

## The role of the brainstem in personal identity

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**abstract:** The main claims of The Human Animal were that we are animals, and that our persistence therefore consists not in psychological continuity but in the continuation of our biological lives. I said further that a human life was possible only if there was a functioning brainstem. Rina Tzinman and Alan Shewmon have challenged this further claim. I concede that it is probably false, but argue that this does not affect the main claims. It may, however, give rise to a new sort of fission case.

1.

In The Human Animal I argued for two main claims. The first was animalism:

1. We are animals.

That is, every human person is an animal: a biological organism of the animal kingdom. We are animals not just in the loose sense of having animal bodies, but in the same straightforward sense that we are people or philosophers. We are not immaterial substances, bundles of perceptions, computer programs, spatial or temporal parts of animals, nonanimals “constituted by” animals, or entities of any other unfamiliar kind.

If we are animals, then that what it takes for us to persist through time is what it takes for those animals to persist. Personal identity, in the sense of the persistence of a human person, is animal identity.

But what is animal identity? My second claim was that it has nothing to do with psychology:

2. No sort of psychological continuity is either necessary or sufficient for the animals that we are to persist.

Each human animal begins as a tiny embryo, and can exist indefinitely in an irreversible vegetative state. At those times, having no mental properties at all, it persists in the complete absence of psychological continuity. No such continuity, therefore, can be necessary for a human animal to continue existing.

Nor is it sufficient. Imagine that we transplant your cerebrum into another head, and that this makes the resulting human animal psychologically continuous with you by any standard: your mental states are physically realized throughout the process, there are no troublesome rival candidates, and so on. Such an operation would not move an animal from one head to another. It would only move an organ

from one animal to another, just as a kidney transplant does. The donor animal would either stay behind with an empty head, or else die on the operating table. So there would be full psychological continuity between one animal and another: psychological continuity without animal identity. If you were the donor animal, the recipient would not be you. You would either stay behind with an empty head, or else die on the operating table.

It follows that our being animals would make psychology completely irrelevant to personal identity, contrary to what almost every authority has written on the subject since the 17th century.

These two claims, as I said, were my main concern. But they raise further questions. Denying that animal identity consists in psychological continuity does not tell us what it does consist in. I might have said simply that it consists in some sort of brute-physical continuity and left it at that. But I wanted something more specific. Everyone agrees, I think, that an organism has a life: an event or process consisting of metabolism, respiration, nutrition, growth, and the other activities that make an organism biologically alive and distinguish it from nonliving things. With this in mind, I proposed that

3. An animal goes where its biological life goes

(1997: 131-140; see also 2013). More precisely,

If  $x$  is an animal at a time  $t$  and something  $y$  exists at a time  $t^*$ , then  $x=y$  iff the event that is  $x$ 's life at  $t$  is the event that is  $y$ 's life at  $t^*$ .

If a certain animal exists now, then something existing at another time is that animal just if it has the same life, then, that this animal has now. I took this from van Inwagen (who got it from Locke, who in turn derived it from Aristotle; see van Inwagen 1990: 142-158). 1 and 3 imply that our persistence through time consists in having the same life, a claim I called the biological approach to personal identity. It implies that death--the end of your biological life--does not transform you from a living thing to a dead one, but brings your existence to an end.

It was in exploring the consequences of the biological approach that I spoke of the role of the brainstem. Following van Inwagen (1990: 169-181, 191), I took it to be an empirical fact that

4. There cannot be a human life unless there is a functioning organ of maintenance caught up in that life,

an "organ of maintenance" being something that coordinates and controls the biological activities making up a life. Without some sort of central direction, I thought, those activities cannot be sufficiently integrated to add up to a life, and

there will be no single organism, but at best a collection of living cells. This may not be true for all animals, and certainly not for all organisms, but I thought it was true for human beings. And I thought, again on empirical grounds, that

5. The organ of maintenance in human beings is the brainstem.<sup>1</sup>

(If human beings have nothing like a brainstem during their embryonic stages, let this be restricted to the period when they have got one.) It follows from 4 and 5 that if your brainstem is destroyed, leaving no organ of maintenance, there is no life and thus no organism--or, given 3, anything that ever was an organism.

All these claims are controversial, but I have always had the most confidence in 1 and the least in 5. More generally, I had less faith in each claim than in the previous one. In this paper I will examine 4 and 5.

2.

Rina Tzinman argues that 3, 4, and 5 entail the “brainstem condition”: that a human animal goes where its brainstem goes (201?). Not only can a human animal never exist without a brainstem, as 4 and 5 imply (once again setting aside the embryonic period), but it could never exchange its brainstem for another one. And the continued existence of the brainstem suffices for the animal to survive. Or at least this is so as long as the brainstem continues to direct an organism’s life. (Preserving it in formaldehyde is no good.) If my brainstem were extracted and kept alive like a kidney awaiting transplant, and this did not merely keep its individual cells alive but enabled it to continue directing a life, then the animal would be pared down to the size of a brainstem. The bits left behind, no longer controlled by the brainstem, would cease to be parts of any organism. So we can state the condition along these lines:

If  $x$  is a human animal (not in an embryonic state) at  $t$  and  $y$  exists at  $t^*$ , then  $x=y$  iff the brainstem directing  $x$ ’s life at  $t$  is the brainstem directing  $y$ ’s life at  $t^*$ .

The brainstem condition is less attractive than 3-5. Tzinman questions it by imagining a second brainstem implanted into my head that gradually comes to direct my vital functions alongside the first. The result is not that the two organs divide their labors among themselves like joint authors, but that their activities duplicate each other like the movements of synchronized swimmers. Whenever one brainstem sends an order to the digestive system or the breathing apparatus or what have you, the other simultaneously sends an identical order. Either order by

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<sup>1</sup>Here too I followed van Inwagen. 4 and 5 were widely accepted at the time. The influential President’s Commission of 1981, for instance, stated that the brain is “the complex organizer and regulator of bodily functions” and that “only the brain can direct the entire organism” (quoted in Halevy 2001: 493).

itself would produce the appropriate effect, so that the control of my vital functions is overdetermined.<sup>2</sup> After a time, however, my original brainstem might become less active and gradually wither away like a disused muscle, until the vital functions are directed only by the new brainstem. It seems possible, Tzinman argues, for the animal to survive this. And it seems that I could survive it. There is no apparent reason to suppose that at some point in the process I must die and cease to exist, replaced by a new animal, or that one life comes to an end and a new one starts up in its place. Tzinman infers from this that a human animal could survive without its original brainstem, contrary to the brainstem condition.

The argument looks good to me. Not that it settles the matter: the events described may not be possible; or there may be some unobvious reason why they really would bring the original animal's life to an end. But without being able to produce such a reason, it would seem foolish to have any confidence in the brainstem condition.

Now I never endorsed that condition. I did not mean to imply either that a human animal has to retain its original brainstem or that it could be cut down to brainstem size. I never took the persistence of an animal to consist in the persistence of any particular organ. Why does Tzinman take me nevertheless to be committed to the claim?

Her most interesting argument is that it's little use being told that you have the same animal just if you have the same life without being told when you have the same life. 3 is incomplete and unhelpful without a further claim of the form

Necessarily, if  $x$  is a human life going on at  $t$  and  $y$  is an event going on at  $t^*$ ,  $x=y$   
 iff... $x...t...y...t^*$ --

that is, a "criterion of identity" for human lives. The absence of such a criterion would not mean that 3 was false, or even that it was trivial or uninformative: it would still have the important and disputed implication that an animal cannot exist with no life at all, as a corpse. But it would tell us nothing about what happens to an animal in cases where there is no question of its existing in a nonliving state. It would not help us to work out, for instance, what would happen to a human animal whose cerebrum is transplanted--whether it would go with its cerebrum, stay behind with an empty head, cease to exist, or suffer some other fate. The answer would depend on whether the cerebrum recipient or the empty-headed leftover or anything else existing after the transplant had the biological life of the original organism. But how could we know that without a principle for the identity of lives? Given my claims about the role of the brainstem (4 and 5), the obvious thing to say is that you have the same life, and thus the same animal, when you have the same brainstem. (Let's not worry about whether this would require a criterion of identity

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<sup>2</sup>Van Inwagen imagines a similar case, though without the transplant (1990: 202-204).

for brainstems.)

I gave no criterion of identity for lives because I couldn't find one that looked right. Instead I tried to give a sense of what it is for a life to continue by giving examples, and by making weaker claims such as 4 and 5.<sup>3</sup> Perhaps my position would have been more satisfying had I been able to provide such a criterion. But in order to argue that we are animals, and that our identity through time is therefore a matter of brute biology, I didn't need to say exactly what this brute biology amounts to.

I have never claimed that my account enables us to work out, in every case, when we have a single biological life--or organism or person--and when we have two or more. There are many imaginary cases involving human beings (including some of Tzinman's) where I don't know what to say. And there are real cases involving nonhuman organisms--slime molds, for instance--where I can only shrug my shoulders in silence. (In some cases the number of lives may be indeterminate, though I can't say which those are either.) But ignorance about how many organisms there are in these hard cases need not undermine our knowledge of how many human animals there are in ordinary cases.

In any event, the lack of a precise account of animal identity is no special trouble for animalists, but arises in equal measure for anyone who believes in the existence of animals. The question of what animal identity consists in is entirely independent of whether we are animals. If our inability to give a satisfying answer to that question is a problem, it is not one that we could avoid by rejecting animalism. Animalists would have reason to worry if their case rested on doubtful claims about animal identity. But the argument for animalism is not that our identity conditions appear to be those of animals, but simply that human animals are the best candidates for being ourselves (Olson 2003).

For that matter, no one has ever offered a serious criterion of identity for chairs, cities, stones, atoms, or any other familiar concrete object. That does not seem to prevent us from having a lot of useful knowledge about when chairs, cities, and other objects continue to exist. In offering 3, I was already going out on a limb and saying more than philosophers normally do about persistence conditions.

So I doubt whether we need a criterion of identity for lives so badly that we have to endorse the brainstem condition, even given what I said about the role of the brainstem (4 and 5).

### 3.

As Tzinman observes, I said other things about animal identity that may support the brainstem condition. But never mind: it appears that I was wrong to connect the brainstem with the continuation of a human life in the first place. The neurologist Alan Shewmon argues against 4 and 5 on empirical grounds.

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<sup>3</sup>Here again I followed van Inwagen. Even if these claims are not true (see the next section), they are near enough to the truth to offer some guidance.

First, he says, the brainstem is not the organ of maintenance in human beings-- or not the only one. It does direct basic life-sustaining functions, but other organs do too. The hypothalamus, for instance, controls such autonomic nervous-system activities as temperature regulation and sleep; and the control over vascular tone is not in the brain at all, but in the spinal cord. The brainstem is just one of several organs of maintenance.

More importantly, Shewmon denies that a human biological life needs any sort of central control. Although the brainstem and other organs direct the vital functions and this improves their performance, the functions can go on without that direction. Respiration (in the sense of cells' absorbing oxygen from the blood), immune-system activity, digestion, blood-pressure regulation, wound healing, waste elimination, proportional growth, sexual maturation, maintenance of fluid and electrolyte balance, and (to some extent) temperature regulation have all been observed in "brain-dead" patients with no working brainstem. Spontaneous breathing and heart function are an exception: they do need central control, and are absent in brain death. But they are not essential to life: a fetus lives for nine months in the womb without taking a breath, and patients undergoing coronary-bypass surgery remain alive while the heart and lungs are inactive and the blood is pumped and oxygenated artificially. Shewmon summarizes:

The integrative functions of the brain, important as they are for health and mental activity, are not strictly necessary for, much less constitute, the life of the organism as a whole. Somatic integration is not localized to any single "critical" organ but is a holistic phenomenon involving mutual interactions of all the parts. (2001: 473)

So there can be a human life without an organ of maintenance. It won't be a healthy life, but it's still the life of an animal. The activities required for there to be a living human organism are carried out locally and need no central direction.

I cannot say from the armchair whether Shewmon is right about this. I have to rely on the scientists. But for the most part the scientists seem to accept it.<sup>4</sup>

If Shewmon is right, then some of the things I said about the brainstem are mistaken. I argued that our being animals would make it possible for a future being to be fully psychologically continuous with you without being you on the grounds that one human animal can be psychologically continuous with another (see §1 above). I worried that a whole-brain transplant was the wrong example to use for this purpose, as it might simply reduce an animal to brain size and then replace the lost parts with new ones, effectively transplanting the animal rather than moving an organ from one animal to another (1997: 44-46; see also van Inwagen 1990: 169-181). So I transplanted only the cerebrum and left the brainstem in place. If Shewmon is right, this complication was unnecessary: transplanting even the

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<sup>4</sup>Brugger 2013 summarizes the reception of Shewmon's claims.

whole brain would move an organ from one animal to another. Later (140-142) I conceded that destroying your brainstem and instantly replacing it with a duplicate would end the animal's life, destroying both the animal and you. I tried hard to explain why this was less objectionable than it seemed. According to Shewmon I was wrong to make the concession: destroying the brainstem need not end the animal's life.

So Shewmon's claims look like friendly amendments to what I said, making my account of animal identity simpler and more attractive than I made it out to be.

#### 4.

But are things really so neat? Suppose my brain were removed from my head and provided with the best-possible inorganic life-support machinery. Shewmon appears to have shown that in the right circumstances, the headless remainder would be a living human animal, since a human life does not need central direction. In that case it seems natural to assume that this animal would be me, the organism from which the brain was removed. But what if the detached brain would also be a living organism?<sup>5</sup>

That may seem unlikely. The brain would have none of the organs responsible for the work that keeps the organism alive: such tasks as breathing, circulation, digestion, and waste elimination. The individual cells would function as organisms, and may be organisms, but there would appear to be no larger animal that they compose. Though the brain would issue orders designed to direct an organism's life-sustaining functions, there would be nothing there to obey them.

But I'm not confident about this. What if the detached brain would be an organism? It might mean only that it's possible to create a new organism out of tissues cut away from another. That would hardly be newsworthy. But suppose all that prevents the "brain" organism from being the original animal is the existence of the rival, brainless organism. That is, destroying all of me but my brain and providing that organ with life-support machinery could keep me in existence as a brain-sized animal, just as (according to Shewmon) destroying my brain but keeping the rest of me intact could keep me in existence as a brainless animal. But if both the brain and the brainless remainder were preserved (after being separated), I could hardly survive as both, for the simple reason that one thing cannot be numerically identical with two things. It seems that neither could be me: the procedure would kill me. Removing or transplanting my brain would be a case

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<sup>5</sup>More precisely: What if detaching the brain resulted in a brain-sized organism? The brain itself, which is not an organism before its removal, could hardly become one, unless being an organism, alive or dead, is an accidental and temporary property of things, contrary to 3. It certainly cannot come to be the organism of which it was once a part, because they were then two things, and a thing and another thing cannot come to be a thing and itself. For more on this point see Olson 2006.

of “branching” or “fission”, where all that prevents me from surviving as one of the two resulting beings is the existence of the other. This would be so only if Shewmon is right and a human life needs no central direction by the brainstem: otherwise the brainless candidate would be no organism at all, and so could not be me, no matter what happened to the brain.

Fission cases violate what Harold Noonan (1989: 152, 164) calls “the only  $x$  and  $y$  principle”: that whether an object  $x$  (identified at one time) is an object  $y$  (identified at another time) can depend only on how  $x$  relates (at the one time) to  $y$  (as it is at the other time). It cannot depend on the existence of beings other than  $x$  or  $y$  (except parts of them). Most of us find the only  $x$  and  $y$  principle attractive. I would rather my view of animal identity were consistent with it.

But even if all these worries were well grounded, it would not change the debate very much. For one thing, everyone knows that psychological-continuity accounts of personal identity give rise to fission cases. Removing a cerebral hemisphere--no thought experiment, but a real operation--leaves enough psychological continuity to ensure survival on any such account; and separating the hemispheres and transplanting each into a different head would create the same kind and degree of psychological continuity between the original person and both resulting beings. (In fact this is so even if one hemisphere is transplanted and the other left in place. Most psychological-continuity accounts imply that such an operation would be fatal.) So the fact that the biological approach to personal identity permitted fission would be no reason to reject it in favor of a psychological-continuity view. What’s more, there may be other sorts of fission cases having nothing to do with the brainstem.<sup>6</sup>

In any event, the case for “Shewmonic” fission requires two doubtful assumptions: that both the detached brain and the brainless remainder could be organisms, and that each would be the original organism if the other were absent. I wouldn’t put money on either claim.<sup>7</sup>

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<sup>6</sup>Noonan is one of many who claim that any “bodily” account of personal identity will permit fission unless it is combined with an ontology of temporal parts (1989: 17f., 152, 164-168). For a fascinating discussion of the metaphysics of cell division--an obvious candidate for fission--see van Inwagen 1990: 150f.

<sup>7</sup>I thank Rina Tzinman and Andreas Blank for comments on an earlier version.

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