission*, as illustrated by C*I*D (in the Unbalanced Fission). The problem for (5B), though, is that it implies that no one persists *before the fission*. To illustrate this problem, consider *the Standard Fission*, diagramed as below:



Here (5B) entails that ~(A*I*B). For, taking A and B as the values of x and y, C and D, e.g., would be a DS pair that falsifies (iiB). (Any DS pair after the fission would be such a pair.) In fact, (5B) yields that *no* two distinct pre-fission stages are *I*-related to each other—hence no one persists before the fission. Furthermore, (5B) violates the reflexivity of *I*. For instance, (5B) yields that ~(A*I*A), for, e.g., C and D would be a DS pair that falsifies (iiB) when we take A as the value of both x and y in (5B).[8]

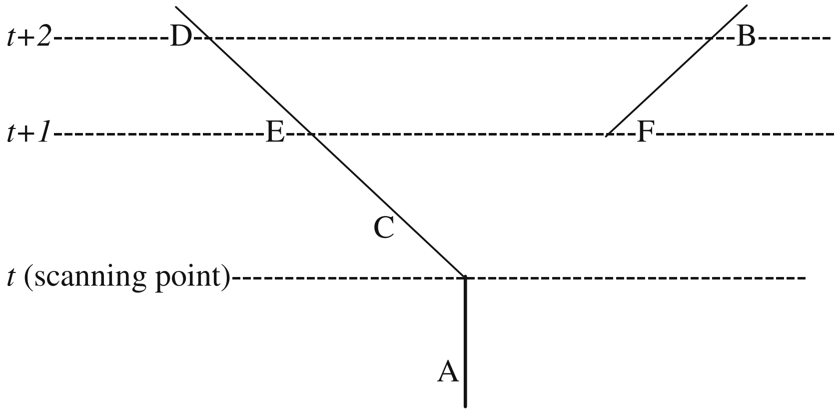
The source of these problems resides in the fact that the current proposal for the non-branching clause—(iiB)—allows that the relevant DS pair may occur later than the latest of the two relata of the *I*-relation. For instance, (5B) yields that ~(A*I*B) because (iiB) allows that the relevant DS pair may occur later than B, which is the latest of A and B. Hence, to get round this problem, we might want to add a temporal constraint on the occurrence of the relevant DS pairs. We may call this constraint *the temporal condition*. Consider the following revision of (5B):

(5C) xIy iff (i) xRy, and
(iiC) there is no DS pair u and v such that
(a) u and v are no later than the latest of x and y, and
(b) either xC^*u or yC^*u, and
(c) either xC^*v or yC^*v.

[8] But note that (5B) sustains the reflexivity of *I* at and after the fission. For instance, it ensures that C*I*C. The problem of (5B) is simply that it entails that no pre-fission stage bears *I* to any pre-fission stage (including itself).

Due to the added temporal condition ((a)), (5C) yields that A*I*B in the Standard Fission: There is no DS pair that satisfies (a) with A and B taken as the values of *x* and *y*; and thus (iiC) is satisfied. (5C) also ensures that A*I*A. This illustrates that (5C) sustains the reflexivity of *I* (even before the fission). So, (5C) solves all the problems posed for (5B).

However, (5C) faces a different problem. Imagine a case where one's body is scanned and continues to exist, and *after some time*, a new body is formed based on the information from the scanning process. Call this case *the Delayed Fission*, diagramed as below:



As the diagram illustrates, A is a stage of the subject before the scanning process was performed. Let F be the very first stage of the person who occupies the new body. Let E be the distinct but simultaneous stage of F in the left branch. The problem of (5C) is that in the Delayed Fission, (5C) will have it that A*I*C, and that C*I*D, and that ~(A*I*D).[9] This violates the transitivity of *I*. Let us call this problem *the Transitivity Problem*.

There may be three approaches to get round the Transitivity Problem: The Parfitian psychological theorist might want to revise (5C) so that the resulting formulation, while sustaining the transitivity of *I*, will yield that:

(I) A*I*C, ~(C*I*D), and ~(A*I*D) [*the First Route*], or
(II) ~(A*I*C), C*I*D, and ~(A*I*D) [*the Second Route*], or
(III) A*I*C, C*I*D, and A*I*D [*the Third Route*].

As far as I can see, each route has at least one implausible implication. Suppose the psychological theorist decides to take the First Route. If ~(C*I*D) in the Delayed Fission as specified in (I), then this would mean that the original subject should cease to exist as soon as his "replica" comes into being in the right branch (at *t*+1). Hence, anyone who holds (I) must reject what is known as *the only x and y principle*: Whether or not *x* is identical to *y* must depend only on the intrinsic features of the relation between them; it cannot depend on a fact about any individual other than *x* and *y* (Noonan 2003: 129; Wiggins 1980: 96). But, this principle seems plausible.

[9] Note that in considering whether C*I*D, neither C nor D is *C**-related to any of the stages in the right branch; hence, in (5C), (iiC) is true when *x* and *y* have the values C and D.

The Second Route does not seem promising, either. If the psychological theorist is to hold that A is not *I*-related to C as specified in (II), then she should admit that the original person ceases to exist at *t*. It would mean that a mere scanning process can terminate one's existence. That is hard to believe.

This leaves us with the Third Route. However, there is a price to pay with (III) as well. Suppose we successfully revise (5C) to ensure that A*I*D. Call this new formulation ($5C_{III}$). Whatever ($5C_{III}$) turns out to be, it should yield either that A*I*B or that ~(A*I*B). Suppose ($5C_{III}$) yields that A*I*B. Then, given that ($5C_{III}$) yields that A*I*D, we would have to conclude that D*I*B, which is implausible. On the other hand, if ($5C_{III}$) yields that ~(A*I*B), then we would have the results that A*I*D but that ~(A*I*B). However, suppose that the temporal distance between the occurrence of A and the occurrence of D (or B) is brief—say, a few seconds. That is, suppose that the person of whom B is a stage comes into existence only a few seconds after the scanning of the original person's body. Then, the internal psychology of D would be almost the same as that of B, and both D and B would be *C*-related to A with almost the same degree. Then, why should A be *I*-related to D, but not to B? That is, why is it that the original person is identical to the person in the left branch (of whom D is a stage) but not to the person in the right branch (of whom B is a stage)? Perhaps one may answer that this is because D, but not B, is bodily continuous with A. However, this answer seems to indicate that bodily continuity plays a crucial role in determining the copersonality of two person-stages. If an analysis suggests that one stage (X) is *I*-related to some stage (Y) but not to the other stage (Z) which is (almost) psychologically indistinguishable to Y just because Y, but not Z, is bodily continuous with X, I think the psychological theorist should reject this analysis. This just sounds like too much of a departure from *any* kind of psychological approach.

So there seems to be no easy way out of the Transitivity Problem for the psychological theorist: No matter which route she takes, she will face some problem. Nevertheless, the psychological theorist must choose one among the three routes, for they exhaust all the sensible options regarding the *I*-relatedness among A, C, and D in the Delayed Fission.[10] In the remainder of this paper, then, I will continue to discuss that which is left out in (5C), and proffer three analyses of the *I*-relation in accordance with the three routes. Each analysis will represent the best candidate for the analysis of the *I*-relation the psychological theorist could reach in choosing one among (I), (II), and (III).

3 The Best Candidate for the First Route

3.1 Securing the Results in (I)

Before we revise (5C) to secure the results specified in (I), consider first how (5C) ends up yielding an undesirable result that C*I*D. First of all, in considering whether C*I*D, we can see that any DS pair between *t*+1 and *t*+2 (inclusive—i.e., including

[10] In fact, I have not here considered the following two possibilities: (IV) ~(A*I*C), ~(C*I*D), and A*I*D, and (V) ~(A*I*C), ~(C*I*D), and ~(A*I*D). But, insofar as I can see, they only have the disadvantages of (I) and (III). So, I do not see any point in holding either of these views.

the DS pairs at t+1 and at t+2) will satisfy the conditions specified in (a) and (b). However, none of these pairs will satisfy (c), for neither *direct* psychological connection nor *forward* psychological continuity can hold between C and any stage between t+1 and t+2 in the right branch; hence, C is *not* C^*-related to any of those stages. Since no relevant DS pairs (i.e., the DS pairs between t+1 and t+2) will satisfy (c), none of them satisfy (a), (b), and (c) together. So, C*I*D.

From this observation, it is tempting to revise (c), replacing the C^*-relation occurring in (c) with a "less stringent" psychological relation, i.e., with a psychological relation that requires neither *direct* psychological connection nor *forward* psychological continuity. In that way, a relevant DS pair would satisfy (c) as well as (a) and (b), which would yield that ~(C*I*D). Suppose then we replace "C^*" occurring in (c) with the *R*-relation (but leave (a) and (b) intact). Then, the current proposal is to revise (5C) as follows:

(5D$_{\mathrm{I}}$) xIy iff (i) xRy, and
(iiD) there is no DS pair u and v such that
(a) u and v are no later than the latest of x and y, and
(b) either xC^*u or yC^*u, and
(c$^{\mathrm{R}}$) either xRv or yRv.

This revision will secure the desired results specified in (I) [~(C*I*D), ~(A*I*D), and A*I*C]. Taking C and D as the values of x and y, any DS pair between t+1 and t+2 would satisfy (a), (b) and (c$^{\mathrm{R}}$) together; and thus (iiD) would be falsified; hence, ~(C*I*D). Similarly, it can be shown that ~(A*I*D). Finally, with A and C as the values of x and y, no DS pair can satisfy (a) and (b) together; thus, no DS pair can satisfy (a), (b), and (c$^{\mathrm{R}}$) together; so (iiD) is satisfied; since A*R*C (and thus (i) is satisfied), A*I*C.

However, (5D$_{\mathrm{I}}$) is unacceptable since it entails that no stage bears *I* to any stage from t+1 on in the Delayed Fission. This in turn yields two problems. First, (5D$_{\mathrm{I}}$) violates the reflexivity of *I*. For instance, it entails that ~(D*I*D): with D as the value of both x and y, D and B would be a DS pair that satisfies (a), (b), and (c$^{\mathrm{R}}$) together; hence (iiD) would be falsified. Similarly, (5D$_{\mathrm{I}}$) yields that ~(B*I*B). Secondly, (5D$_{\mathrm{I}}$) implies that no one persists from t+1 on in the Delayed Fission. This is because (5D$_{\mathrm{I}}$) will have it that no two *distinct* stages from t+1 on are *I*-related to each other. For example, (5D$_{\mathrm{I}}$) yields that ~(E*I*D): with E and D as the values of x and y, any DS pair between t+1 and t+2 (inclusive) will satisfy (a), (b), and (c$^{\mathrm{R}}$), and thus will falsify (iiD). Similarly, it will yield that ~(F*I*B). These results reveal that (5D$_{\mathrm{I}}$) fails.

There is a way to solve the two problems posed for (5D$_{\mathrm{I}}$) all at once. Consider first how to solve the second problem. The preceding discussion makes it clear that (5D$_{\mathrm{I}}$) must be revised to yield that E*I*D while ensuring that ~(C*I*D) in the Delayed Fission. Hence, it may be advisable to revise (5D$_{\mathrm{I}}$) based on the difference between the environments involving the relationship between C and D and the environments involving the relationship between E and D. Note then that in the Delayed Fission, C (or any stage before t+1), unlike E (or any stage from t+1 on), lacks a distinct, simultaneously occurring stage to which it is *R*-related. Now, consider:

(5E$_{\mathrm{I}}$) xIy iff (i) xRy, and
(iiE$_{\mathrm{I}}$) *either* (A) there is no DS pair u and v such that

(a) u and v are no later than the latest of x and y, and
(b) either xC^*u or yC^*u, and
(c^R) xRv or yRv,

or (B) there is a stage w such that
(d) z=the earliest of x and y,[11] and
(e) z and w are a DS pair, and
(f) zRw.

(In English, (B) is read as: some stage and the earliest of x and y are a DS pair, and they are R-related.)

($5E_I$) yields that ~(C*I*D) in the Delayed Fission. Taking C and D as values for x and y, any DS pair between t+1 and t+2 (inclusive) would satisfy (a), (b), and (c^R) together; and thus would falsify (A). Also, no stage is such that it is both R-related to C (when C is the earliest of C and D), and distinct from but simultaneous with C; and thus (B) is falsified. So, ~(C*I*D). ($5E_I$) delivers that E*I*D as well, for E*R*D (and thus (i) is satisfied), and there *is* a stage such that it is R-related to E and distinct from but simultaneous with E, when E is the earliest of E and D (F is such a stage) (and thus (B) is satisfied); since both (i) and (B) are satisfied, E*I*D. Similarly, it can be shown that ($5E_I$) yields that F*I*B. Hence, ($5E_I$) solves the second problem posed for ($5D_I$).

($5E_I$) also solves the first problem for ($5D_I$), since it yields, e.g., that D*I*D. This is so because D*R*D, and there is a stage R-related to D and distinct from but simultaneous with D, when D is the earliest of D and D (B is such a stage); hence, (i) and (B) are satisfied, and so D*I*D. Similarly, it can be shown that B*I*B. These results illustrate that ($5E_I$) solves all the problems posed for ($5E_I$), securing the desired results specified in (I).

3.2 The Convergence Problem

However, ($5E_I$) entails some implausible consequences. For instance, it yields that D*I*B in the Delayed Fission, for D*R*B, and D and B are a DS pair that satisfies (B). Another implausible result of ($5E_I$) is that it yields that F*I*D. F is the earliest of F and D, and there is a stage R-related to F and distinct from but simultaneous with F (namely, E), and F*R*D—hence, F*I*D. (Another way of introducing this problem is to point out that ($5E_I$) yields that E*I*C in the Standard Fission).

The source of these problems is that ($5E_I$) allows that two distinct stages across the diverging branches may be I-related to each other. For example, in the Delayed Fission, F is located in the right branch while D is in the left branch, and ($5E_I$) yields that F*I*D. Since the nature of the problem is that the analysis would mistakenly attribute copersonality to two post-fission stages in diverging branches, I will call this problem *the Convergence Problem*. Then, to get round the Convergence Problem, it would be tempting to add a restriction specifying that the two relata of the I-relation must be located in the same branch. Consider:

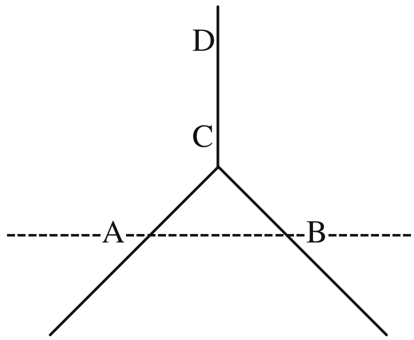
($5F_I$) xIy iff (i) xRy, and
(iiF_I) [either (A)... or (B)...], *and*
(C) either xC^*y or yC^*x.

[11] Here, I stipulate that if x and y are simultaneous, then either x or y can be the earliest of x and y. A similar remark applies to "the latest of x and y" in (a).

(5F$_{\mathrm{I}}$) yields that ~(F*I*D) in the Delayed Fission, for F and D, taken as the values of *x* and *y*, would falsify (C); hence would falsify (iiF$_{\mathrm{I}}$). Similarly, it can be shown that (5F$_{\mathrm{I}}$) yields that ~(D*I*B) in the Delayed Fission and that ~(E*I*C) in the Standard Fission.

3.3 Problems from the Standard Fusion and the Final Proposal for the First Route

The preceding discussion makes it clear that (5F$_{\mathrm{I}}$) solves the Convergence Problem. But there is a further complication for (5F$_{\mathrm{I}}$). Consider *the Standard Fusion*, diagramed as below[12]:



In the Standard Fusion, (5F$_{\mathrm{I}}$) yields that A*I*C, and that B*I*C, and that ~(A*I*B). Here are the proofs. Taking A and C as the values of *x* and *y*, A (the earliest of A and C) and B are a DS pair, and they are *R*-related to each other, and thus (B) is satisfied; since (B) is satisfied, [either (A) or (B)] is satisfied; A is *C**-related to C, and thus (C) is satisfied; and thus (iiE$_{\mathrm{I}}$) is satisfied; since A*R*C, (i) is satisfied; since (i) and (iiE$_{\mathrm{I}}$) are satisfied, A*I*C. It can be shown that B*I*C in a similar fashion. Finally, with A and B as the values of *x* and *y*, neither A is *C**-related to B nor B is *C**-related to A; hence, (C) is falsified; and thus, (iiE$_{\mathrm{I}}$) is falsified. So, ~(A*I*B). Given the symmetry of *I*, the aforementioned results violate of the transitivity of *I*.

To get round this problem, (5F$_{\mathrm{I}}$) needs to be revised to accommodate our intuitions about the fusion case, i.e., (5F$_{\mathrm{I}}$) needs to be revised to secure, e.g., that ~(A*I*C), and that ~(B*I*C), and that ~(A*I*B). Roughly speaking, in a fusion case, two distinct and simultaneous stages are both *C**-related to a future stage. Hence, it is tempting to add a restriction specifying that not every member of a relevant DS pair can be *C**-related to the latest of the two relata of the *I*-relation. Consider:

(5G$_{\mathrm{I}}$) *xIy* iff (i) *xRy*, and
(iiG$_{\mathrm{I}}$) [(either (A)... or (B)...), and ((C)...)], *and*
(D) there is no DS pair *u* and *v* such that
(g) *z*=the latest of *x* and *y*, and
(h) *uC*z* and *vC*z*.

(5G$_{\mathrm{I}}$) yields that ~(A*I*C) (and that ~(B*I*C)) in the Standard Fusion: With A and C as the values of *x* and *y*, any DS pair in the diagram would satisfy (g) and (h) (for

[12] It seems clear to me that Parfit did not take the fusion case into consideration when he argued that copersonality consists in non-branching psychological continuity. However, for a complete analysis of the *I*-relation, I think it is relevant to discuss the fusion case as well.

each member of such DS pair would be C^*-related to C, which is the latest of A and C); and thus (D) is falsified; hence, (iiF_I) is falsified. So, ~(A*I*C). Similarly, it can be shown that ~(B*I*C). Finally, (5G_I) yields that ~(A*I*B): with A and B as the values of *x* and *y*, (C) is falsified; and thus, the first conjunct of (iiG_I) is falsified; hence, (iiG_I) is falsified. So, ~(A*I*B). Thus, (5G_I) avoids the problem facing (5F_I), honoring the transitivity of *I*.

The problem of (5G_I), however, is that it yields the unacceptable result that no stage bears *I* to any stage after the fusion. For instance, (5G_I) entails that ~(C*I*D) in the Standard Fusion: taking C and D as the values of *x* and *y*, any DS pair before the fusion would satisfy (g) and (h), and so falsify (D). Since C and D are chosen to represent any two distinct post-fusion stages, this means that (5G_I) implies that no one persists after the fusion. Furthermore, (5G_I) violates the reflexivity of *I*. For instance, it entails that ~(C*I*C) in the Standard Fusion: With C taken as the value of both *x* and *y*, C is the latest of *x* and *y*; and thus any DS pair before the fusion would satisfy (g) and (h), and thereby would falsify (iiG_I).

The source of all these problems is that (5G_I) allows that a relevant DS pair may be located earlier than the earliest of the two relata of the *I*-relation. For instance, with C and D as the values of *x* and *y*, (5G_I) allows that the relevant DS pair may occur earlier than C, when C is the earliest of C and D. Hence, it is tempting to add a temporal restriction on the occurrence of the relevant DS pairs. Consider the following revision of (5G_I):

(5H_I) *xIy* iff (i) *xRy*, and
(iiH_I) [(either (A)... or (B)...), and ((C)...)], and
(D) there is no DS pair *u* and *v* such that
(g)..., and
(h)..., and
(j) either [xC^*u or yC^*u] or [xC^*v or yC^*v].

Due to the added condition, (5H_I) delivers that C*I*D and that C*I*C in the Standard Fusion. Taking C and D as the values of *x* and *y*, no DS pair in the diagram can satisfy (j), and thus (D) is satisfied; since C is C^*-related to D, (C) is satisfied; no DS pair can satisfy (a) and (b) together, and thus (A) is satisfied; since (A) and (C) are satisfied, the first conjunct of (iiH_I) is satisfied; hence, (iiH_I) is satisfied. So, C*I*D. Similarly, it can be shown that C*I*C. Hence, (5H_I) solves all the problems posed for (5G_I). Furthermore, (5H_I) secures all the desired results regarding various types of other fission/fusion cases discussed so far. That is, (5H_I) solves all the problems posed for (5), (5N), (5A)–(5C), and (5D_I)–(5F_I) as well. Then, (5H_I) seems to be the best candidate for the psychological theorist who takes the First Route to solve the Transitivity Problem. This completes my discussion on the First Route. Now, let us turn to the best analysis of the *I*-relation for those who take the Second Route.

4 The Best Candidate for the Second Route

4.1 Securing the Results in (II)

The Second Route tells us to revise (5C) to yield that ~(A*I*C), C*I*D, and ~(A*I*D) in the Delayed Fission. Also, it is important to note that the revised analysis must ensure that two pre-fission stages are *I*-related in the Standard Fission. What would be the best way to ensure all these results in revising (5C)? Since the revised analysis is supposed to yield that ~(A*I*C) and that ~(A*I*D) in the Delayed Fission, I propose to start from finding out the elements that are common between the environments around the relationship between A and C and the environments around the relationship between A and D. Here is a portion of the list that indicates such elements:

1. A is the earliest in the two sets of relata (i.e., A is the earliest of x and y both in A and C and in A and D).
2. There are DS pairs (whose members are R-related to each other) later than C or D (i.e., there are DS pairs later than the latest of x and y).
3. In each of those DS pairs, only one member (the one in the left branch) is such that both A and C (or both A and D) are C^*-related to it.
4. The other member in each of those DS pairs (the one in the right branch) is such that only A (the earliest of x and y), but neither C nor D, is C^*-related to it.

Then, it is tempting to add a restriction to (5C) specifying that not all the listed conditions are true of the two relata of the *I*-relation. Consider:

($5D_{II}$) xIy iff (i) xRy, and
(iiD_{II}) (A) there is no DS pair u and v such that
(a) u and v are no later than the latest of x and y, and
(b) either xC^*u or yC^*u, and
(c) either xC^*v or yC^*v, *and*
(B) there is no DS pair u and v such that
(d) xC^*u and yC^*u, and
(e) either [xC^*v and ~(yC^*v)] or [yC^*v and ~(xC^*v)].

($5D_{II}$) will deliver the desired result that ~(A*I*C) in the Delayed Fission: taking A and C as the values of x and y, any DS pair from $t+1$ on would satisfy (d) and (e), and so falsify (B). Then, since one conjunct of (iiD_{II}) is falsified, (iiD_{II}) itself is falsified; hence, ~(A*I*C). Likewise, it can be shown that ~(A*I*D): with A and D as the values of x and y, any DS pair from $t+2$ on would satisfy (d) and (e), and so falsify (B).

Furthermore, ($5D_{II}$) ensures that C*I*D in the Delayed Fission. Taking C and D as the values of x and y, neither C nor D is C^*-related to any stage in the right branch; hence, no DS pair that satisfies (a) and (b) can satisfy (c), and no DS pair that satisfies (d) can satisfy (e). So, both (A) and (B) are satisfied, which delivers that C*I*D.

Finally, ($5D_{II}$) secures the desired result that two pre-fission stages in the Standard Fission are *I*-related. To illustrate, take A and B in the Standard Fission as the values of x and y. Then, no DS pair can satisfy the temporal condition (i.e., (a)), and so (A) is satisfied. Also, each DS pair after the fission is such that *both* A and B are C^*-related to either member of the pair; hence, no DS pair satisfies (e). Then, (B) is satisfied as well, and so A*I*B in the Standard Fission. Furthermore, ($5D_{II}$) delivers all the desired results for the Unbalanced Fission and for (other cases in) the Standard Fission. That is, ($5D_{II}$) yields that ~(A*I*C), C*I*D, ~(A*I*D), and E*I*C in the Unbalanced Fission, and that ~(B*I*C) (and ~(B*I*D)), and E*I*D in the

Standard Fission. Hence, ($5D_{II}$) delivers all the desired results for the various fission cases discussed before (5C), while securing all the desired results specified in (II).

4.2 The Final Proposal for the Second Route

One problem of ($5D_{II}$), though, is that it does not handle the Convergence Problem. For example, ($5D_{II}$) yields that E*I*C in the Standard Fission: With E and C as the values of *x* and *y*, no DS pair that satisfies (a) would satisfy both (b) and (c) (and so, (A) is satisfied), and no DS pair would satisfy (d) (and so, (B) is satisfied). However, this is not much of a threat, for we have already seen how to get round the Convergence Problem. All that should be done is to add a clause specifying that the two relata of the *I*-relation are to be located in the same branch, as below:

($5E_{II}$) *xIy* iff (i) *xRy*, and
(iiE_{II}) [(A)..., and (B)...], *and* (C) either xC^*y or yC^*x.

($5E_{II}$), while taking care of the Convergence Problem, suffers from a problem from the Standard Fusion: It yields that A*I*C, B*I*C, and ~(A*I*B) in the Standard Fusion, and thereby violates the transitivity of *I*. Again, this is not much of a worry, for we have already seen how to get round this problem. Consider:

($5F_{II}$) *xIy* iff (i) *xRy*, and
(iiF_{II}) [((A)..., and (B)...), and ((C)...)], *and*
(D) there is no DS pair *u* and *v* such that
(f) z=the latest of *x* and *y*, and
(g) uC^*z and vC^*z, and
(h) either [xC^*u or yC^*u] or [xC^*v or yC^*v].

($5F_{II}$) solves the problem involving the Standard Fusion, while securing all the desired results in various fission/fusion cases discussed so far. Hence, I say, ($5F_{II}$) is the best candidate for the analysis of the *I*-relation for those who take the Second Route in dealing with the Transitivity Problem.

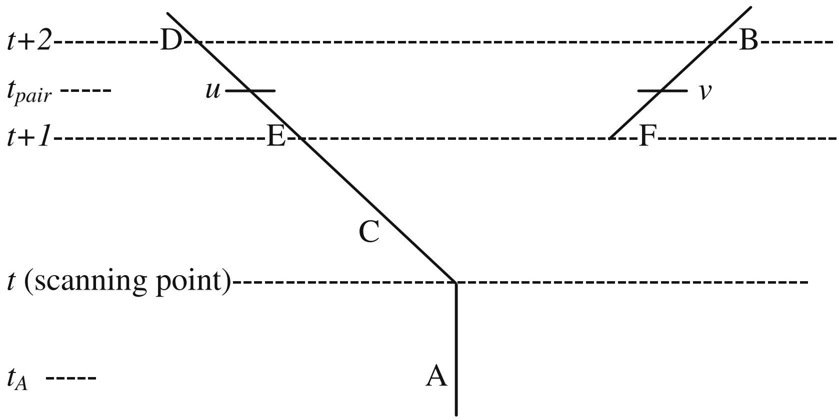
5 The Best Candidate for the Third Route

The Third Route requires us to revise (5C) so that the resulting analysis delivers that A*I*D in the Delayed Fission. For the reader's convenience, I shall repeat (5C) below:

(5C) *xIy* iff (i) *xRy*, and
(iiC) there is no DS pair *u* and *v* such that
(a) *u* and *v* are no later than the latest of *x* and *y*, and
(b) either xC^*u or yC^*u, and
(c) either xC^*v or yC^*v.

Recall how (5C) ended up yielding that ~(A*I*D): With A and D as the values of *x* and *y*, any DS pair between t+1 and t+2 in the Delayed Fission would satisfy (a), (b), and (c) together, and thereby falsify (iiC). Now, compare this process with how (5C) ended up yielding C*I*D in the Delayed Fission: With C and D as the values of *x* and *y*, none of the DS pairs that satisfy (a) could satisfy (b) and (c) together, for C, unlike A (where both being the earliest of *x* and *y* in considering whether C*I*D and whether A*I*D, respectively), is not *C**-related to any stage between *t*+1 and *t*+2 in the right branch; then, no DS pair can satisfy (a), (b), and (c) together; hence, (iiC) is satisfied. This comparison suggests that it is (c) that should be revised if the revision of (5C) is to deliver that A*I*D in the Delayed Fission.

As the first step of revising (c), suppose that in the diagram of the Delayed Fission, we use the letters "*u*" and "*v*" to mark a DS pair that satisfies (a) and (b) when A and D are taken as the values of *x* and *y*, as follows:



There are four different groups of stages between A and *v* (or between A and *u*).[13] We can list a characteristic feature of each group as follows:

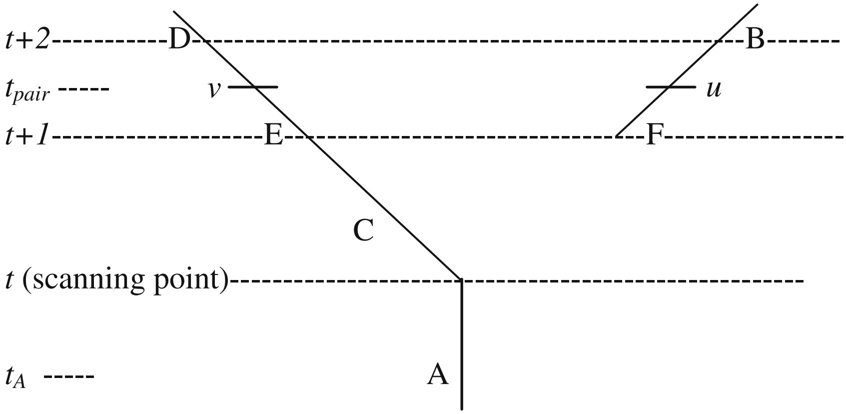
1. The stages between t_A and *t* (inclusive): These stages are *C**-related to *v*.
2. The stages between *t* and *t*+1 (exclusive—i.e., neither at *t* nor at *t*+1): These stages are not *C**-related to *v*. Also, each of these stages lacks a distinct, simultaneously occurring stage to which it is *R*-related.
3. The stages in the right branch between *t*+1 and t_{pair} (inclusive): these stages are *C**-related to *v*.
4. The stages in the left branch between *t*+1 and t_{pair} (inclusive): Each of these stages has a distinct, simultaneous stage (to which it is *R*-related) that is *C**-related to *v*.

Now, having this list in mind, consider the following revision of (5C):

(5D$_{III}$) *xIy* iff (i) *xRy*, and
(iiD$_{III}$) there is no DS pair *u* and *v* such that
(a) *u* and *v* are no later than the latest of *x* and *y*, and
(b) either *xC*u* or *yC*u*, and
(c$^+$) If *z*=the earliest of *x* and *y*, and *w* is between *z* and *v*, and *wRx*, then either *wC*v* or there is a stage *s* such that *w* and *s* are a DS pair and *wRs* and *sC*v*.

[13] Here I define: *x* is *between* *y* and *z*=$_{df}$ *x* is no later than the latest of *y* and *z*, and *x* is no earlier than the earliest of *y* and *z*.

One might think that ($5D_{III}$) delivers the desired result that A*I*D in the Delayed Fission. Let us take A and D as the values of *x* and *y* in the preceding diagram of the Delayed Fission. Then, each stage between *t* and *t*+1 (exclusive) is such that neither it is *C**-related to *v* nor it has a distinct, simultaneous stage to which it is *R*-related; and thus (c^+) is falsified, which satisfies (iiD_{III}). This, however, does not show that ($5D_{III}$) yields that A*I*D. In fact, ($5D_{III}$) yields that ~(A*I*D). To prove this point, let us mark a DS pair using *u* and *v* in a slightly different fashion:



Taking A and D as the values of *x* and *y*, *u* and *v* are a DS pair that satisfies (a) and (b). Also, each stage in the left branch between t_A and t_{pair} (inclusive) is *C**-related to *v*, and each stage in the right branch between *t*+1 and t_{pair} is such that its distinct, simultaneous stage (to which it is *R*-related) is *C**-related to *v*. Hence, (c^+) is satisfied as well. Since *u* and *v* in the above diagram are a DS pair that satisfies (a), (b), and (c^+) together, (iiD_{III}) is falsified—hence, ~(A*I*D).

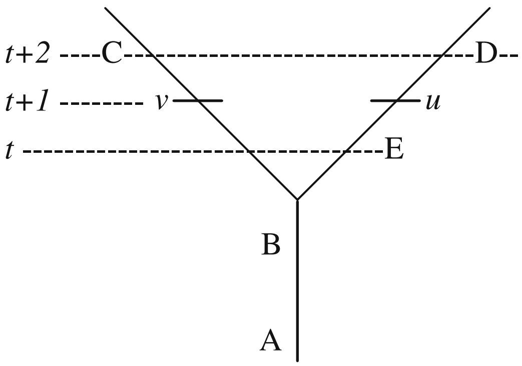
The source of this problem resides in the fact that A is *C**-related to *both* member of the DS pair under scrutiny (i.e., A is *C**-related to the stages from *t*+1 on in *either* branch). Hence, it is tempting to add a restriction specifying that the member of the DS pair occurring in (b)—i.e., *u*—must be located in the left branch. Now, consider:

($5E_{III}$) *xIy* iff (i) *xRy*, and
(iiE_{III}) there is no DS pair *u* and *v* such that
(a) *u* and *v* are no later than the latest of *x* and *y*, and
(b^+) either [*xC*u* and *uC*y*] or [*yC*u* and *uC*x*], and
(c^+) If *z*=the earliest of *x* and *y*, and *w* is between *z* and *v*, and *wRx*; then either *wC*v* or there is a stage *s* such that *w* and *s* are a DS pair, and *wRs* and *sC*v*.

With A and D as the values of *x* and *y*, ($5E_{III}$) ensures that the member of the DS pair occurring in (b^+) may only be located in the left branch from *t*+1 on. Hence, it solves the aforementioned problem, securing the desired result that A*I*D in the Delayed Fission. Furthermore, ($5E_{III}$) yields that A*I*C and that C*I*D in the Delayed Fission. With A and C as the values of *x* and *y*, no DS pair would satisfy (a) and (b^+) together; and thus, no DS pair would satisfy (a), (b^+), and (c^+) together; hence,

(iiE_{III}) will be satisfied—thus, A*I*C. With C and D as the values of *x* and *y*, each of the stages between the occurrence of C and *t*+1 (exclusive) is such that neither is it *C**-related to *v* (in the right branch) nor has it a distinct, simultaneous stage to which it is *R*-related; and thus, (c^+) is falsified, which satisfies (iiE_{III})—hence, C*I*D. These proofs reveal that ($5E_{III}$) delivers all the desired results specified in (III).

One problem of ($5E_{III}$), though, is that it yields that in the Standard Fission, no one persists after the fission. For instance, it yields that ~(E*I*D) in the Standard Fission. Suppose, in the diagram of the Standard Fission, we use the letters *u* and *v* to mark a DS pair as follow:



Taking E and D as the values of *x* and *y*, we can see that *u* and *v* are a DS pair that satisfies (a) and (b^+). Furthermore, each stage in the left branch between *t* and *t*+1 (inclusive) is *C**-related to *v*, and each stage in the right branch between *t* and *t*+1 (inclusive) is such that its distinct, simultaneous stage (to which it is *R*-related) is *C**-related to *v*; and thus, (c^+) is satisfied as well. Since *u* and *v* are a DS pair that satisfies (a), (b^+), and (c^+) together, (iiE_{III}) is falsified—hence, ~(E*I*D).

To get around this problem, let us make a slight revision in (c^+) as follows:

($5F_{III}$) *xIy* iff (i) *xRy*, and
(iiF_{III}) there is no DS pair *u* and *v* such that
(a) *u* and *v* are no later than the latest of *x* and *y*, and
(b^+) either [xC^*u and uC^*y] or [yC^*u and uC^*x], and
(c^{++}) If *z*=the earliest of *x* and *y*, and *w* is between *z* and *v*, and *wRx*; then either wC^*v or there is a stage *s* such that *w* and *s* are a DS pair, and *wRs* and zC^*s.

Due to the revision in (c^{++}), ($5F_{III}$) delivers that E*I*D in the Standard Fission. With E and D as the values of *x* and *y*, each stage in the right branch between *t* and *t*+1 (inclusive) is such that neither it is *C**-related to *v* nor it has a distinct, simultaneous stage to which E (the earliest of *x* and *y*) is *C**-related. Thus, (c^{++}) is falsified, which satisfies (iiF_{III}). Hence, E*I*D.

($5F_{III}$) faces the Convergence Problem and the problems involving the Standard Fusion. But we know that they should not be worrisome, for we have already seen the solutions for these problems. Then, we can formulate the final analysis as follows:

($5G_{III}$) *xIy* iff (i) *xRy*, and
(iiG_{III}) (A) (a)..., and (b^{+})..., and (c^{++})..., *and*
(B) either $xC^{*}y$ or $yC^{*}x$, and
(C) there is no DS pair *u* and *v* such that
(d) z=the latest of *x* and *y*, and
(e) $uC^{*}z$ and $vC^{*}z$, and
(f) either [$xC^{*}u$ or $yC^{*}u$] or [$xC^{*}v$ or $yC^{*}v$].

($5G_{III}$) solves the Convergence Problem and the problems involving the Standard Fusion, securing all the desired results specified in (III). Hence, I contend, ($5G_{III}$) is the best candidate for those who take the Third Route to get round the Transitivity Problem.

So far I have proffered three candidates for the non-branching clause. There may remain other problems for each candidate. However, the psychological theorist can at least now use one of my analyses as a stepping stone to develop her own view. In this respect, the analyses of the non-branching clause suggested in this paper may be regarded as a progress to those who follow the Parfitian psychological approach to personal identity.

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