EMBODIED INTERFACES

AVANT, Vol. III, No. 2/2012
ISSN: 2082-6710 avant.edu.pl/en

How many bodies we can find in one mind... and the other stories

Interview with Frederique de Vignemont[1]

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Realized July 2012; published online 24 December 2012.

THE BOOK

We know that you are in the process of finishing your monograph. Let us then begin with the question: why "Mind the Body"?

While more and more people make every possible use of the notion of embodiment within the growing Embodied Cognition research program, the body itself remains an object rarely investigated explicitly. The embodied approach claims to return the mind to the body. In this book, my objective is to return the body to the mind. The aim of my book is to develop a naturalistic approach to bodily self-awareness and its underlying body representations, combining philosophical analysis with recent experimental results from cognitive neuroscience, neuropsychology, and psychiatry.

To continue the subject of your new book: your research interests centre around body awareness and the cognition of others. Will the book bring a synthesis of these two domains (e.g. a continuation of what you cooperated on with Alvin Goldman)?

Most of the book is dedicated to self-awareness, and, more particularly, to the sense of body ownership (i.e. the awareness of the body as one's own). In order to do so, I need to single out representations of the body that are self-specific for them to be susceptible to ground body ownership. However, recent evidence from the mirroring literature as well as mirror-tactile synaesthesia seems to indicate that some body representations at least are shared between self and others. In Chapter 5 of the body, I thus analyse to what extent body representations can be shared and their implication for the theory of ownership that I defend.

Although, as we have mentioned, your research centers around two notions, is there any subject your haven't published about yet, but which intrigues you and which you are planning to undertake?

I am more and more interested in the wide range of bodily sensations beyond touch and proprioception, and, in particular, in pain and in interoception. Bodily sensations have been exploited in the philosophical literature as paradigmatic examples of qualia, thus neglecting their specificity. They remain rarely, if ever, analysed for their own sake. Little is known about how these sensations fit into the architecture of mind. Collectively, they resist analysis as either perceptual or affective states. The variety of bodily sensations is so wide that they may seem to form a mongrel category. What qualifies such a variety of experiences as bodily sensations? What do they have in common? Can one provide a unified account of bodily sensations despite their dissimilarities? I would like to work on these questions in the future once the book is done.

picture source: F. de Vignemont's archives

THE BODY

The body, or, more precisely, bodily awareness and bodily self-knowledge, frequently appear in your work in the spirit of Evans' works, as do references to Frege. Where does your interest in these authors stem from? And as concerns the latter of these authors, do you think that the categories present in Frege's research can be successfully used in studies on the sense of ownership, or the representations of the body?

I was philosophically brought up with Evans, so to speak. The Jean-Nicod Institute, where I did my PhD, is strongly influenced by the Fregean tradition, and by Evans. I was actually surprised the first time I visited another philosophy department in the States that Evans was not the key reference there. There are many aspects of Evans' theory that I appreciate. For instance, his paper on Molyneux's problem is the best I've read on the topic. Another example is his treatment of the notion of immunity to error through misidentification. He was the first to acknowledge the importance of the ways of gaining self-information, and, in particular, of body senses.

In your aforementioned research there appear references to Gibson's conception. What do you think about his notion of a hand as a subjective object?

Gibson is, of course, very important if one wants to work on topics such as the self, action and the body. But I prefer to avoid slogans like "subjective object," because you can put everything and nothing behind. I do believe that the hand has a special status in comparison to other parts of the body: we often see our hands, most of our actions are performed by them and their tactile sensitivity is very high. They are thus especially interesting. What is problematic, however, is that most experiments on bodily awareness investigate only the representation of the hand and it is not obvious that we can always generalize results on the hand to the other body parts, let alone to the body as a whole.

In your work you try to retain and defend the division into body scheme and body image, although you formulate a more functional definition thereof (than, for instance, Gallagher). Do you reject the existence of three distinct kinds of body representations (entailing structural representation of the body) only on economic grounds? On the other hand, are you perhaps planning (or working on) a continuation of your research from "The weight of representing the body...", which was a certain alternative for the divisions present in literature of the subject?

The more I work on the notions of body schema and body image, the less I want to keep the terminology. There is too much confusion and too little evidence in favour of the dual distinction. Yet, I do not think that the threefold distinction suffices to account for the complexity of the field. I now make two orthogonal distinctions which I call 'cold' and 'hot' body representations and long-term and short-term body representations. The latter distinction is quite standard and comes from O'Shaughnessy. For the former distinction, I use Ruth Millikan's theory about pushmipulliu representations. Cold body representations are purely descriptive. They represent various types of bodily properties, as they can be experienced in bodily awareness. Hot body representations are both descriptive and directive. They have two directions of fit, world-to-mind and mind-to-world. They represent bodily affordances for action. Now, one can ask how many cold and hot body representations there are. But I think that the Bayesian approach makes this question meaningless.

Sometimes in your works there appears the idea of body space: maybe this concept would be more satisfying than earlier distinctions, especially if we remember how important a role space took e.g. in Kant's philosophy (being aware of the existing differences between these two, obviously)?

Starting from the intuition that the body where I feel bodily sensations is the body that I experience as mine, I analyse in the book how the mind builds up representations of bodily space: a theory of embodiment requires a theory of spatial ascription of bodily experiences. Spatial ascription of bodily experiences, however, displays puzzling features, which do not seem to fit with what we know of spatiality. It becomes then questionable whether bodily sensations themselves are intrinsically spatial, as it has been suggested by the Local sign theory in the 19th century. If the Local sign theory were true, then one would expect to experience floating sensations with no spatial ascription, and exosomesthesia, that is, sensations experienced beyond the felt boundaries of one's body. But there are no such things (for more details, see the chapter *The mark of touch*, co-written with Olivier Massin for the *Oxford Handbook of philosophy of perception*). I also criticize the sensorimotor approach to bodily experiences, showing that it faces a dilemma. As I argue in my Mosquito paper, if the enactive account is cast in terms of spatial know-how (how to reach and move the body part that is touched), then it is false, because spatial know-how is separable from bodily experiences. If the enactive account is not cast in terms of spatial know-how, then it is unclear what type of sensorimotor expectations could provide the spatial content of any kind of tactile experiences, including instantaneous passive touch. Rather, what I defend is what I call the Body Map theory, partly inspired by O'Shaughnessy's theory. In my view, somatosensory information does not suffice to account for the spatial content of bodily experiences. It needs to be structured by what I call the body map, that is, the representation of the spatial configuration of the body. Furthermore, I argue that the body map is multimodal, that it is dynamic, and that it can be either purely descriptive or both descriptive and directive.

You devote little attention to the idea of the pre-reflexiveness of bodily consciousness. Asking in the spirit of one of Adrian Alsmith's papers, do you think there exists such a thing as pre-reflexive consciousness? Is it something more than marginal consciousness (referring to your own work)?

I think this may be more a terminological debate than a real disagreement. The notion of pre-reflexive consciousness comes from the phenomenological tradition. But it is not clear to me what exactly is meant by pre-reflexivity, and this is why I avoid it. Is it merely a matter of attention or introspection? But then I agree that we do not attend to most of our bodily experiences. Or is it a matter of conceptualization? But then I agree that bodily experiences have non-conceptual content. Or is it something else, but then what?

This is our last question regarding the subject of the body: from the studies on the rubber hand illusion there appears to emerge a rather paradoxical picture of our embodiment, as it seems that it is sight which plays a key role in our feeling of being corporeal, especially in the context of the recently published results showing the lack of RHI in visually impaired people. What are your thoughts on this issue?

I was actually very happy when I found out about this recent study by Henrik Ehrsson with blind people. It is not so often when experimental data confirm your theories… I strongly believe that vision plays an important role for bodily awareness. This is well accepted for action, why not for the body? For too long, philosophers have emphasized the importance of proprioception. However, recent literature about multisensory interaction shows that bodily experiences are not exclusively based on somatosensory information. They are rather multimodal, and even constitutively so, as I defend in a paper currently under revision. I argue that blind people experience their body differently that sighted people, as this is well illustrated by this study. I do not see why this raises difficulty for the problem of ownership. Actually in a chapter for a collected volume on immunity to error through misidentification edited by Recanati and Prosser, I argue that vision can ground bodily judgments that are immune to error in some circumstances and even when it does not, multimodality is not an obstacle for immunity.

Could you comment on the opinion below?

> ***Frederique de Vignemont recently co-authored an article with Alvin Goldman on embodied accounts of social cognition in the journal Trends in Cognitive Sciences. What they called embodiment was anything but embodiment. (…) So their question comes to this: how does a body, without a brain, isolated from its environment (including the social environment), and unable to perceive the bodily behaviors of others, discover the mental states of others? Their answer, what they call the best (or 'most promising') candidate for an embodied account, paradoxically, is that social cognition depends on body representations in the brain – paradoxically, because they ruled out appeal to the brain in any true embodied account. In effect, what they call the best candidate for an embodied account is an account that excludes any contribution from the body. Obviously, if this is considered an embodied account, there is a problem.***[49]

Most evidence in favour of the so-called embodied approach to social cognition comes from the discovery of mirror systems, and nobody can deny that they are in the brain. One can then say that Gallese and all the others are wrong in taking these results into account to defend an embodied view. Or one can try to determine the peculiarities of this specific brain activity in comparison with other brain processes. That's what we

[49] Shaun Gallagher. 2011. Interview. *AVANT*, 2/2012: 81-82.

did with Alvin by proposing the notion of bodily code or format. It is interesting to note that Gallese and Sinigaglia have taken over this notion in their own TICS paper. You could then say that they do not defend an embodied account of social cognition. But if not them, who does?

OTHER MINDS

The other large subject in your work are other minds. Although you do not specify it this way, if your works can be considered to conceptualize embodied cognition, would that be embodied cognition of other minds?

I am interested in embodied cognition, but I would not qualify myself as an embodied theorist. For instance, my view on empathy is not really embodied. With Tania Singer and with Pierre Jacob, we stress the importance of cognitive appraisal, as shown by modulation of the activity of the pain network by many factors, some of them being high-level. In addition, there is a variety of questions about social cognition I am interested in beyond the implications of the discovery of mirror systems. For instance, I recently co-wrote a paper with Hugo Mercier on egocentric and altercentric biases, and their consequences for the Simulation approach. Recent evidence by Kovacs and by Samson indicates that we can be influenced by what we believe other people believe although it is pointless or even detrimental. Since the egocentric bias is taken as evidence in favour of the Simulation approach, we analysed whether the altercentric bias was a counterargument against the Simulation theory.

On the other hand, there exist numerous indications towards the social nature of bodily representations themselves (a tradition dating back at least to Marcel Mauss's works). Do you think that knowledge about one's own body can be explained without referencing social factors?

Can Robinson Crusoe move on his desert island? Obviously, yes. And to do so, he needs knowledge about his body. One may reply that he spent all his childhood surrounded by people. Maybe then other people would be important for the acquisition of body representations. But again, if we look at animals that are not social, it is hardly controversial to claim that they have a kind of representation of their body that they use for action. Social factors can influence body knowledge, but I do not think that they constitute a necessary condition. What is more interesting is whether they are necessary for the feeling of ownership. In other words, if you are not aware that there are other bodies, do you feel your body as your own?

While we are going to return to enactivist concepts, could you share with us your opinion regarding enactivist, direct concepts of cognition of other minds?

If you mean the theory of direct perception as defended by Zahavi, then I have difficulties in understanding it both for conceptual and empirical reasons. It seems sometimes that it falls into behaviorism, as if mental states exclusively consisted in public

behaviours that can be perceived. It is also difficult to accommodate with the evidence of modulation in empathy, which shows that there is nothing direct. And if by direct, they merely mean the absence of conscious inferences, then it becomes hard to see their disagreement with other theories. Advocates of theory theory and simulation theory have never assumed that mindreading processes are conscious.

The discussion regarding the nature of mechanisms underlying mindreading has for a long time been structured by the famous "theory theory/simulation theory" distinction. Some currently argue that it is high time we abandoned this opposition as no longer useful and looked for completely new concepts and theories that could explain the ability to attribute mental states to others (perhaps ones directly inspired by neuroscience rather than philosophy). Would you agree with this assessment, or do you think that theory theory or simulation theory (or some combination thereof) could still prove useful? If the latter is true, then which of those theories do you think is on point, or at least closer to the truth? If the former is true, then what do you think a new, alternative explanation of mindreading might look like?

It is true that several hybrid views have been proposed. As argued by Goldman (2006), simulation and theorizing need not be in competition. Rather, they may cooperate (if for instance, a theory is used to select the pretend inputs). Furthermore, some instantiations of mindreading may result from simulation only, whereas others may result from theorizing only. With the new hybrid views emerges what we might call the multiple routes hypothesis. On this view, there is more than one route leading to mindreading. The multiple routes hypothesis may then be in a position to account for recent results both in neuroscience with the discovery of mirror systems and in developmental psychology with the new implicit versions of the false-belief task, which are successfully passed by infants as young as 13-month old. The multiple routes hypothesis can be declined in many ways: low-level and high-level simulation (Goldman 2006), implicit and explicit mindreading (Frith & Frith 2008), minimal and full-blown theory of mind (Apperly & Butterfill 2012), system 1 and system 2 (Evans 2008), and so forth. But these distinctions raise a number of questions. In particular, along what dimension(s) should mindreading processes be distinguished? Their automaticity? Their availability to consciousness? Their efficiency? Their flexibility? The conceptual apparatus they require? Or the types of mental states they target?

Pierre Jacob - a philosopher with whom you have cooperated - proposed several years ago that neural structures commonly dubbed "mirror systems" may in fact underlie conceptual representations of certain mental states. From this point of view, structures that are responsible for experiencing some mental states (e.g. disgust) are also used to represent those states conceptually. This proposition appears close to neo-empirical approaches to the issue of encoding notions in the brain. What do you think of such an idea? Do you see any empirical basis that might support it? Do you see it as a potentially attractive way of "embodying"

social cognition? Would you consider the neo-empirical approach to notions as such (not necessarily mental notions) close to your research?

Pierre Jacob was my master and my PhD superviser, so we've had many discussions on mirror systems together. I think he has done a great job in inviting neuroscientists to be more careful with the use of the notion of mirroring. According to Evans' principle of generality, I master the concept 'to grasp' if I am able to use it to represent both that I grasp a peanut/a glass of water and that John grasps a peanut/a glass of water (x grasps y). Such definition of concepts meets the requirement of mirror systems. And indeed, mirror systems have been said to encode a "motor vocabulary" shared between self and others (Rizzolatti et al. 1988). However, we should not neglect also the specificity of mirror systems, namely, the fact that they are pragmatic representations, to borrow Jeannerod's terms. They represent action from the first-person point of view of the agent in interaction with the world. This is well illustrated by Calvo-Merino and coll. (2006)'s study on ballet dancers: dancers have visual familiarity for all the visually presented movements, but only motor familiarity for movements of their own gender. Mirror activity was found only in the latter case. I would like also to add that with Pierre, we both agree that it is misleading to qualify as mirroring shared brain activity in the domains of emotion and bodily sensation. We believe that it deserves a different account. For instance, in a joint paper on empathy for pain, we have defended the view that shared brain activity in the pain network should be understood in terms of enactment imagination.

INTERDISCIPLINARITY

It is very interesting to us (primarily as philosophers) how you manage to connect your philosophical works with those strictly experimental? Is it difficult, or more of a natural task? How do you see the role of the philosopher in experimental work?

Bringing together different approaches is never easy and it is especially hard to find a good balance between theoretical discussions and experimental results. In particular, one danger is to believe that empirical data provide the answers to all the philosophical problems. Empirical data provide only partial or indirect answers to questions more fully expressed in a philosophical context. Philosophical theories and conceptual tools are thus needed for the perspicuous interpretation of empirical data and their systematization. Another danger is to use selectively empirical evidence, taking what confirms the view that one wants to defend, and leaving out the other results that do not fit so well. For example, in the last ten years, research in cognitive science has yielded a vast array of exciting discoveries and provocative hypotheses about bodily awareness. It is only if one takes the time to study systematically the very rich and complex recent empirical literature that one can offer a full-fleshed theory of bodily awareness. I was lucky enough to be trained both in philosophy and in cognitive science. In particular, I learnt a lot during my post-doc with Pr. Patrick Haggard, during which I actually designed and ran experiments. Since then, I've been able to collaborate with several psychologists, and my role has been limited to design experiments

and discuss results. I think that philosophers can be helpful at both stages. But even without directly collaborating with psychologists, I think that the interaction between the experimental and the philosophical perspectives is essential. Through confrontation with empirical findings, one can shed new light on long-standing conceptual issues, hone new conceptual frameworks, and explore and resolve a new range of puzzles revealed by cognitive science.

You have cooperated with many leading scholars, both scientists (Marc Jeannerod, Uta Frith, Patrick Haggard, Tania Singer) and philosophers (Pierre Jacob, Alvin Goldman). Which of these collaborations do you find most memorable?

That's a tricky question. I've been very lucky through my research career, I've had the opportunity to meet amazing people both at the professional level and at the personal level. I have also been able recently to collaborate with great pleasure with Alessandro Farnè, Marjolein Kammers, Adrian Alsmith, Olivier Massin and Hugo Mercier. I've learnt a lot with all the people I have worked with. But more than collaborators, they are friends with whom I share a lot more than just papers.

When you connect philosophical and experimental works, don't you feel as if you were "living on no man's land," between science and philosophy?

Or on everybody's land I hope, where we can all meet and discuss.

To close this subject – you practise interdisciplinarity. Do you have a theoretical vision of what this interdisciplinarity entails?

In all my work, I defend a naturalist approach to the mind. By definition, this involves interdisciplinarity. I do not believe that one can achieve a real understanding of the mind without looking at results coming from cognitive science. My work is at the meeting point between a bottom up approach, based on the analysis of empirical evidence, and a top down approach, based on conceptual analysis. Those two approaches are complementary and both necessary.

ENACTIVISM

It seems that over the course of its development enactivism has become more differentiated rather than more defined. It can be treated as a certain frame of conceptualization or a research platform, allowing to coordinate divergent views. How would you respond to the objection that in the otherwise excellent "A mosquito bite…" you have somewhat concocted the enanctivist perspective with which you argue? According to one group, you have dealt with the enactivist approach to bodily experiences; according to another, you help to make them more precise.

It may be because I share the enactivist intuition that action must play a role in self-awareness that I feel so frustrated when I cannot find a clear articulation of what this role is. It is very difficult to criticize the enactivist view because its proponents can always say that it is not exactly what they meant. But I presented the Mosquito paper in front of Alva Noë and Kevin O'Regan, and they took the objections that I offered seriously. That's a beginning. Furthermore, with Adrian Alsmith, we have recently published a special issue on embodied cognition and body representation in the *Review of Philosophy and Psychology*. Our aim was to clarify the field and to bring together people that do not agree. For instance, there is a discussion between Ned Block and Kevin O'Regan and another between Shaun Gallagher and Daniel Povinelli. They do not agree in the end, but, at least, the nature and the extent of their disagreement is clearer.

How would you react to an opinion like this: The article "Habeas Corpus..." provides, among others, reasons for enactive grounding for a sense of self, own body, ownership of one's own body in action? Much like e.g. Dana Ballard, never mentioning enactivism or embodiment in his studies, which are described in a rather computational manner, he arrives at the conclusion *You see what you need*, unintentionally supporting enactivism with his research.

I am aware of this apparent paradox in my theory. Since the Habeas Corpus paper, I have somehow refined my view. In particular, if one wants to give a theory of body ownership, one needs to account for the following puzzles: why do we feel ownership for a rubber hand although action is immune to the Rubber Hand Illusion? And why do we feel no ownership for tools although we can feel sensations there? I still want to keep the view that I defend in the Habeas Corpus article: I feel ownership towards a body part that is represented in a specific type of representation of the bodily space for action. But more work is needed to determine the content of this representation. And we need finer-grained concepts that the body schema.

You write that "action is immune to the Rubber Hand Illusion", but Zopf et al. show something different, that action is affected. Maybe the issue is that (1) we look at the wrong 'part' of action; (2) in other research on RHI and action, one's own body is the goal of action, but in Zopf et al. there are nonbodily goals (as in one of Kammers at al.'s papers, with similar results as in Zopf's paper), maybe the goal of action makes a difference?).

I haven't read this new study yet (but it's on my reading list...). However, there is already a reply based on another study by Marjolein Kammers and her colleagues (2010). They found that in some circumstances action could be sensitive to the RHI. In this experiment, the participant's hand and the rubber hand were shaped as if they were ready to grasp an object, with congruent or incongruent width of grip aperture. Both the index fingers and the thumbs of the real hand and of the rubber hand were stroked. After the stroking phase, participants were asked to mimic the perceived grip aperture using their non-stimulated hand or to grasp an object with their stimulated

hand. This time, it was found that both the perceptual and the motor responses were sensitive to the illusion. The representation of the hand configuration did not seem to differ between action and perception. One can find explanations for the differences between the two RHI studies. For example, one appeals to local stimulation of the index finger, whereas the other appeals to a more holistic stimulation of both index finger and thumb. Moreover, one is exclusively about the body, whereas the other is about the relation between the body and an external object. But all these possible explanations merely show that when it comes to empirically dissociating different types of body representations, there are many factors that may interfere. This is one reason among others why I think we should stop counting body representations.

What is your attitude towards such concepts as situated and dispersed cognition, and thus – to the work of such scholars as Edwin Hutchins or David Kirsh? We are asking here about your approach to studying relations between individuals and their environment (including inanimate environment): can they to any degree have importance for your perspective?

I haven't really worked on that. The only way I take into account the environment in my theory is in terms of peripersonal space, which I think, is fascinating. But that's far from the issues raised by situated cognition.

OTHER ISSUES

Would you agree with J. Kevin O'Regan on the subject of benefits that can be drawn for the knowledge of cognition and consciousness from the study of aesthetic experience? This scholar – as he has put it – expresses doubts whether studying one mysterious thing can distinctly help in understanding another.

I am really not an expert there. I agree with Kevin that for now we know little about aesthetic experience. But that's precisely why we need to study it.

Very frequently we find in your work quotations from literature, such as from Gogol's *Nose* or Edmond About's book. Is literature your second passion, after philosophy? If not, then what is?

Yes, indeed. You might even say that it is my first passion. Some people are addicted to tobacco or coffee. My addiction has always been literature, since I was a child. And you should see me when I have no novel left at home, I can be in a very bad mood. Any suggestion, by the way, about Polish authors I should read?...

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