



Where is my mind?

Mark Rowlands on the vehicles of cognition^{48, 49}

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Abstract

Do our minds extend beyond our brains? In a series of publications, Mark Rowlands has argued that the correct answer to this question is an affirmative one. According to Rowlands, certain types of operations on bodily and worldly structures should be considered to be proper and literal parts of our cognitive and mental processes. In this article, I present and critically evaluate Rowlands' position.

Keywords: extended mind; intentionality; ownership; Rowlands Mark; vehicle externalism.

1. Two Types of Externalism

Perhaps the best known variety of externalism is the *semantic* or *content* externalism. This is the type of externalism associated with the works of Putnam (1975) and Burge (1975). It holds that the contents of some mental states of a subject *S* depend for their individuation on factors external to *S*. Assuming that there are mental states that possess their content essentially, then semantic externalism turns out to be a thesis about the *individuation* of those mental states. And although it can also be understood as a thesis about the *constitution* or *location* of mental states (given certain assumptions about the nature of mental content), typically it is not.⁵⁰ As a thesis about mental or cognitive *states*, semantic externalism does not commit one to an externalist thesis concerning the nature of mental or cognitive *processes*. That is to say, whereas the contents of certain cognitive states might depend on external factors, the cognitive processes that give rise to those cognitive states can

⁴⁸ Please note that sections 4 and 5 of this essay draw heavily upon material found in Elpidorou (2012). And although these two sections ultimately develop, and expand upon, ideas and themes found in Elpidorou (2012), there is still substantial overlap between the two works.

⁴⁹ I am grateful to two anonymous reviewers for their helpful comments and suggestions.

⁵⁰ For further discussion on this issue, see Rowlands (2006) and Rupert (2004).

still be internal: they can still be located inside the head of the subject (or organism) insofar as they can be identical to, or realized exclusively by, brain processes.⁵¹

Semantic externalism can be contrasted with a different type of externalism: *vehicle* externalism. Whereas the former is a thesis (primarily, at least) about the individuation of the content of mental states, the latter is a thesis about the constitution and location of the vehicles of those states. Vehicle externalism, I shall assume, is the thesis according to which mental or cognitive processes may extend beyond the brain. That is, vehicle externalism denies that mental or cognitive processes have to be identical to, or exclusively realized by, brain processes. Instead, certain types of operations on bodily and worldly structures can also be proper parts of mental or cognitive processes. (Henceforth, the expression “cognitive process” will be understood broadly, insofar as “cognitive process” and “mental process” are assumed to be co-referential.)

For over a decade, Rowlands has been arguing in support of vehicle externalism. He has maintained that *some* cognitive processes do not merely depend on external processes, but are *constituted* by them. To be clear, Rowlands’ claim is not that there are *purely* external cognitive processes; nor does he hold that cognitive processes *must* be externally constituted. For Rowlands, external processes (i.e., the manipulation or transformation of information-bearing items that are located outside the boundaries of the brain) only *partly* and *contingently* constitute cognitive processes.⁵² External processes, in other words, can be literal parts of some cognitive processes. In what follows, I present and evaluate Rowlands’ externalist account of the mind.

2. The Evolution of Cognition

Why should we accept vehicle externalism? Rowlands argues that there are evolutionary reasons in its favor (1999: 64-99; 2003: 162-9). Suppose that an organism needs to accomplish a task *T* and that the successful completion of *T* increases the probability of survival of the organism or organisms of that lineage. Suppose fur-

⁵¹ Semantic externalism can also be true even if the phenomenal character of experiences is narrowly individuated. In other words, even if the semantics of a phenomenally conscious state is externally individuated, its phenomenality need not be.

⁵² A process is *external* if the structures that it manipulates, exploits, or transforms lie outside the boundaries of the brain. Difficulties pertaining to how to precisely circumscribe the brain’s boundaries can be sidestepped. There is no need to adjudicate whether glial cells or the spinal cord, for instance, constitute parts of the brain. Rowlands’ objective is unaffected by such adjudication. His aim is to show that processes incorporating structures that *clearly* and *unambiguously* lie outside the boundaries of the brain can partly constitute cognitive processes. Regardless of how liberally one might draw the boundaries of the brain, it is unlikely that muscular compositions or artificial tools, for instance, will turn out to be parts of the brain.

ther that there is a “choice” between two evolutionary strategies in accomplishing *T*: a manipulative and a non-manipulative strategy. The former consists in the manipulation and use of certain environmental structures by the organism. The latter does not – or if it does, it does so to a substantially lesser extent than the manipulative strategy. In the scenario according to which the adopted strategy is a non-manipulative one, evolutionary forces result in the development and maintenance of certain features of the organism that permit it to accomplish *T*. Whereas in the non-manipulative scenario the organism does all or most the work in accomplishing *T*, in the manipulative scenario the environment is used in a way as to do some of the work *for* the organism. Here is an example: suppose that *T* is the task of lifting a weight. A manipulative strategy might involve building a lever, the use of which will allow the organism to perform *T*. A non-manipulative strategy will instead consist in the organism growing stronger so as to be able to lift the weight by itself. Rowlands holds that “strategies that involve the manipulation by organisms of structures in their environment typically (but not necessarily, and perhaps not even always) have a more favorable [evolutionary] cost–benefit analysis than strategies which do not” (1999: 74). Manipulative strategies are thus typically more selectively advantageous than non-manipulative ones. Assuming that (i) the reason why cognitive processes have evolved is to accomplish evolutionarily determined tasks and (ii) cognitive processes have followed the most efficient evolutionary route, then evolutionary considerations provide support for vehicle externalism: evolution favors manipulative strategies in accomplishing cognitive tasks and manipulative strategies give rise to (at least some) cognitive processes that extend beyond the boundaries of the organism.

Although suggestive, the argument is not conclusive. First, it is unclear whether assumptions (i) and (ii) should be granted. Rowlands recognizes this difficulty. In response, he treats the argument as a conditional one: *if* we are correct to assume (i) and (ii), then evolutionary theory can be used as support for vehicle externalism. But skepticism about (i) and (ii) notwithstanding, there are additional problems with the argument. Take a concrete example of a cognitive task, one that recurs in Rowlands’ works, namely, having to transmit a rather lengthy message to your conspecifics (1999: 126ff; 2010: 37–41). Let us assume that such a cognitive task is evolutionarily determined. The non-manipulative strategy for the accomplishment of that task would consist, presumably, in the development and maintenance of at least two abilities: first, the ability to store in one’s own brain a large amount of information; second, the ability to recall and transmit the stored information. The manipulative strategy would take a different path. The organism would develop the capacity to employ certain parts of the environment in order to accomplish the task. In other words, the organism would develop the capacity to offload part of the task onto external structures by developing and employing a system of “language.” External structures will be used in a manner analogous to the way that we use notepads. Once the organism acquires the capacity to store

information in external structures and the capacity to read the information from such structures, there is no need for the organism to remember the whole message.

Which of the two strategies is more evolutionary advantageous? Rowlands' suggestion is that the manipulative strategy is more evolutionarily advantageous (1999: 143; cf. 2010: 41). The non-manipulative strategy would require the development of a memory capable of storing a great amount of information. According to Rowlands, such a development would be, in evolutionary terms, rather costly. As he writes, "an expansion of biological memory capacities would eventually be stymied by considerations of evolutionary cost, energy requirements, etc" (1999: 143). The manipulative strategy would also result in an increased memory capacity. This increase, however, would not be due to the development of an advanced biological memory capacity. Instead, it will be the product of "the development [and use] of external representational systems" (144). The latter way of increasing the memory capacity of an organism is, according to Rowlands, more "economic" (144). Biological capacities are evolutionarily costly. Hence, manipulative strategies, which eschew the expansion of biological capacities, make evolutionary sense.

But consider what is required in performing the task at hand if the manipulative strategy is adopted. The organism must have developed (a) the capacity to code information in external structures and (b) the capacity to extract this information from external structures (i.e., the capacity to perform certain computations that allow it to read the stored information). Capacities (a) and (b) are fairly advanced and only organisms with a certain type of brain are capable of performing them. Indeed, one might argue that *more* biological resources – more neural structures – are needed in order to develop and perform (a) and (b) than to simply store and recall a lengthy message (see Jacob 2002). If that is so, then given Rowlands' own assessment of the evolutionary costs of biological capacities, it would be the manipulative strategy that turns out to be more costly. Suppose that an organism can be thought, for present purposes, to be analogous to a computer. Whereas the non-manipulative strategy would result in a computer with greater storing capacity, the manipulative strategy would give rise to a computer with much less storing capacity but with a better processor. Judging by today's price, it would be cheaper to upgrade memory than processing power.

I do not mean for this objection to be a devastating blow to the evolutionary argument. There are ways around of it. First, Rowlands could insist that there are benefits associated with the manipulative strategy – benefits which I failed to mention – that end up making it more evolutionary advantageous. Second, Rowlands does not hold that *every* single cognitive process has to be extended, nor does he insist that manipulative strategies are always more evolutionarily advantageous than non-manipulative ones. Consequently, he could allow that natural selection did not favor the development of extended remembering and still maintain that evolution has favored (or more strongly: resulted in) the development of other extended cognitive processes. Still, neither of these two responses undermines the main

claim that the objection makes, namely, that the task of determining which strategy is more evolutionarily advantageous is not a trivial one. Evolutionary considerations should thus be used with caution.

The evolutionary argument faces an additional, more serious problem. Suppose that we grant Rowlands that evolutionary considerations favor the development of cognitive processes that include the manipulation of environmental structures. Does that show that evolution has given rise to *extended* cognitive processes? Recall that vehicle externalism is not the thesis according to which cognitive processes involve or even depend upon the use or manipulation of environmental structures. Rather, vehicle externalism holds that cognitive processes are *constituted* by the use of such structures. What Rowlands thus needs is an argument that shows the following: manipulated external structures become proper parts of a cognitive process because the evolutionary costs associated with a strategy accomplishing a cognitive task are reduced by the involvement and manipulation of external structures. But no such argument has been provided. Return to the example of lifting a weight. The fact that the manipulative strategy of lifting the weight is evolutionarily more advantageous than the non-manipulative strategy does not show that the lever should be considered to be a literal part of me. Similarly, why should the use of external structures – even if they make evolutionary sense and have been the products of natural selection – turn them into proper parts of cognitive processes? (see also Adams and Aizawa 2010: 147-50; Rupert 2010: 149-53).

3. Information Processing and Cognition

The success of the evolutionary argument does not determine the success of Rowlands' position. Indeed, in *The Body in Mind*, Rowlands advances a different type of argument in support of vehicle externalism. His argument unfolds in two broad steps. First, he provides a characterization of *cognitive process* in terms of a cognitive task. Specifically, he holds that “[a] process *P* is a cognitive process if and only if (i) *P* is essential to the accomplishing of a cognitive task *T*, and (ii) involves operations on information-bearing structures, where the information carried by such structures is relevant to task *T*” (1999: 102-3).⁵³ Second, Rowlands argues that if we understand cognitive process in this manner, then many cognitive processes will turn out to be extended. Take, for instance, visual perception and, specifically, Gibson's ecological account. The optic array is an external information-bearing structure. Its structure nomically co-varies with features in the environment. As such, it carries information about the environment of the organism. The organism can manipulate the optic array by performing certain actions, such as moving in space or turning its head. In doing so, the organism makes information available to it –

⁵³ Similar definitions of *cognitive process* are also found in Rowlands (2003) and (2006). Here, I put aside the biconditional formulation of Rowlands' characterization of cognitive process and focus instead on the sufficient conditions that he provides.

information that was not available prior to the manipulation of the optic array. The act of making information available is a form of information processing. But since the information that is made available to the organism by manipulating the optic array is essential for accomplishing a perceptual or cognitive task – for instance, in determining the size of an object – we should conclude that the manipulation of the optic array is a cognitive process (see 100-118). Thus, even if visual perception does require internal information-processing operations, the vehicles of perception are not purely internal. Operations on structures in the environment (in this case, the optic array) are also constituents of cognitive or perceptual processes. The lesson that Rowlands invites us to draw is this: once we permit that “the information processing that a perceiving organism achieves extends, in part, outside its skin, then it seems, we have little reason for denying that its cognitive processes extend in the same way” (39).

Rowlands’ argument is, however, open to criticism. Specifically, one might argue that it relies on a characterization of cognitive process that is too permissive. If we accept Rowlands’ characterization, then too many things turn out to be cognitive. But it is not clear, to say the least, that those things should be counted as such. Suppose that I am using an abacus in order to perform an arithmetical operation. The abacus is an information-bearing structure and thus my use of it is a manipulation of an external information-bearing structure that makes information available to me. Since, however, the use of the abacus is essential in the performance of a cognitive task – say, the addition of two numbers – then, assuming Rowland’s characterization of cognitive process, we should conclude that my manipulation of the abacus is a literal part of cognition. If one has doubts whether the use of an abacus meets the conditions that Rowlands provides, one can always run the example with a laptop, calculator, or microscope instead.

Assuming Rowlands’ characterization of a cognitive process, the use of an abacus or calculator should be taken to be a literal part of cognition. But this result turns out to be problematic for Rowlands’ account: it renders his account too liberal. In line with Rowlands (2010: 86), I shall call the objection according to which vehicle externalism is based on a characterization of cognition that is too (i.e., problematically) liberal the “cognitive bloat objection.” Ultimately, the objection holds that the conditions that Rowlands specifies as sufficient conditions for a process *P* to count as cognitive are not sufficient after all. By failing to specify sufficient conditions, Rowlands’ position mistakenly treats causal accompaniments of cognition as constituents of cognition. If Rowlands’ characterization of cognition is accepted, then simply too many items become cognitive. A more stringent account of cognition or cognitive process is needed.

Note that even if Rowlands were to insist that, despite appearances, his conditions are indeed sufficient for rendering a process cognitive, he would still need to provide reasons in support of this contention. That is especially so given that there is a competing view to Rowlands’ extended view which (a) maintains that “typical cognitive processes depend, in surprising and complex ways on the organism’s use of

resources . . . but cognition does not literally extend into the environment” (Rupert 2010: 5); (b) accommodates the empirical findings that Rowlands cites; (c) accounts for the successes of cognitive psychology; and (d) unlike Rowlands’ account, neither postulates new entities as cognitive nor counts as cognitive what, *prima facie*, seems to be non-cognitive. Hence, unless there are substantial reasons that favor Rowlands’ extended view, one could argue that there is little or no motivation to choose his account over the more conservative alternative one. (For an elaboration of this argument, see Rupert 2010.)

4. A Revised Account of Cognition: The Problem of Ownership

In defending vehicle externalism, Rowlands is faced with a choice. He can either provide a more stringent characterization of cognition in the hope of avoiding the cognitive bloat objection, or embrace the conclusion of the cognitive bloat objection but demonstrate that there are benefits in adopting a liberal characterization of cognition. In *The New Science of the Mind*, Rowlands takes the former option and advances an updated and more stringent mark of the cognitive. According to Rowlands’ most recent position, a process *P* is a *cognitive* process if it satisfies the following conditions:

1. *P* involves *information processing* – the manipulation and transformation of information-bearing structures.
2. This information processing has the *proper function of making available* either to the subject or to subsequent processing operations information that was, prior to this processing, unavailable.
3. This information is made available by way of the production, in the subject of *P*, of a *representational state*.
4. *P* is a process that *belongs* to the *subject* of that *representational state* (2010: 110-1).

It is important to note that conditions (1) – (3) are still too permissive. For example, the processes inside my computer involve the manipulation and transformation of information-bearing structures, and such information processing not only has the proper function of making available in me information that was previously unavailable, it actually makes available this information in me by way of the production of a representational state. The same goes for processes that are located inside a network of computers far away from me but which I can access remotely through my smartphone. If conditions (1) – (3) were sufficient, then the processes

of the remotely accessed computers (or at least, the processes that constitute the smartphone and remotely accessed computers system) would count as cognitive. But such a result would again give rise to the problem of cognitive bloat.⁵⁴

In order for Rowlands' updated mark of the cognitive to avoid counting as cognitive processes that should not be counted as such, or at least processes for which we have no good reasons to count as cognitive, he needs more than just conditions (1) – (3). For Rowlands, it is condition (4) (in conjunction, of course, with [1] – [3]) that can adequately and accurately demarcate cognitive from non-cognitive processes. If conditions (1) – (4) constituted, as Rowlands holds that they do, an “adequate and properly motivated mark of the cognition,” then any process that meets conditions (1) – (4) would be correctly counted as cognitive: it would be constitutive and not a mere causal accompaniment of cognition (95). Rowlands' criterion of cognition, if adequate, would then restrict the bounds of cognition so that processes inside computers, calculators, or microscopes would not turn out to be cognitive (in a sense that I explain below). Nonetheless, it would not restrict the bounds too much so as to exclude the use of extended processes from being cognitive.

But how should we understand condition (4)? That is, what does it mean for a subject to *own* a process that meets conditions (1) – (3)? Given the distinction between personal-level processes and subpersonal-level processes, the question or problem of ownership of cognitive processes arises for both types of processes. Regarding subpersonal-level processes, Rowlands suggests that their ownership should be understood in terms of the idea of integration. Specifically, a subpersonal-level process P_{sub} belongs to a subject only if P_{sub} is “appropriately integrated into the subject” and P_{sub} is appropriately integrated only if “it makes some contribution to the personal-level cognitive life of the subject” (151; 147). The proposed understanding of the ownership of subpersonal-level processes requires, however, that we already have an account of ownership for personal-level processes. After all, to evaluate whether a subpersonal-level process makes a contribution to the personal-level cognitive life of a subject, one must already be in position to make sense of the idea that the subject has or owns a cognitive life.

The problem of ownership for subpersonal-level processes thus leads to the problem of ownership for personal-level processes. Rowlands' solution to the latter problem unfolds in three steps. First, he invites us to think of personal-level processes as *activities* that can be subsumed under a “general activity-type” (152).

⁵⁴ Of course, a proponent of vehicle externalism could insist that those processes should be counted as cognitive. As mentioned before, the problem with such a liberal account of cognition is that it needs to be accompanied with a story as to why we should switch from an understanding of cognition that does not count processes inside computers as cognitive to a more liberal one that does. Does the liberal account of cognition accommodate empirical data better than the more conservative account? Or is such a liberal account in agreement with the mandates and practice of cognitive science? Without answers to those questions it is hard to see what the benefits of changing our understanding of cognition might be.

Second, he suggests that we can provide a preliminary solution to the problem of ownership by determining the way in which we can own this general activity-type (151ff.). Finally, he argues that we own this general activity-type when we have *epistemic authority* over it. As a result, a subject owns a personal-level process when the subject has epistemic authority over that process.

It is important to emphasize that this is only Rowlands' preliminary solution to the problem of ownership. As he insists, the idea of epistemic authority is merely symptomatic of a more fundamental feature of cognition – and it is to that feature that we need to turn in order to solve the ownership problem (156ff.; 163-5). Having said that, epistemic authority is still assumed by Rowlands to be “a reasonably reliable accompaniment of personal-level processes that we own” (157). Furthermore, even if the idea of epistemic authority does not provide the final answer to the problem ownership, Rowlands still holds that the idea of epistemic authority suffices to provide a solution to the cognitive bloat objection.

Indeed, assuming that the notion of epistemic authority is a reliable guide to ownership of personal-level processes, Rowlands can deny that processes occurring inside computers or microscopes are *personal*-level cognitive processes. Condition (4) is not met, for we do not have epistemic authority over such processes (155). Nonetheless, the very same processes can turn out to be *subpersonal*-level cognitive process, if a subject subpersonally owns them. All that is required is for those processes to be “appropriately integrated into the subject's (personal-level) psychological life” (155). In effect, Rowlands responds to the cognitive bloat objection by treating it as two separate objections: one applying to subpersonal-level processes and one applying to personal-level processes. In regards to subpersonal-level processes, Rowlands admits that there is cognitive bloat, but such bloat turns out to be innocuous. Processes inside computers, telescopes or smartphones can be subpersonally cognitive, if they are properly integrated into the psychological life of a subject. Yet, their cognitive status should be understood as being “on a par with, for example, the operations that transform the raw primal sketch into the full primal sketch” (155). To admit cognitive bloat of this sort does not amount to saying that “the processes occurring inside telescope, calculator, or computer are cognitive processes on a par with perceiving, remembering, reasoning, and thinking” (155). That would be true only if there was cognitive bloat on the personal-level. But since ownership of personal-level processes is more demanding than ownership of subpersonal-level processes, personal-level cognitive bloat is avoided. Perceiving, remembering, reasoning, and thinking do not occur inside telescopes, calculators, or computers.

A complete evaluation of Rowlands' solution to the problem of cognitive bloat will have to wait until the next section. However, enough has been said to allow me to voice two concerns regarding Rowlands' solution. First, I am not convinced that the idea of epistemic authority does the work that Rowlands wants it to do, i.e.,

that it either reliably picks out personal-level cognitive processes or that it is a reliable accompaniment of such processes. This problem with the idea of epistemic authority, I wish to argue, has consequences for Rowlands' solution to the cognitive bloat problem. Let me explain. Rowlands explicates the notion of epistemic authority with the use of the following example (152-4). Consider the activity of building a home and specifically that of laying bricks. According to Rowlands, one has epistemic authority over the activity of laying bricks when one is "acquainted with the bricks in all relevant and necessary ways" and when one can discern "the characteristics of good mortar" (153). Suppose that when it comes to laying bricks or building a house epistemic authority is indeed a "tolerably reliable indicator" of the ownership of such activities (155). We still need to examine whether epistemic authority over personal-level *cognitive* processes is a reliable indicator of ownership of such processes.

Consider thinking. In the case of bricks or mortar, epistemic authority amounts to knowledge about characteristics of bricks and mortar. But in the case of reasoning, knowing whether a reasoning pattern is valid or invalid, for instance, does not make that pattern of reasoning mine. Furthermore, I can own a thinking process, i.e., I can be its author, even if I do not know whether such a process embodies a reasoning pattern that is valid or invalid. Or consider remembering. What is the epistemic authority that I have over such personal-level cognitive process? Is it knowledge of certain characteristics of the products of such process, i.e. memories? It does not seem likely. Knowledge of memories does not seem to be sufficient in order to render such memories mine. Arguably, I can know plenty about the memories of someone else. Perhaps, epistemic authority over remembering amounts to a more specific kind of knowing: either knowing *how* to recreate imaginatively (aspects of) memories or knowledge *that* memories have a specific phenomenal character when recalled. This proposal fares better, but still it does not seem quite right. The former suggestion appears to be incongruous with what the laying-bricks example suggests epistemic authority to be. In what sense is the ability to recreate in imagination (aspects of) my memories something that deserves the label *epistemic*? In the laying-brick example, epistemic authority amounts to knowledge *that* the bricks have certain characteristics, not to the ability of laying bricks in a certain way. If we take the latter suggestion, then it is worth asking whether it is (logically) possible that a subject *A* might imaginatively recreate (aspects of) memories of a different subject, say, *B*. In other words, is it possible for two subjects to undergo two phenomenally identical experiences? It certainly seems so and if such a case were to take place, we would not claim, I take it, that *A* owns *B*'s process of remembering. I should point out that Rowlands does not hold that having epistemic authority over a process is a sufficient condition for owning that process. Thus, he could allow for the possibility of a subject who has epistemic authority over remembering – insofar as the subject has the ability to imaginatively recreate memories – but who does not own that process of remembering. But even if Rowlands can circumvent this (logical) issue, there is an additional issue that needs to be addressed: if we agree that epistemic authority over

the process of remembering is to be understood in terms of the ability to imaginatively recreate (aspects of) memories, then we need to investigate the extent to which subjects are capable of performing such a task. If it turns out that subjects are typically bad at performing such a task, then it will also turn out that epistemic authority is neither a reliable indicator nor an accompaniment of ownership.⁵⁵

Perhaps a more fruitful way of understanding epistemic authority might be to look at cases in which one lacks epistemic authority. I could only find one instance in which Rowlands is explicit about what a lack of epistemic authority over a process amounts to. He writes: "I am not author of, but hostage to, the processes that, for example, transform the raw primal sketch into the full primal sketch" (155). But even this understanding of epistemic authority needs further refinement. In what sense am I the author of the (personal-level) process of perceiving? Or am I not, at least often, hostage to certain thoughts, emotions, and even decision-making processes? (See, for instance, Miller 1962; Neisser 1967; Latané and Darley 1970; Isen and Levin 1972; Carver et al. 1983; Bargh et al. 1996; Bargh and Ferguson 2000; Fazio 2001; Keizer et al. 2008; and Bargh and Morsella 2009.) Would we, then, discount those thoughts, emotions, and decision-making processes as personal? I think not.

The above considerations can be summarized in the form of a dilemma: either there is a correlation between epistemic authority over a personal-level cognitive processes and ownership of such a process, or there is not. If the former, then certain paradigmatic cognitive processes such as remembering or thinking would no longer be taken to be personal-level cognitive processes. Such a result, however, undermines the value of the notion of epistemic authority. If the latter, then the fact that we lack epistemic authority over processes inside computers or telescopes should not lead us to conclude that such processes are not personal-level cognitive processes. As a consequence, Rowlands' position remains vulnerable to the cognitive bloat objection.

There is potentially an additional problem with Rowlands' proposed solution to the problem of cognitive bloat and specifically with his claim that processes inside computers or telescopes could count as cognitive. Recall that for Rowlands a subpersonal-level process is appropriately integrated only if "it makes some contribution to the personal-level cognitive life of the subject" (147). I think that Rowlands is correct to hold that some kind of integration (i.e., contribution to the personal-level cognitive life of the subject) is sufficient for rendering a subpersonal-level process cognitive. Still, it is important not to lose sight of the fact that integration

⁵⁵ One might suggest that epistemic authority over the processes of remembering or thinking amounts to knowledge that either the processes themselves, or the products of such processes, are mine. But this does not help. Epistemic authority over a process P_{per} cannot just be knowledge of the fact that P_{per} belongs to me, nor can it be knowledge of the fact that the products of P_{per} belong to me. The claim that a process P_{per} (or a product of P_{per}) is mine if I know that P_{per} (or a product of P_{per}) is mine, does not solve the problem of ownership. It only postpones it.

comes in degrees. That is to say, although some kind of integration might be sufficient for rendering a process subpersonally cognitive, another kind of integration might not.

Recently there has been great success in the implementation and use of neural interface systems for restoring mobility for people with long-standing paralysis (see, e.g., Donoghue 2008; Gilja et al. 2011; Schwartz et al. 2006; and Green & Kalaska 2011). After having been implanted with a device that could record and transmit neural firing patterns, subjects were able to perform certain types of movements. In a remarkable case, a subject suffering from a long-standing tetraplegia was able to move and control a robotic arm just by willing to move the robotic arm (Hochberg et al. 2012). In this case, it seems that the processes of the device that records and transmits the relevant neural firing patterns should be counted as cognitive and that is precisely for the reasons that Rowlands advances: the processes are appropriately integrated in the cognitive life of the subject for they allow the subject to perform certain movements or tasks.

Now, contrast the provided example with Rowlands' example of processes located inside computers or telescopes. What I would like to suggest is that in the case of neural interface systems, the implanted device that facilitates the movement of a robotic arm is integrated in the cognitive life of the organism to a greater extent than processes located inside telescopes or computers – but not because one is located intracranially whereas the other is not. The implanted device needs to be calibrated to the subject. That is, there is a necessary and often long training phase during which the device records the neural firing patterns of the subject in order to be able to translate them into control signals. The implanted device is hence subject-specific. And by being subject-specific, the device can be said, in a rather meaningful sense, to belong to the subject. There does not seem to be an equivalent training phase for computers or telescopes – there might a phase during which one learns how to use a computer or a telescope, but not a phase during which the computer or telescope becomes calibrated to the subject. That is corroborated by the fact that different computers or different telescopes can be treated, for certain purposes, as interchangeable. I can check my email, for example, on all sorts of computers, but I cannot use all kinds of neural interface systems (cf. Sterelny 2010: 475-477).

My point here is not that Rowlands is mistaken in thinking that processes inside computers could turn out to be cognitive if certain conditions are met. Rather, what I wish to point out is that the conditions for ownership of subpersonal-level cognitive processes demand better articulation. Given that there can be substantial differences in the way in which two processes can be integrated in the psychological life of a subject, the concept of *integration* needs to be further delineated. Specifically, how much integration is enough integration to make a process subpersonally cognitive? The absence of such an articulation may invite proponents of vehicle externalism to deny the cognitive status of processes inside computers or telescopes. In fact, they might hold that such processes are integrated but not

enough. That is to say, they are not integrated to the extent to which implanted neural interface devices are integrated in the psychological life of the subject. Consequently, they should not be counted as cognitive

5. Intentionality as Revealing Activity

The notion of epistemic authority is used by Rowlands only to provide a preliminary solution to the problem of ownership when it comes to personal-level process. As Rowlands makes clear, epistemic authority is not a criterion for personal-level ownership. And although it is a “reasonably reliable accompaniment of personal-level processes that we own,” epistemic authority is symptomatic of something more basic or fundamental (2010: 157). Indeed, the core of idea of ownership is to be found in the idea of revelation or disclosure:

The idea of revelation or disclosure supplies the ultimate basis for our ownership of cognitive processes. There is no such thing as revelation or disclosure in itself. Disclosure is always disclosure to someone or some thing. Personal-level disclosure is disclosure to someone; subpersonal disclosure is disclosure to something (163).

Furthermore, cognition, Rowlands tells us, is a revealing or a disclosing activity because it is intentional. Hence, in order to fully understand and solve the problem of ownership, we need to understand intentionality. In fact, the task of delineating the nature of intentionality carries for Rowlands a double significance. First, it should provide us with an understanding of ownership more fundamental than that provided by the idea of epistemic authority. Second, it should demonstrate the truth of vehicle externalism. As Rowlands writes, “the ideas that cognitive processes should be embodied and extended are utterly quotidian – practically banal implications of a proper understanding of intentionality” (164).

What is thus the proper understanding of intentionality? It is helpful to first consider the nature of our experiences. According to Rowlands, experiences “are not just items *of* which we are aware;” they are also “items *in virtue* of which we are aware, both of non-mental objects and their properties and also of other experiences” (169). Experiences, in other words, “are not just object of awareness, but also *acts*” (169). But insofar as experiences are also items in virtue of which we are aware of something, then there will always be something of which we are not aware – something that cannot be turned into an object *of* experience. (Indeed, even if we were to turn the items in virtue of which we are aware of something into an object *of* awareness – that is, even if we were to turn the act of experience into an object of experience – the very attempt to do so would require a new act.)

Rowlands argues that a similar conclusion applies to the idea of mode of presentation – as this is found in the standard account of intentionality according to which intentionality has a threefold structure: act, object, and mode of presentation. Rowlands' view is that a mode of presentation can be understood both as that of which we are aware and as that in virtue of which we are aware (183ff.). Of these two ways of understanding a mode of presentation, it is the latter that captures the essence of intentionality: intentionality is best understood as that in virtue of which we are made aware of objects or as a type of revelation or disclosure. Insofar as experiences and cognition are intentional, they are types of revelation or disclosure; but insofar as “disclosing is, in general, indifferent to its location,” cognitive and perceptual processes are extended (187).

What are the consequences of Rowlands' argument, assuming it to be sound? That is, suppose that we grant that (a) the transcendental conditions of cognition are not items of which we are aware, (b) these conditions constitute a form of disclosing or revealing, and (c) theoretically and abstractly speaking, disclosing is location-independent insofar as its vehicles are location-independent. Having assumed all of that, have we shown that cognition extends? Yes, but in a sense which will be granted by a good deal of opponents of vehicle externalism. That is because what we have shown is the *possibility* of extended cognition. Nonetheless, the debate surrounding vehicle externalism is primarily a debate about whether cognition is *actually* extended or embodied. After all, if what we were after were the conclusion that it is possible that cognition is extended, then the truth of the thesis of functionalism would have sufficed in establishing such a conclusion. Hence, what Rowlands needs to demonstrate is that some of the aspects of intentionality in virtue of which things are disclosed to us are located (at least, partly) outside the boundaries of the brain. Or since the kind of disclosure relevant to the vehicles of cognition is causal and not constitutive (191-196), Rowlands needs to show that the “causal disclosure of the world does not take place purely inside the head of a subject” (195).

Rowlands does provide examples of what he takes to be extended vehicles of cognition: the cane of a blind person (196-198), saccadic eye movements (202-203), the activities involved in the identification of sensorimotor contingencies (204-205), and the manipulation of the optic array (205-206). According to Rowlands, these examples count as extended vehicles of cognition because they are external and causally disclose the world to the subject. But just as with the notion of integration, I suspect that skeptics of vehicle externalism will find the notion of causal disclosure to be in need of further articulation. It seems unlikely that every entity that causally contributes to the disclosure of a personal-level state is an entity *in virtue of which* things are disclosed to us. If causal disclosure is understood so broadly, then, arguably, the sun would have to be considered as a vehicle of cognition. Rowlands, I think, needs to restrict causal disclosure to entities that meet certain conditions. This requirement, however, ultimately takes us back to the search for an adequate mark of the cognitive. But the crucial condition of Rowlands' own mark

of the cognitive, i.e., condition (4), does not seem to be of help: either ownership is understood derivatively in terms of epistemic authority, or it is understood as a feature of disclosure (214-217). If the former, then, as I suggested in the previous section, it is unclear to what the relationship between epistemic authority and ownership amounts. If the latter, then the notion of ownership is unhelpful in demarcating the relevant causal contributions from the irrelevant, for ownership is itself given in terms of causal disclosure. As Rowlands himself states, “[a]t the personal level, a cognitive process is mine when it causally discloses the world to me” (216). The notion of ownership, if understood in terms of causal disclosure, cannot be used to explicate causal disclosure. Thus, neither solution to the problem of ownership seems to yield a criterion of cognition which is accurate, properly motivated, and that shows that cognitive processes are extended. To be more precise, neither solution to the problem of ownership as presented in Rowlands (2010) secures vehicle externalism. Of course, that is not to say that a future articulation of ownership will not succeed in establishing Rowlands’ desired conclusion. Given the writings of Rowlands so far, one can expect that such an attempt to vindicate vehicle externalism is forthcoming.

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