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Mental Institutions

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Abstract We propose to extend Clark and Chalmer's concept of the extended mind to consider the possibility that social institutions (e.g., legal systems, museums) may operate in ways similar to the hand-held conveniences (notebooks, calculators) that are often used as examples of extended mind. The inspiration for this suggestion can be found in the writings of Hegel on "objective spirit" which involves the mind in a constant process of externalizing and internalizing. For Hegel, social institutions are pieces of the mind, externalized in their specific time and place. These institutions are the products of shared mental processes. We then use these institutions instrumentally to do further cognitive work, for example, to solve problems or to control behavior.

Keywords Extended mind · Objective spirit · Parity principle · Hegel · Social institutions

1 Introduction

It may seem philosophically odd to offer a corrective to an overly Cartesian cognitive science by turning to Hegel—a philosopher who is rarely mentioned in contemporary discussions of the philosophy and science of mind. Indeed, to anyone familiar with Hegel, to mention Hegel in the context of philosophy of mind and cognitive science will likely evoke an embodied reaction, or at the very least a knee-jerk response. Can Hegel really offer anything productive to ongoing debates in these areas? Our intention, however, is not to propose Hegel as a new general philosophical consultant for the cognitive sciences. Rather we see him as a resource that can be used on a limited basis, and specifically, here, in regard to the question of the extended mind. Let that be the first proviso. The second one is that the Hegel we appeal to will strike anyone familiar with Hegel as somewhat anemic—not the full-blooded Hegel that insists on the strict dialectic or the large and overarching concept of Spirit. We'll leave that Hegel for the few Hegelians who have survived. Rather, with apologies to those Hegelians, we appeal to only one particular aspect of Hegel's work, and we frame it in ways that Hegel might not approve. In the history of the use and abuse of Hegel, however, this is nothing new, and in any case, this is not a paper about Hegel; it is about what we can learn from Hegel that may be relevant to the concept of the extended mind.

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2 Beyond the Parity Principle

By introducing the concept of extended mind, Clark and Chalmers (1998) were clearly trying to move beyond the standard Cartesian idea that cognition is something that happens in a private mental space, or in the head. The concept of the extended mind is a challenge to this idea. At the same time, the *parity principle*, which is central to their argument, although presented as liberating the way we

think of the mind, and certainly as both anti-Cartesian, and a challenge to neuro-chauvinists, nonetheless continues to reflect a minimal Cartesian view in the sense that it continues to measure cognition in terms of the gold standard of what goes on in the head.

> If, as we confront some task, a part of the world functions as a process which, *were it to go on in the head*, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world *is* (so we claim) part of the cognitive process. (Clark and Chalmers 1998, p. 8)

The principle suggests that a process outside of the head can count as a cognitive process only if in principle it could be accomplished in the head (or at least imagined to be so)—that is, only if in some way it conformed to the (minimal) Cartesian concept of mental process as something that would normally happen in the head. This frees us to think of some mental processes as happening "out there" in the world, yet still models cognition as in principle in the head. Clark and Chalmers "allowed that (at least as far as [their] own argument was concerned) conscious mental states might well turn out to supervene only on local processes *inside the head*" (Clark 2008b, p. 79), but some other, perhaps non-conscious, mental states may supervene on some external processes and form part of a cognitive process.

Clark and Chalmers go further in tightening up the parity principle. They propose additional criteria that need to be met by physical processes outside of "head-quarters" if they were to be included as part of an individual's cognitive process.

1. That the resource be reliably available and typically invoked.
2. That any information thus retrieved be more-or-less automatically endorsed. It should not usually be subject to critical scrutiny (unlike the opinions of other people, for example). It should be deemed about as trustworthy as something retrieved clearly from biological memory.
3. That information contained in the resource should be easily accessible as and when required. (Clark 2008b, p. 79)

One can say about these criteria that each of them involves matters of degree. What counts as reliably available, for example? Here we prefer Clark and Chalmers's first intuition: "mere contingency of coupling does not rule out cognitive status" (1998, p. 8), and we are not sure why one needs to worry about availability as long as the resource is available some of the time. If we invent a machine that is regularly available for use in cognitive problem solving and we count this as a case of extended cognition, why should we not count as a case of extended cognition the use of a machine that did exactly the same thing, but worked only once, or is no longer available? What does "usually" (certainly a matter of degree) mean, and why should some process that would otherwise count as a cognitive process not count as a cognitive process because it requires critical scrutiny, which is itself a cognitive process? There are plenty of instances of taking a critical metacognitive perspective (which is, of course, a cognitive process) on some problem solving acts of cognition that don't disqualify those acts as cognitive. Why insist on the information involved being "about as trustworthy" as biological memory; some people have extremely poor memory processes, but we would not claim that they do not engage in cognition as they try to use their untrustworthy memory. Does easy accessibility mean something different from "reliably available," and how should we measure it?[1]

At the very least, we should be able to interpret these criteria liberally or conservatively. Taking this in the more liberal direction, we are quickly led to the following kind of issues. One might think that a more prolonged and complex external process that involves many elements may be less reliable, or may be less easy to access as a whole, or may require more critical metacognitive scrutiny. If X (e.g., retrieving information in a notebook) can count as cognition, or can be some part of a cognitive process—part of which is done in the head and part outside—then the question is whether the amount or complexity of the process that is done outside of the head matters. What if X, instead of briefly supervening on a set of directions in a notebook, supervenes in a temporally extended way on a complicated and large set of directions for solving a problem—perhaps the directions are complex and printed in a book that takes a couple of days to work through. If some part of my cognition supervenes on external processes it shouldn't matter in principle whether it takes 2 s to retrieve information, or 2 days to solve a problem using a printed book. The issue of complexity or quantity of time or processing, however, pushes on the issues of easy accessibility and ready availability. A 2-day engagement with a book may not be considered as passing the ease of access condition or the ready availability condition (maybe the book is even missing a page that I have to find at a different library). But should that matter if the process is the same in kind and the outcome similar?

[1] Clark and Chalmers introduce these criteria around their discussion of belief. Clark (2008b) seems to generalize them to apply to all cognitive processes. Our argument here is that these are not necessary criteria that apply to all cognition, especially if one thinks of cognition in terms of cognitive processes and activities, e.g., problem solving, rather than in terms of mental states, e.g., beliefs.

Furthermore, in some instances, automatic endorsement may be difficult to bestow if parts of the information retrieved are not fully understood (perhaps until the problem actually gets solved). It seems somewhat arbitrary to claim that when Boris solves a brain teaser after 2 days of working through complex exercises in a book, his cognition is extended because having done this before he automatically endorses each step, but when Natasha does the same thing, except that she is not willing to give her endorsement at each step since she did not do the exercise before, her cognition is not extended.

It's not clear why availability, automatic endorsement, and easy accessibility are essential criteria for extended cognition. The important issue here is not whether something is rare, or requires critical evaluation, or is easy to access. Rather, the question is whether the external resources can carry our cognitive processes—whether they can be part (or a potential part) of a cognitive process in that sense. Right here, however, we may be moving beyond the parity principle. There may be external resources that can carry out cognitive processes that in principle may not be possible to do in our head, and that we would have a hard time conceptualizing as something we could even refer to using the phrase 'if it were done in the head'. There may be a lack of parity, in this sense, between such external processes and those that go on in the head. But why would such a lack of parity disqualify such processes if they are processes in which the human organism is linked in the right way "with an external entity in a two-way interaction, creating a coupled system that can be seen as a cognitive system in its own right"? (Clark and Chalmers 1998, p. 8)

For purposes of the argument, let's balance out a liberal reading of these criteria with a rather circumscribed and conservative (and certainly incomplete) view of what we use cognition for. I think most theorists will agree that we often use cognitive processes to solve problems of various sorts, and to control behavior. Of course we can also use things that we would not consider cognitive in order to solve problems and control behavior. For example, I can build a wall to keep my cattle in and my neighbor out. We would not consider the wall to be part of a cognitive process—even if it is the result of some cognitive planning on my part. It is also clear, however, that if for purposes of solving a mathematical problem I scratched some numbers on the wall and used it as I might use a piece of paper, the wall may play the right sort of role in driving cognitive processes. We could, of course, bang our head against this wall for a long time over the question of whether the kind of process involved is genuinely a cognitive process, or whether the scratch marks are "marks of the cognitive" (see Adams and Aizawa 2001); if such head-banging sufficed to answer that question, then that would indeed have a positive answer. For purposes of the argument, however, we set that question aside and follow Clark and Chalmers on this issue, and see if we can lead them a bit further on the issue of non-parity.

3 Thinking Big

Consider three cases of human problem-solving (cf. Clark and Chalmers 1998, p. 7):

(1) A person, let's call her Alexis, is given a set of facts and is presented a collection of evidence and is asked to judge on the basis of her own subjective sense of fairness, the legitimacy of a certain claim that is being made. To make her judgment Alexis must weigh the facts and consider the evidence entirely in her own head, without help or interference from others. In this process she draws up and considers three questions about the facts, tries to answer them the best she can, and then makes her decision.

(2) Alexis is given a set of facts and is presented a collection of evidence and is asked to judge the legitimacy of a certain claim that is being made. This time, however, she is given the three questions by a group of experts who provide a set of possible answers from which she may choose. She may also decide to formulate her own set of answers.

(3) Alexis is given a set of facts and is presented a collection of evidence and is asked to judge the legitimacy of a certain claim that is being made. As in (2), she is asked to consider the same three questions by a group of experts who inform her of a set of pre-established possible answers from which she may choose, and a set of pre-established rules she must follow in answering the questions. The rules specify that she must answer each question in one of only two ways, choosing from the set of possible answers. Alexis is not allowed to formulate her own alternative set of answers.

How much cognitive processing, or let's say cognitive effort, is present in these cases? We suggest that all three cases are similar in respect to cognitive effort. In the first case Alexis does all of the work in her own head. In the second case, there may be less cognitive effort on her part since she did not have to draw up the questions, and some of the possible answers were already provided so she did not have to think them up. But overall, there seems to be an equal amount of cognitive effort going on; the effort that Alexis contributes plus the effort that the experts contribute in drawing up the questions and possible answers. We could say in this case that the cognitive effort was distributed across a number of heads. In the third case there may be even less cognitive effort going on in Alexis' head

since she not only doesn't have to draw up the questions, she doesn't have to draw up any alternative answers. And there seems to be less cognitive effort going on in the heads of the experts, since they are simply informing her of possible answers and the rules that have been pre-established. Yet, given that the possible answers and rules have been previously established in some kind of process that we would also call cognitive—perhaps others have drawn them up, or perhaps they are the result of many people over a long period of time contributing some cognitive effort, which results in these answers and rules being determined—we should say that over all there is an equal amount of (if not more) cognitive effort to be found in the third case. It's just that most of it is happening outside of Alexis's head. The important point, however, is that in both the second case and the third case, the categories and concepts that Alexis would otherwise have sought for in her own head, are being explicitly provided by external sources. In this sense, part of the cognitive work that she is engaged in is being done outside of her head.

In the third case, precedent and law are doing real cognitive work, in the same way that certain concepts constrain or enable Alexis's own thinking in the first case. On traditional models of cognition, Alexis, faced with a set of facts and a collection of evidence will think about these things using some schema of concepts that she has in her head. The facts are framed or shaped by her understanding, which depends on the specific conceptual knowledge that she has at her disposal. In the third case, the conceptual framework is being provided by precedent and law. That part of the cognitive process that in the first case involves cognitive schemas that run on Alexis's brain, in the third case is replaced by cognitive schemas that are processed according to the rules of a legal institution.

Such cases seem similar to ones where we might use a pre-established formula to solve a mathematical problem. We may be able to do this in our head, using a memorized formula. But if the formula is complicated, it may be easier to do the cognitive work using a piece of paper, and if the formula is extremely complicated it may be easier to program the formula into a calculator and use that. If these latter instances (employing paper or calculator) count as examples of extended cognition, then it seems clear that the process involved in the third case is also an example of extended cognition. The law, which may be the product of previous generations, but is currently organized in a legal institution, operates like a mechanism which helps to accomplish our thought. Like the formula, the law may be already written down on paper (e.g., in law books) or even held in computer memory, but it enters into the process via the legal institution which, like the calculator, does some of the work.

Usually we think of judgments as happening in the privacy of one's own head. But some judgments supervene on processes that allow control over a large amount of empirical information. In a court of law, evidence must be produced, and judgments must be based on that evidence following a set of rules. Judgments may have to be based on the testimony of others who have information that you, as a judge or jury member, simply cannot have in the first-hand way. More than this, the whole case—and the judgments that get made—will depend on a body of law, the relevant parts of which only emerge (because of the precise particulars of the case) as the trial proceeds. In such cases, judgments don't happen purely in the head, or even in the many heads that constitute the court. Judgments emerge in the workings of a large institution—i.e., the legal system. The legal process is a cognitive one—it is *cognition producing*, insofar as it produces judgments—and *cognition produced*, in the sense that it is the product of many (and perhaps generations of) cognizers, although it is not reducible to simply the cognitive processes that occurred in their individual heads. The practice of law, which is highly cognitive (and communicative), is carried out via the cooperation of many people relying on external (and conventional) cognitive schemas and rules of evidence provided in part by the legal institution itself; it depends on a large and complex system, an institution, without which it could not happen. It is a cognitive practice that in principle could not happen just in the head; indeed, it extends cognition through environments that are large and various.

If the use of pen and paper to perform long multiplication, and "the use of instruments such as the nautical slide rule … and the general paraphernalia of language, books, diagrams, and culture" are instances of extended cognition, then it seems clear that the use of a legal system to solve a legal problem, certainly a case of complex "epistemic action," is also an instance of extended cognition. "In all these cases the individual brain performs some operations, while others are delegated to manipulations of external media" (Clark and Chalmers 1998, p. 8), or external mechanisms that may take the form of rules and cognitive schemas. An individual required to make judgments about the legitimacy of certain arrangements interacts with the legal institution and forms a coupled system in a way that allows new kinds of behavior to emerge. Take away the external part of this cognitive process—take away the legal institution—and "the system's behavioural competence will drop, just as it would if we removed part of its brain" (Clark and Chalmers 1998, p. 9).

Consider another example. I can use a short note in a notebook to keep the location of a museum in mind; but I can also use the museum itself, an institution, a rather large cultural structure that embodies a complex set of cognitive schemas, to conduct my thinking about a rich cultural past, or about a rich set of possibilities for my action. Indeed, certain types of thinking and possibilities for actions

wouldn't be possible in the absence of this kind of cultural and social institution.

When Boris travels he may use notes in his notebook to help him find some monuments or museums. Alternatively upon his arrival in a new city, he may purchase a book to find out about the history of the city or the art that can be found there. He may also visit a museum for the very same purpose, and instead of processing the information in his notebook, he processes the information that is presented in different media in the museum. For example, Boris may read up on the Ducal Palace in Urbino, learn that Raphael was from Urbino and that he will find some of his paintings there. He now has this knowledge in his head. He subsequently visits Urbino, walks through the Palace, comes upon the paintings there by Raphael, and then, in a way that goes beyond what he has read, he starts to truly appreciate why Raphael was such a great painter. One could argue that Boris gets linked in the right way with the paintings, or more generally with the museum, in a two-way interaction, and in a way that creates a coupled system that can be seen as a cognitive system. The museum, for example, sets out its collection in a way that imposes certain rules about how we can think of what we see there. Some paintings are arranged according to chronological order; some are set behind glass because the institution of art history has already developed a cognitive schema for considering some paintings to be more valuable than others. Boris's judgments about these paintings (likely, unbeknownst to Boris) are constrained by these schemas in such a way that his thinking about them follows these external rules rather than his own arbitrary ones.

When he returns home Boris may want to share what he experienced with Natasha. Because Boris has a poor memory they look in one of her art books to find some images of the Raphaels. The parity principle tells us that the conversation that ensues is certainly itself a cognitive process. A number of theorists have suggested that the thinking process that goes on in the head is something like a conversation that one has with oneself. Often, when we are explicitly trying to think through a problem, we conduct an inner conversation where we may represent one side of the issue against the other side. A conversation with someone else then, can serve the very same purpose. Our thinking is often conducted by just such conversations. Indeed, one's conversational thinking may be better than any kind of solitary, in-the-head thinking.

Throughout these experiences we could say that the cognitive processes that deliver an understanding of Raphael's art are not simply in Boris's head—his memory for his experiences and his thinking about the Raphaels depend in part on the images; his understanding of the paintings depend not only on his previous experience of them framed by the cognitive schemas imposed by books, museums, and art history more generally, but also on the formulations that constitute his conversation with Natasha, which may elicit more memory and better formulations. A larger system, a socially constituted system, which includes museums, the paintings themselves, art historical scholarship, texts, and conversational practices, helps to run the cognitive processes that Boris exploits for his own understanding. Moreover, the various things and practices that constitute this system, are on a cognitive circuit—they are not only cognition producers, they are cognition produced. On this model, cognition is thought of as a set of processes that loop in and out of brains and social institutions that are designed with cognition in mind.

Other people, relying on processes that are larger than their own individual brains, write the books and build the museums, specifically for the purpose of communicating and storing information, controlling behavior, and generating more knowledge. If we think that cognition supervenes on the vehicle of the notebook, it seems reasonable to say that it supervenes on the vehicle of the museum—an institution designed for just such purposes. Indeed, given the nature of such "mental institutions," including the learning practices that are propagated in educational institutions, it may be more appropriate to say that the cognition that goes on in one's individual head is really derivative from, or perhaps an internalized version of these larger processes—socially instituted processes—that are ongoing and outside of any particular individual's head.

It seems possible, then, to extend the Clark–Chalmers version of the extended mind, usually exemplified in terms of notebooks and such, in the direction of these larger processes where we may be able to think of social institutions as contributing to the constitution of extended cognition.

4 Hegel

Much of what we are suggesting here about extending the concept of extended cognition can be found in Hegel's texts. Throughout his writings Hegel describes the concept of "objective spirit" which involves the mind in a constant process of externalizing and internalizing. For Hegel, social institutions, like cultural practices and legal systems, are pieces of the mind, externalized in their specific time and place. We create these institutions via our own (shared) mental processes. We then use these institutions instrumentally to do further cognitive work—i.e., to solve problems and to control behavior.

Hegel not only makes the extended mind, objective spirit, something larger than anything to be found in an individual's immediate environment, but such institutions take on a life of their own and allow us to engage in

activities (often cognitive activities) that we are unable to do purely in the head, or even in many heads. This pushes us beyond the parity principle and extends the mind to a degree that even Clark and Chalmers might have reservations about. One question then is whether Hegel's concept of objective spirit is too large, or whether Clark and Chalmers' concept of the extended mind is not large enough. A better question, however, is whether we gain some additional insight into the concept of the extended mind by considering Hegel's notion of objective spirit.

Setting aside any of the large claims that Hegel makes about *Geist* (Spirit with a capital S), we note that his analysis often starts with the individual mind and in the realm of psychology (see, e.g., 1949, §§4ff). In his analysis he moves beyond abstract claims about the nature of the mind. That is, he moves beyond any claims about how the mind functions in isolation from the world and he recognizes that the better concept of mind is to be found in a person's contextualized action. The idea that the mind is a kind of subjectivity that is opposed to the objectivity of the world is rejected as an abstraction, although it is a way that one can begin to talk about the mind. The mind becomes objective to itself in the fulfillment of its activity. We could trace this analysis through a number of his works, but it will serve us well to look at his *Philosophy of Right* where we can see how something like a social institution can be viewed as extended cognition.

Hegel offers what today we might call an enactive concept of the mind where the mind, as reflected in an exercise of will, appropriates the things around it, and in so doing becomes invested in those things.[2] In the social realm, this is the concept of property (1949, §45) which has meaning only for a subject who is recognized as such by others (1949, §51), and who is capable of making use of property, and in so doing "externally realizes" his or her will (1949, §59). For Hegel, will, as a form of cognition expressed in this appropriation is immediately normative. The meaning and value of externalities derive from the subjective claim on them, which begins as a purely internal cognition, but is realized only in their appropriation and use, and immediately puts us in certain kinds of relations to others, relations which grow in complexity (1949, §§64ff). These relations may involve alienation of property, the instantiation and violation of rights, which may be expressed or tested out in contracts. A contract is in some real sense an expression of minds–minds externalized and extended into the world, instantiating in external memory an agreed-upon decision, adding to a system of rights and laws that transcend the particularities of any individual's mind. Contracts and the system of rights and laws are the embodiment of conceptual schemas that contribute to and shape our cognitive processes. Once the concepts of property, contract, rights, and law are realized in the form of social institutions, our thinking about social arrangements, for example, or about what we can and cannot do, is conducted through these institutions.

The institutions of civil society, the social, educational, and legal institutions that originate in human cognition, as Hegel points out, are, ideally, not alien to the subject; "his spirit bears witness to them as to its own essence, the essence in which he has a feeling of his selfhood, and in which he lives as in his own element which is not distinguished from himself" (1949, §147). Such institutions are the result of human cognitive processes (they are externalizations of individual minds working collectively) but they are also employed in a cognitive manner to solve problems and to control behavior. Educational institutions are good examples. The purpose of education, as Hegel puts it, is to "banish natural simplicity, whether the passivity which is the absence of the self, or the crude type of knowing and willing, i.e., the immediacy and singularity in which the mind is absorbed. It aims in the first instance at securing for this, its external condition, the rationality of which it is capable. … By this means alone does mind become at home with itself within this pure externality. … [M]ind becomes objective to itself in this element" (1949, §187). For Hegel, education liberates the individual mind by introducing it to something larger, but still of the same nature. "In the individual subject, this liberation is the hard struggle against pure subjectivity of demeanour, against the immediacy of desire, against the empty subjectivity of feeling and the caprice of inclination…. [I]t is through this educational struggle that the subjective will itself attains objectivity …" (Ibid.).

The law is another good example. Hegel states clearly that the law is a product of thinking (1949, §211)—it is constructed in thought processes, and indeed, it is that fact which makes it positive law. Hegel recounts the formation of law as "the march of mental development" in the "long and hard struggle to free a content from its sensuous and immediate form, [in order to] endow it with its appropriate form of thought, and thereby give it simple and adequate expression" (1949, §217). The recognition of rights in law, qua recognition, is a form of cognition that depends on the law. The administration of justice, the application of law to particular cases, is a cognitive process through and through. If we are justified in saying that working with a notebook or a calculator is mind-extending, it seems equally right to say that working with the law as a means (1949, §223), the use of the legal system in the practice of

[2] Much of the analysis in the *Philosophy of Right* turns on the concept of the will. Of this Hegel says, "The distinction between thought and will is only that between the theoretical and the practical. These, however, are surely not two faculties: the will is rather a special way of thinking, thinking translating itself into existence, thinking as the urge to give itself existence" (1949, Addition 4).

legal argumentation, deliberation and judgment, as well as the enforcement of law for purposes of controlling behavior is mind extending too.

5 Conclusion

We acknowledge that one could reasonably disagree with this interpretation of Hegel. Some will undoubtedly say that we are reading too much into Hegel; others will complain that we are leaving too much out. Let's set the Hegel scholarship question aside, however, and call this a thought experiment or a Hegelian speculation on the concept of the extended mind. We think this view offers a lot to think about. There is no good reason, once we start along the path of the extended mind, to stop short of considering the larger processes, such as the processes involved in social, educational, and legal institutions, as cases of extended cognition. If our thinking through a solution to a local environmental problem is possible only by basing it on categories or conceptual schemes delivered by a legal precedent; if we can formulate judgments only by working through a legal system that provides the rules for how we think about the relevant phenomena, is that not similar to thinking through a solution to a mathematical problem employing a rule that's stored in one's calculator, or in one's math notebook?

In each case the cognitive extension begins with a cognitive invention. Some tool, or rule, or institution is, as we put it, cognitively produced. Someone, or some group, has invented the notebook, calculator, legal system, etc., and this inventing itself involves cognition. As Hegel would say, however, this is really an abstract moment of the full phenomenon since the invention of such tools and institutions already has cognitive problem solving and regulation of behavior in mind. With the idea of running cognitive processes on these inventions we come to the Clark–Chalmers concept of the extended mind. We take one of these cognitively produced things and we use it for further cognitive production. Our subsequent acts of cognition are facilitated or enhanced or made possible by particular tools or institutional mechanisms. In every act of cognition that runs through these tools or institutions, the mind is extended.

There is, however, and not surprisingly from the Hegelian perspective, a third aspect to this phenomenon, and this is something that is not remarked upon in the contemporary extended mind debate, as far as we know (although, cf. Selinger and Engström 2008; Clark 2008a). To put it most succinctly, the extended mind can come back to bite us; it can place limitations on our thinking, as easily as it can enable great and wonderfully extended cognitive performances. In either case, the extended mind can have profound effects on us, and on our thinking. An interesting question that frequently pops up, and should pop up here, is whether thinking itself, as a human enterprise, and as an individual practice, has changed, not simply because of the increased quantity of information that we have to deal with, or because our scientific knowledge has increased to a point where it requires overspecialization, but because of the particular means that we have invented to facilitate or enhance cognition (e.g., notebooks and institutions, computers and the internet, and of course all of the various media and technologies that have been invented throughout history, including printed text, digital images, and the means of mass communication). These are common themes to be found in technology and cultural studies, but, so far, have not been raised in the debate on the extended mind hypothesis.

As a final note, let's not forget that science itself, in the modern sense of the term, is an institution, and that the scientific method is a tool that we use to extend cognition. We use our labs in the same way as we use our courts. In this and all other respects noted here, it is difficult to think of a form of cognition that is not extended in some sense. The exceptions may be our dreams and the other small bits of cognition that go on in our heads.

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