

Cognitive Extension: The Parity Argument, Functionalism, and the Mark of the Cognitive*

Abstract: During the past decade, the so-called ‘hypothesis of cognitive extension’, according to which the material vehicles of some cognitive processes are spatially distributed over the brain and the extracranial parts of the body and the world, has received lots of attention, both favourable and unfavourable. The debate has largely focussed on three related issues: (1) the role of parity considerations, (2) the role of functionalism, and (3) the importance of a mark of the cognitive. This paper critically assesses these issues and their interconnections.

Section 1 provides a brief introduction. Section 2 argues that some of the most prominent objections against the appeal to parity considerations fail. Section 3 shows that such considerations are nevertheless unsuitable as an argument for cognitive extension. First, the actual argumentative burden is carried by an underlying commitment to functionalism, not by the parity considerations themselves. Second, in the absence of an independently motivated mark of the cognitive, the argument based on parity considerations does not get off the ground, but given such a mark, it is superfluous. Section 4 argues that a similar dilemma arises for the attempt to defend cognitive extension by a general appeal to functionalism. Unless it can be independently settled what it is for a process to be cognitive, functionalism itself will be undermined by the possibility of cognitive extension. Like parity considerations, functionalism is thus either unable to support cognitive extension or superfluous. Hence, nothing short of the specification of an appropriate mark of the cognitive that can be fulfilled not only by intracranial but also by extended processes will do as an argument for cognitive extension.

Key Words: extended mind, extended cognition, functionalism, parity principle, mark of the cognitive, cognition

According to classical cognitivism, cognitive processes are computations over internal symbolic or subsymbolic representations. Such an approach naturally yields what Susan Hurley [1998] dubbed the ‘sandwich model of cognition’: cognition as the intracranial filling between the buns of perceptual input from and behavioural output to the world. Andy Clark and David Chalmers [1998] suggested the radical and by now famous alternative that the material vehicles of some cognitive processes are spatially distributed over the brain and the extracranial parts of the body and the world. Such cognitive extension occurs, for instance, if

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we regularly rely on external devices like pens and paper, notebooks, laptops, PDAs, or iPhones for solving a cognitive task (see, e.g., Clark [2003, 2008]). The case for cognitive extension is often made by appeal to the ‘Parity Principle’ (PP), according to which an extended process is cognitive if it is functionally equivalent to an intracranial cognitive process:

PP: If, as we confront some task, a part of the world functions as a process which, were it done in the head, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is part of the cognitive process. [Clark and Chalmers 1998: 8]

Clark and Chalmers’ hypothesis of cognitive extension has sparked a heated debate which has concentrated on three related issues: (1) the role of parity considerations, (2) the role of functionalism, and (3) the importance of a so-called ‘mark of the cognitive’.

Opinions on these matters diverge widely. While Mike Wheeler [MS: ch. 5] thinks PP provides the only viable basis for cognitive extension, Clark denigrates it to a mere ‘rule of thumb’ designed to prevent ‘biochauvinistic prejudice’ [2008: 77], and its critics deny that it plays any substantial argumentative role at all. Similarly, while Clark [2008: 88] points out that the original Clark and Chalmers argument is best viewed as an argumentative extension of functionalism and Wheeler [in press] and Mark Sprevak [forthcoming] maintain that functionalism entails cognitive extension,¹ Larry Shapiro [2008] and Robert Rupert [2004, 2009] argue that functionalism is at best inconclusive and at worse at odds with cognitive extension. Lastly, while Adams and Aizawa [2001, 2008] argue that a proper defence of

¹ While Wheeler thinks functionalism thus supports cognitive extension, Sprevak thinks the fact that it entails cognitive extension amounts to a reductio of functionalism (see section 4).

cognitive extension requires providing a mark of the cognitive according to which cognitive processes actually are extended but deny that there is any plausible candidate for such a mark,² Clark [2008, forthcoming] thinks a mark of the cognitive is neither available (according to him cognitive processes form a motley heterogeneous lot) nor required, whereas Wheeler [forthcoming, MS] contends that a 'locationally uncommitted account of the cognitive' must and can be provided. The situation, it seems, is rather muddled.

This paper critically assesses these issues and their interconnections. After some initial stage setting in section 1, section 2 argues that some prominent objections against PP fail. Section 3 shows that there are two reasons why PP is nevertheless unsuitable as an argument for cognitive extension. First, the argumentative burden is carried by a general commitment to functionalism that underlies PP, not by PP itself. Second, in the absence of an independently motivated mark of the cognitive, PP does not support cognitive extension, but given such a mark, it is superfluous. Section 4 argues that a similar dilemma arises for the attempt to defend cognitive extension by a general appeal to functionalism. Unless it can be independently settled what it is for a process to be cognitive, functionalism itself will be undermined by the possibility of cognitive extension. Like PP, functionalism is thus either unable to support cognitive extension or superfluous. Nothing short of an appropriate mark of the cognitive that can be fulfilled not only by intracranial but also by extended processes will do as an argument for cognitive extension.

² The only plausible mark of the cognitive, Adams and Aizawa maintain, is that cognitive processes are implemented by special 'kinds of mechanisms that operate on non-derived representations' [2008: 12–13]. But since both occur (currently at least) only in nervous systems, there is 'defeasible reason to suppose that cognitive processes are typically brain bound and do not extend' [2008: 70].

1. The Parity Argument

Clark and Chalmers [1989] motivate cognitive extension by means of two thought experiments involving different ways of playing the computer game Tetris and different ways of having dispositional beliefs about the location of New York's Museum of Modern Art.

There are several ways to determine whether a falling Tetris block fits a socket in the bottom lines: (1) rotate the block's image mentally; (2) rotate the block's image physically on the screen by pressing a rotate button, which is faster than the mental rotation in (1); (3) rotate the block's image mentally, but by means of a (conceivable) neural implant that renders the mental rotation as fast as the physical rotation in (2). Since the mental rotation in (1) is undoubtedly cognitive, the mental rotation in (3) is cognitive, too: there is no reason why the implant should render the rotation process non-cognitive. But if the mental rotation in (3) is cognitive, then why should the physical rotation in (2) not be cognitive? After all, 'case (2) with the rotation button displays the same sort of computational structure as case (3)' [Clark and Chalmers 1998: 7]. Clark and Chalmers' point is that the processes in (2) and (3) are functionally equivalent: Suppose the neural implant in (3) is triggered by the same sensory motor cortex activity that triggers the bodily movement in (2) and produces, via visual cortex activity, the same mental image as does looking at the screen in (2). If computational structure or function determines whether a process is cognitive, (2) is not fundamentally different from (3) merely because it involves an extended process.

Inga is a normal human believer who hears about a new art exhibition at the MoMa, recalls that the MoMa is on 53rd street and heads off. Otto, in contrast, is suffering from Alzheimer's disease and relies on a notebook in which he records information he thinks he will later need to remember. Upon deciding to want to see the exhibition, Otto consults his notebook, finds out that the MoMa is on 53rd street and heads off, too. If certain conditions are met—if the notebook is a constant in Otto's life, if its information is directly available to

him without difficulty, if, upon retrieving its information, he automatically endorses it, and if its information has been consciously endorsed at some point in the past—then the ‘information in the notebook functions just like the information constituting an ordinary non-occurrent belief’ [Clark and Chalmers 1998: 13; emphasis AUTHOR], and hence should be counted as (the material realiser of) Otto’s dispositional belief about MoMa’s location.

What warrants treating case (2) and the Otto-cum-notebook system as instances of cognitive extension seems to be the sort of ‘equal treatment policy’ captured by PP: If an extended process functions like an intracranial process which we would deem to be cognitive, then the extended process is cognitive, too. By insisting on an equal treatment of functionally equivalent intracranial and extended processes, PP warrants the claim that Otto’s notebook and the physical rotation in (2) are cognitive just in case Inga’s biomemory and the mental rotations in (1) and (3) are cognitive. This is what may be called the ‘parity argument’ for cognitive extension. Section 2 shows why some prominent objections against this argument fail. Section 3 then argues that, nonetheless, the parity argument is unable to establish cognitive extension.

2. The Parity Argument: Objections and Replies

What the discussion in section 1 reveals is that PP seems to be intended as an argument for cognitive extension. It is the fact that Otto’s notebook entries and Inga’s biomemory are functionally equivalent with regard behaviour, language production etc. that licenses the claim that ‘beliefs can be constituted partly by features of the environment’ [Clark and Chalmers 1998: 11]. Similarly, it is the fact that manually rotating the tiles on the screen and rotating them mentally are functionally equivalent with regard to successful performance of Tetris that allows us to treat ‘the standard players’ epistemic use of the external rotate button, the near future agent’s use of a cyberpunk implant, and the Martian player’s use of native

endowment as all on a cognitive par' [Clark 2008: 78]. And while Clark himself has recently attempted to denigrate PP to an 'informal test' [Clark forthcoming: 19], a mere 'call for sameness of opportunity' [Clark 2008: 115],³ Wheeler explicitly insists that 'the parity principle provides the only viable basis' [MS: ch. 5, 2] for cognitive extension.

Critics, however, have argued (1) that for the advocate of cognitive extension the appeal to PP borders on incoherence, (2) that PP is not even applicable in many alleged cases of cognitive extension, and (3) that PP, even if intelligible and applicable, often yields the wrong result because intracranial and extended process fail to be functionally equivalent.

(1). Ezequiel Di Paolo has recently argued that it is nonsense for someone who is already convinced that a process' location is irrelevant for its status as cognitive to appeal to PP. When someone who denies that the boundary of the brain marks an important cut-off point appeals to PP in order to determine whether a particular process is cognitive, Di Paolo argues, she finds the following 'schizophrenic piece of advice: "Even though you know that you should not rely on the skull boundary in order to call process X cognitive, you must still use it to check whether it would have still made sense to those confused people who did not take ... [cognitive extension] seriously and consider how they would have judged process X were it to happen in the head"' [2009: 11].

However, the fact that the advocate of cognitive extension appeals to PP to support her hypothesis that extended process can be cognitive does not entail that she is relying on PP when determining in a particular case whether a given extended process is cognitive. What is true is that someone who is convinced that a process' location is irrelevant for its status as cognitive cannot take PP to provide something like a real definition of what it is for a process to be cognitive. But that is not what the advocate of cognitive extension who appeals to PP attempts to do. Rather, PP is an extensionally sufficient, and maybe even necessary, condition

³ Section 3 shows that this is wrong.

for a process' being cognitive. As such, it may serve as a valuable guide to the proper extension of the term 'cognitive process'—even for someone who is convinced that the boundary of the brain marks no important difference. The purpose of PP is not to reveal the real essence of a process' being cognitive, but heuristic: When determining in controversial cases whether a process is cognitive, compare it, qua functional role, with uncontroversial instances—which, as a contingent but irrelevant matter of fact, usually happen to be intracranial. There is nothing schizophrenic about this.⁴

(2). Rupert has recently argued that in some allegedly paradigmatic cases of cognitive extension—for instance Wheeler's [2005] example of a robot which uses a lighted triangle on a wall to effect navigation or Alva Noë's [2004] enactive approach to visual perception—PP is inapplicable or fails to deliver a clear verdict because the meaning of the counterfactual 'If this process were to occur in the head, would we consider it to be cognitive?' is obscure:

⁴ Suppose a biologist discovers a worm in Lake Victoria, Africa, which resembles in all important respects the members of the species Baikalobia guttata that is supposedly found only in Lake Baikal, Siberia. Faced with the objection that since the worm was found in Africa, not in Siberia, it cannot possibly be a Baikalobia guttata, the biologist may say without a palpable sense of incoherence: 'Had we found it in Lake Baikal, we would not have hesitated to conclude that it is a Baikalobia guttata'. The fact that she is already convinced that the place where the worm was found is irrelevant as far as its classification is concerned does not render the advice schizophrenic. It is simply that features that are inessential as far as the real nature of the members of a kind are concerned can, if they happen to be prevalent in uncontroversial instances, serve as a reliable guide to the correct classification of controversial instances.

[W]hat are we to imagine is taking place inside a person's (or robot's) head? Is it the interaction between the robot and the mounted, lighted triangle? Are the walls of the room in the head? ... An actual lightbulb or LED? Such problems worsen when we turn to ongoing perceptual interaction with a large object, such as a building. Are we supposed to ask what would happen if a large building were in someone's head and the surface of the building were emitting photons that stimulate the subject's retinae? ... And how can a building be in a person's head without causing the person's death? And so on. [Rupert 2009: 31]⁵

Of course, the charge that the case for cognitive extension cannot always be made by appeal to PP because PP may sometimes not be unambiguously applicable would still be compatible with the claim that PP is sufficient to establish cognitive extension in those cases where it is applicable, but it would nevertheless seriously limit the scope of the parity argument.

To see what is wrong with this objection consider again the Tetris example. When assessing the cognitive status of the physical rotation process in (2), we are not supposed to ask what would happen if the subject's brain contained a button and an index finger and visual stimulation from the retina triggered the intracranial index finger to press the intracranial button, thereby producing a rotated mental image of the tile. We are not supposed, that is, to imagine the material details of the process being moved into the subject's brain. PP is a decidedly functionalist principle. PP asks whether an extended process functions in such a way that, were it intracranial, we would have no hesitation in recognizing it as cognitive. What matters is the 'achieved functional poise' [Clark 2008: 88] of a process,

⁵ Note that similar questions could be asked in the familiar case of Otto: Are we supposed to ask what would happen if a notebook were in Otto's head and the entries were, when Otto tries to remember the location of the MoMa, emitting photons that stimulate his retinae?

‘the way it poises ... information for a certain kind of use within a specific kind of problem-solving routine’ [ibid.: 87]. What we are therefore supposed to imagine is a process that, although maybe materially different, ‘displays the same sort of computational structure’, as Clark and Chalmers put it. That we cannot sensibly imagine the material details of a process being moved into a subject’s brain is entirely irrelevant.

(3). A frequently heard criticism is that PP will often yield the wrong result because intracranial and extended processes turn out to be functionally different. Daniel Weiskopf [2008], for instance, argues that alleged cases of extended beliefs like the states of the Otto-cum-notebook system do not count as beliefs properly so called because they lack a crucial feature—they are amendable to rapid, automatic, and unconscious informational integration with already existing beliefs: ‘Beliefs are, as I will say, normally informationally integrated with, and updated in concert with, other beliefs But most externally located mental states do not share this feature. So ... they cannot be beliefs’ [Weiskopf 2008: 268]. In a similar vein, Rupert [2004] and Adams and Aizawa [2001, 2008] have argued that alleged cases of extended memories are not memories properly so called because they neither exhibit negative transfer [Rupert 2004: 413], nor recency, primacy, or chunking effects [Adams and Aizawa 2001: 91, 2008: 61].⁶

A well-known rejoinder on behalf of the advocate of cognitive extension is that the differences between intracranial and extended processes affect only their fine-grained functional role, while the sort of functional equivalence that matters for the parity argument is assessed at a relatively coarse-grained level [e.g., Clark 2008; Sprevak forthcoming; Wheeler

⁶ Sam Coleman [MS] argues that Clark and Chalmers’ Tetris example faces a similar difficulty because the imagination process in (1) differs functionally from the visualization process in (2).

forthcoming].⁷ As Clark puts it: ‘It is the coarse or common-sense functional role that ... displays what is essential to the mental state’ [2008: 89], and to ‘demand identity of fine-grained causal role is surely to set the cognitive bar too high’ [2008: 93].

In response, Rupert [2004, 2008] has pointed out that coarse-grained functional equivalences between intracranial and extended processes are insufficient for the sort of parity required by the parity argument. A coarse-grained individuation, he argues, does not yield the generic cognitive kinds that are the only interesting or useful kinds for practicing cognitive scientists (Adams and Aizawa [2008] make a similar response). However, suppose tomorrow a subject is discovered that when subjected to standard psychological memory tests does not exhibit negative transfer, recency, primacy, or chunking effects.⁸ The proper response on behalf of practicing cognitive scientists would obviously be to say ‘What an amazing and unusual kind of memory!’ and not ‘What an amazing and unusual performance that far exceeds our own mnemonic capacities—and that without any memory at all!’ It is thus plausible to assume that cognitive processes need not be individuated so finely that the differences between the Otto-cum-notebook system and Inga’s biomemory or between the physical rotation in (2) and the mental rotations in (1) and (3) inevitably lead to substantially different cognitive kinds.

⁷ AUTHOR [2010] argues that Weiskopf’s version of this objection succumbs to an additional problem: it is just not true that newly acquired beliefs are typically amendable to rapid, automatic, and unconscious informational integration with already existing beliefs.

⁸ One need not even resort to fancy Martian’s to make this point (a methodology explicitly eschewed by Rupert [2009]): consider the mnemonic skills of acquired or autistic savants like Orlando Serrell, Kim Peek, or, most famously perhaps, Solomon Schereschewski (described by Luria [1968]).

Some of the most prominent objections against the parity argument are thus far from cogent. Section 3 argues that the argument nonetheless fails.

3. PP, Functionalism, Equal Treatment, and the Mark of the Cognitive

There are two reasons why the parity argument is useless as an argument for cognitive extension. (1) As some of the responses to the objections discussed in section 2 have already indicated, the argumentative work is done not by PP itself but by the implicit functionalist commitments incurred by proponents of PP. (2) The parity argument faces a dilemma: absent an independently motivated mark of the cognitive, it does not get off the ground, but given such a mark, it is superfluous.

(1) The parity argument presupposes functionalism. The problem with PP is not that it is incoherent, not applicable to some allegedly paradigmatic cases or that its application yields the wrong result. The problem is that all the argumentative burden is carried by the assumption that cognitive processes must be individuated functionally. The Otto and Inga example, for instance, is suggestive because we assume that having a dispositional belief is a property of a system which is fully exhausted by that system's overall functional organization. We assume, that is, a functionalist approach to the cognitive, and we assume that brain-based approaches like the one offered by Adams and Aizawa (see note 2) are wrong. PP is just a trivial consequence of these assumptions: if cognitive processes are individuated functionally, then the extended process in the Otto-cum-notebook system and the intracranial process in Inga's biomemory are of course on a par qua cognitive process, if they are functionally equivalent.

That PP alone cannot establish cognitive extension is evident from its conditional form. What PP says is that if an extended process is functionally equivalent to an intracranial cognitive process, then the extended process is cognitive, too. PP is silent, however, both

about the conditions under which we would grant that an extended process functions in such a way that, were it an intracranial process, we would take it to be cognitive, and about whether these conditions are ever fulfilled. That crucial part of the argument is established by a commitment to functionalism and by a specification of the correct level of grain at which functional equivalence has to be assessed.

The problem with the parity argument is thus that it creates the impression that the case for cognitive extension hinges only upon the equal treatment policy expressed by PP—that a process' location is irrelevant for its status as cognitive—whereas it is in fact a functionalist conception of cognitive states that does the crucial argumentative work. Without it, PP cannot make a case for cognitive extension, but with it, PP is trivial. To suggest that arguments like those reviewed in section 1 are parity arguments is thus a red herring. They are, at root, functionalist arguments. Section 4 will consider the tenability of such arguments. Before that, however, let us consider another problem with the parity argument that has to do with the often heard claim that PP is nothing but a 'veil of metabolic ignorance' [Clark 2008: 114] whose sole purpose is to remind us that '[e]xtended processes should not have to meet a higher standard merely because they are extended' [Sprevak forthcoming: 3].

(2) The parity argument presupposes a mark of the cognitive. Characterizing PP as the innocent expression of the equal treatment policy, as Clark recently did, suggests that its adoption should be uncontroversial and not illegitimately biased against brain-bound approaches to cognition. In fact, PP is a very tendentious expression of the equal treatment policy.

As Wheeler [forthcoming: 20] points out, if the slogan is merely 'equal treatment regardless of location', then it is also true that an extended process that we take to be non-

cognitive does not become cognitive purely in virtue of being shifted inside the brain.⁹ This suggests the following alternative expression of the equal treatment policy:

PP': If, as we confront some task, a part of the head functions as a process which, were it done in the world, we would have no hesitation in rejecting as part of the cognitive process, then that part of the head is not part of the cognitive process.

Here are two more:

PP'': If, as we confront some task, a part of the world functions as a process which, were it done in the head, we would have no hesitation in rejecting as part of the cognitive process, then that part of the world is not part of the cognitive process.

PP''': If, as we confront some task, a part of the head functions as a process which, were it done in the world, we would have no hesitation in recognizing as part of the cognitive process, then that part of the head is part of the cognitive process.

Each of these principles expresses the equal treatment policy. They all say that if an intracranial and an extended process are functionally equivalent, then they are either both cognitive or both non-cognitive. However, these principles differ substantially in the intuitive support they lend to the idea of cognitive extension.

⁹ The following argument was prompted by Wheeler's [forthcoming, MS] discussion of Sprevak [forthcoming], in the course of which Wheeler makes the remark just mentioned. I later discovered that a similar point is made by Coleman [MS].

PP is the by far extension-friendliest principle. When applied to the Otto-cum-notebook system and the physical rotation in (2), PP suggests that the extended processes are cognitive because they are functionally equivalent to Inga's biomemory and to the mental rotations in (1) and (3), which we implicitly take to be cognitive. In contrast, had Clark and Chalmers used PP'' or PP''', no argument for cognitive extension would have been forthcoming. PP'' says we should not deem an extended process cognitive if we would not consider its intracranial counterpart to be cognitive. Given that, say, cell division in the brain is not (on its own) a cognitive process, PP'' entails that when it happens outside of the brain it is not a cognitive process either. This is true, but not very interesting. PP''' is also hardly of any help. If one were already prepared to accept Otto-cum-notebook processes as cognitive, then one could use PP''' to argue that a functionally equivalent intracranial process is cognitive, too. But that is obviously not what the advocate of cognitive extension needs.

Things are even worse with PP' according to which an intracranial functional equivalent of an extended non-cognitive process is also non-cognitive. Consider Otto and Inga again. Since we would not ordinarily count the Otto-cum-notebook processes as cognitive (unless we are already biased towards cognitive extension), application of PP' yields the result that their intracranial functional equivalent, viz., the biomemory processes of Inga, are not cognitive either (likewise for the Tetris example)—hardly the kind of conclusion one wants to end up with.

This shows three things that together throw considerable doubt upon the prospects of parity considerations as an independent argument for cognitive extension. (i) PP is far more biased than is usually assumed. (ii) Unless there is a way of singling out PP as the only viable expression of the equal treatment policy, the parity argument will beg the question. (iii) If no independently motivated mark of the cognitive is provided, parity considerations do not yield any interesting results, if such a mark is provided, they are superfluous.

(i). Pace Clark's recent allegations, PP is not merely an innocent call for fairness. PP is tendentious. All four principles concern functional equivalences between an actual process the cognitive status of which is at issue and a counterfactual process with which the actual process is compared qua functional role. Expressions of the equal treatment policy can thus vary along two dimensions. First, the counterfactual process may either be intracranial (PP and PP'') or extended (PP' and PP'''). Second, it may either be cognitive (PP and PP''') or non-cognitive (PP' and PP''). PP' and PP''' show that no case for cognitive extension is made if the counterfactual process is extended. Moreover, PP'' shows that no case for cognitive extension is made if the counterfactual process is non-cognitive. Hence, all four principles express the equal treatment policy, but only PP intuitively supports cognitive extension. PP is thus far more than an 'innocent veil of ignorance'.

The following two points go directly against the viability of parity considerations as an argument for cognitive extension.

(ii). Given what has just been said, motivating PP requires more than pointing out that it expresses the equal treatment policy. One must also show why PP is preferable to PP', PP'' and PP'''. As far as I know, advocates of the parity argument have yet to address this issue. But unless there is a convincing reason for why PP, and only PP, is a viable expression of the equal treatment policy,¹⁰ the parity argument begs the question in the following sense: it picks, without further argument, the only expression of the equal treatment policy which, when applied to cases like the Otto and Inga example or the Tetris example, yields the desired pro-extension conclusion, and it ignores alternatives which yield either neutral or anti-extension conclusions.

¹⁰ Needless to say, that reason may not itself be biased in favour of cognitive extension.

(iii.) Most importantly, in the absence of a mark of the cognitive, we will not know whether PP is applicable in a particular case. PP says that if we would not hesitate to deem an extended process cognitive were it an intracranial process, then the fact that it is extended should not make us deem it non-cognitive. What we still need to know, however, is when, i.e., under which conditions, we would consider the counterfactual internal process to be cognitive. Of course, since it is obvious that Inga's biomemory processes are cognitive, the functionalist approach to the cognitive that underlies PP entails that the functionally equivalent Otto-cum-notebook processes are cognitive, too. But it will not always be obvious whether the counterfactual intracranial process is cognitive. First, although it is uncontroversial that memory, object recognition, categorization or planning and reasoning are cognitive processes, the meaning of the term 'cognition' has undergone significant changes throughout the past decades and is nowadays far from obvious. Whether, say, emotions, affectivity, consciousness, comprehension, or instinct are cognitive phenomena is a question which will not receive a unanimous answer from cognitive scientists. Absent a mark of the cognitive that provides a convincing reason for thinking that the answer will be 'Yes', parity arguments for these phenomena will not get off the ground. Second, in section 4 we will encounter the hypothetical case of a Martian able to calculate the dates of the Mayan calendar, and it will be argued that absent a mark of the cognitive, it is impossible to decide whether the calculation process in question is cognitive or not. But without a principled way of determining, in controversial cases, whether the counterfactual intracranial process is cognitive, the appeal to PP does not deliver a straightforward verdict.

The parity argument thus succumbs to the following dilemma. On the one hand, in the absence of a mark of the cognitive, it is unable to make a case for cognitive extension. On the other hand, given such a mark, it is at best superfluous: instead of checking extended and intracranial processes for functional equivalence, thereby risking excessive and hard to settle

debates about the right level of grain, we can simply go and see where in the world the processes fall that have the mark.

Section 4 argues that the same dilemma arises for the attempt to motivate cognitive extension by a general appeal to functionalism. Before that, however, consider briefly a puzzling remark by Wheeler regarding the relationship between PP and a mark of the cognitive.

Wheeler argues that in order to avoid the fine-grained versus coarse-grained functional role objection discussed in section 2, we must ‘give a scientifically informed account of what it is to be a proper part of a cognitive system that is fundamentally independent of where any candidate element happens to be spatially located’ [MS: ch. 3, 13]. This is an explicit commitment to the indispensability of an independently motivated mark of the cognitive, to what Wheeler calls a ‘locationally uncommitted account of the cognitive’ [forthcoming: 8, MS: ch. 5, 3]. Despite this, however, Wheeler goes on to maintain that ‘the only viable basis’ [MS: ch. 5, 2] for cognitive extension is PP. But how can both claims be true? Once we have at hand a mark of the cognitive, then if some extended process has it, it is cognitive, and if not, then not, regardless of any parity reasoning. In response to an apparently similar concern, Wheeler points out that his strategy ‘may be explicated using a perfectly reasonable notion of parity, just so long as parity is conceived not as parity with the inner simpliciter, but rather as parity with the inner with respect to a locationally uncommitted account of the cognitive’ [MS: ch. 3, 14; first emphasis AUTHOR]. It is of course true that the only sensible meaning that can be attached to the term ‘parity’ is one according to which intracranial and extended processes are on a par with regard to an independently motivated mark of the cognitive, i.e., with regard to Wheeler’s ‘locationally uncommitted account of the cognitive’. But that alone does not render the argument for cognitive extension a parity argument. One ‘may’, as Wheeler puts it, phrase the argument in

terms of parity, but that is at best misleading and at worst false: parity considerations can play no substantial argumentative role because parity with regard to the cognitive can be assessed only ex post facto when the intracranial and the extended process are already known to be cognitive. There is simply no parity argument for cognitive extension.

4. Functionalism and the Mark of the Cognitive

Given the discussion in section 3 it may seem as if advocates of cognitive extension ought simply to abandon PP and instead provide a functional characterization of cognitive processes at a level of grain where extended and intracranial processes come out as functionally equivalent. And indeed, some of them have recently started to make their functionalist commitments explicit. Clark for instance, admits that Clark and Chalmers' original arguments are best 'viewed as a simple argumentative extension ... of ... "commonsense functionalism" concerning mental states' according to which 'normal human agents already command a rich (albeit largely implicit) theory of the coarse functional roles distinctive of various familiar mental states' [2008: 88]. And Wheeler's claim that the possibility of cognitive extension 'is just a footnote to Putnam' [in press: 8] also strongly suggests that the case for cognitive extension is made once the case for functionalism is made.

It is beyond the scope of the present paper to deal with all objections that have been raised against the functionalist argument for cognitive extension (e.g., Rupert [2004, 2009: ch. 5; Shapiro 2008]). The modest goal is to show that, quite generally, the functionalist argument is untenable because functionalism itself is undermined by the possibility of cognitive extension unless, again, there is an independently motivated mark of the cognitive that distinguishes those functionally complex systems that are cognitive systems from those that are not. The functionalist argument thus faces the same dilemma as the parity argument:

absent a mark of the cognitive, it does not get off the ground, given such a mark, it is superfluous.

Consider an argument due to Sprevak [forthcoming] according to which functionalism is reduced to absurdity because entails a ridiculously over-permissive version of cognitive extension. The argument starts with a claim Sprevak calls the ‘Martian intuition’ (MI). MI claims that creatures that differ from us in their physical, biological, and fine-grained psychological makeup may nevertheless enjoy the same cognitive states [Sprevak forthcoming: 6]. MI reflects the well-known and plausible functionalist credo that the mere fact that others are materially different is no good reason to think they must also differ cognitively. MI adds that fine-grained psychological differences are just as irrelevant provided the coarse-grained functional structure is the same. What drives the claim that fine-grained psychological differences are cognitively irrelevant is the intuition that Martians may experience pain even if their pain response does not decay in exactly the same way as ours, that they can be said to memorize things even if their learning profiles and reaction times may not exactly match ours etc. [Sprevak forthcoming: 6–7]. The advocate of cognitive extension must, it seems, accept this because PP yields the correct verdict only if fine-grained functional differences are discarded in favour of coarse-grained similarities (see section 2).

Next, Sprevak [forthcoming: 16–18] maintains that if MI is accepted and the level of grain at which functional equivalence is assessed is fixed at least coarse enough to allow that Martians with a different fine-grained psychology are nevertheless cognitively like us, then functionalism entails an absurd proliferation of cognitive extension. Consider again the alleged memory process in the Otto-cum-notebook system. It is possible to imagine a functionally equivalent process located in the brain of a Martian. By MI, the Martian’s intracranial memory process should count as cognitive, even if it differs from human memory processes materially and at a fine-grained psychological level. Hence, the level of grain that

sets the benchmark for the cognitive must be set coarsely enough to allow that the Martian's intracranial memory process is cognitive. But then, by PP, the functionally equivalent extended memory process in the Otto-cum-notebook system is cognitive, too. Note that this line of reasoning is entirely general: First, consider some arbitrary extended process \underline{P} ; next, imagine a Martian with a purely internal process \underline{P}^* that is functionally equivalent (at the relevant level of grain); next, appeal to MI to show that \underline{P}^* is cognitive; finally, appeal to PP to show that \underline{P} is cognitive, too. Given this generality, Sprevak [forthcoming: 16] maintains, the result is an absurd proliferation of cognitive extension.

Suppose I have a desktop computer containing a program for calculating the dates of the Mayan calendar 5.000 years into the future. Now imagine an intracranial Martian process following the same algorithm as my desktop computer. By MI, the Martian's intracranial calculation process should count as cognitive. By PP, then, the functionally equivalent process in my desktop computer is an extended cognitive process by which I am able to calculate the dates of the Mayan calendar (even if I in fact never run the program). This, however, is absurd. Even the most ardent defender of cognitive extension should deny that simply in virtue of having a desktop computer capable of performing various tasks, I am subject of a host of extended cognitive processes for solving those tasks. Since PP, MI, and functionalism lead to rampant cognitive extension, Sprevak [forthcoming: 20–22] concludes, functionalism—and with it the functionalist argument for cognitive extension—is in deep trouble.

Sprevak has undoubtedly raised a serious challenge. But he has not shown that PP and MI inevitably lead to unbridled cognitive extension. Rather, what he has shown is that the functionalist argument for cognitive extension presupposes an independently motivated mark of the cognitive. Let me elaborate.

Consider Wheeler's [forthcoming: 19–20] response to Sprevak. According to Wheeler's reconstruction, Sprevak's argument starts with a clearly non-cognitive process (viz., the program on my desktop computer), and then argues that a functionally equivalent process (viz., the intracranial Martian one) is cognitive, which eventually leads to the absurd conclusion. But, Wheeler objects, MI cannot show that the Martian's intracranial process is cognitive because MI does not entail, he argues, 'that any state or process that happens to be found inside the head of an intelligent Martian must, simply because of its in-the-head-ness, count as a cognitive state or process' [Wheeler forthcoming: 19]. Since the Martian's intracranial process differs only in location from the program on my desktop computer, which is ostensibly non-cognitive, Wheeler argues, it violates PP to suppose that the Martian's intracranial process is cognitive. PP insists on an equal treatment of extended and intracranial processes and therefore 'also implies that an external element that we take to be noncognitive doesn't become cognitive purely in virtue of being shifted inside the head' [Wheeler forthcoming: 20]. Sprevak's claim that the Martian's internal process is cognitive, Wheeler concludes, is thus not licensed by the original (and plausible) version of MI, but rests on a much stronger (and much more implausible) version according to which any process that happens to be found in the brain of a Martian must eo ipso be cognitive [Wheeler MS: ch. 5, 29]. Since this stronger version of MI is at odds with PP, the advocate of cognitive extension should reject it, thereby blocking Sprevak's argument.

There is much truth in Wheeler's response, but he misconstrues Sprevak's argument. Sprevak does not start with the non-cognitive desktop computer process and then illegitimately appeals the stronger version of MI in order to conclude that the Martian's intracranial process must be cognitive. Sprevak appeals to the original version of MI in order to establish that the Martian's intracranial process is cognitive and then argues that given PP

the process in the desktop computer is cognitive, too. MI in its original version suffices to generate the absurd conclusion.

Wheeler is right that the advocate of cognitive extension ought to deny that the Martian's intracranial process is cognitive. What is wrong is that this can be done by rejecting the stronger version of MI. Sprevak's argument can be blocked only by rejecting MI.

Sprevak [forthcoming: 19] argues that any denial that the Martian's intracranial process is cognitive will be arbitrary and an ad hoc manoeuvre designed only to save cognitive extension. MI, reflecting as it does the core idea behind functionalism that minor differences are irrelevant as long as the coarse-grained functional profile is the same, is too plausible a principle to be abandoned in favour of such a controversial claim. Sprevak motivates MI by pointing out that Martians can experience pain even if their pain response decays differently from ours, and can memorize something even if their exact learning profiles and reaction times are different. Fair enough. But one may accept this and nevertheless insist that a Martian's intracranial process that is functionally equivalent to the one in my desktop computer is not cognitive. That some fine-grained differences are irrelevant for some cognitive capacities (like the exact decay in pain response and the exact learning profile and reaction times for experiencing pain and having a memory) does not entail that they are always irrelevant.

Considered as a general principle applying to all cognitive processes, MI is wrong: Functionalism is not a carte blanche that allows us to treat every process as cognitive just because it performs, at some level of description, some task that can also be performed by a cognitive process. If I were to calculate the Mayan calendar (in my head, say), the calculation process would arguably be cognitive. But that does not entail that every process by which a

Martian may calculate the Mayan calendar must be cognitive.¹¹ Some may, some may not. In particular, our best conception of the cognitive may dictate that if a Martian calculates the Mayan calendar via the same algorithms as my desktop computer, what it does is so different from what would be going on in me that it should not be treated as the same kind of cognitive process and maybe not as a cognitive process at all.¹² And if the Martian's intracranial process is not cognitive, then PP does not yield the absurd conclusion that forms the basis of Sprevak's reductio.

What is required to prevent this move from being ad hoc is an independently motivated mark of the cognitive that provides a clear and cut characterization of what it is for a process to be cognitive such that a Martian with a different decay in pain response is still in pain while the process by which Sprevak's Martian calculates the Mayan calendar is non-

¹¹ Even opponents of cognitive extension like Adams and Aizawa [2008: 43] have pointed out that Martians may solve tasks we solve by means of cognitive processes using non-cognitive processes only.

¹² The situation is reminiscent of the debate about functionalism and so-called 'strange realisations' in the early 1980s. The charge was that functionalism specifies the causal roles of mental states so abstractly that the population of China linked by two-way radio [Block 1978] or a system in which stones are moved algorithmically in and out of beer cans [Searle 1982] would have to be said to exhibit mentality. In response, functionalists have pointed out that while they want to maintain that silicon-based Martians can share our mental states, they deny that the same holds for the bizarre systems above. Dennett [1991], for instance, has denied that these systems can satisfy the relevant computational conditions (in particular once real-time constraints are taken into account). Some differences may not matter, but others may. We should keep that lesson mind when assessing the plausibility of MI as a general principle.

cognitive. I will not attempt to provide such a mark. For current purposes it suffices to note that Sprevak's objection fails if such a mark is provided, and that providing such a mark is the only way to block Sprevak's argument. Functionalism is thus itself undermined by the possibility of cognitive extension unless an independently motivated mark of the cognitive is provided that distinguishes those functionally complex systems that are cognitive systems from those that are not. Therefore, the functionalist argument faces the same dilemma as the parity argument. At best, if a mark of the cognitive can be provided, it is superfluous: we need no longer check extended and intracranial processes for functional equivalence at what we think is the right level of grain, we can simply go and see where in the world those processes that have the mark fall. At worst, if no such mark is provided, the functionalist argument results in Sprevak's reductio and fails to establish what it is supposed to establish.

5. Conclusion

As far as a substantial argument for the hypothesis of cognitive extension is concerned, the parity argument and the functionalist argument are non-starters. Arguably, nothing short of a specification of an appropriate mark of the cognitive will do—a mark of the cognitive, that is, according to which the conditions for a process' being cognitive are actually fulfilled by extended processes spanning brain, body, and environment.¹³ As a consequence, the view defended by, e.g., Clark [2008] who thinks the case for cognitive extension can be successfully made by appeal to PP and functionalism while at the same time remaining agnostic vis-à-vis a mark of the cognitive is doomed to failure. If you want to argue for cognitive extension, forget parity considerations and do not worry about whether cognitive

¹³ Rowlands [2009] reaches a similar conclusion, but for a different reason: As he sees it, the standard objections against cognitive extension lose their force if (and probably only if) an adequate mark of the cognitive is provided.

extension follows from a general commitment to functionalism. Try to provide a plausible mark of the cognitive that is actually fulfilled by extended processes. Unless such a mark is provided, the case for cognitive extension will not be made.¹⁴

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¹⁴ As of yet, there have been few explicit attempts to provide such a mark (for notable exceptions, see Rowlands [2009] and Wheeler [MS]).

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