

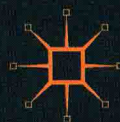
keeping the world in mind

mental representations and
the sciences of the mind



anne jaap jacobson

New Directions in Philosophy and Cognitive Science

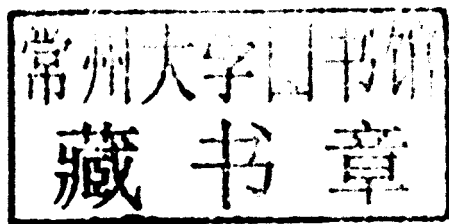


Keeping the World in Mind

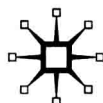
Mental Representations and the Sciences of the Mind

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New Directions in Philosophy and Cognitive Science

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This series brings together work that takes cognitive science in new directions. Hitherto, philosophical reflection on cognitive science – or perhaps better, philosophical contribution to the interdisciplinary field that is cognitive science – has for the most part come from philosophers with a commitment to a representationalist model of the mind.

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For Allan

Series Editors' Foreword

Few questions are more central to modern philosophy than that of representation. But are our disciplinary horizons wide enough, and our historical horizons deep enough, to be satisfied with the standard notion of representation as an internal mental state with content referring it to states of the world? Anne Jaap Jacobson has her doubts on that score, and in *Keeping the World in Mind*, she offers us a way to rethink that notion.

To widen our disciplinary perspective, Jacobson argues that the notion of representation found in recent cognitive neuroscience is that of a brain state that samples and instantiates the world by way of patterns of neural firing that are mathematical transformations of external features. In terms of historical depth, Jacobson argues that this sampling notion resonates with the Aristotelian notion of cognition as the realization of forms. Together, these moves widen and deepen our perspective and so offer us important resources for rethinking representations.

Jacobson's work contains both historical argument, with discussions of the notion of representation as sampling operative in Aristotle, Aquinas, Hobbes and Hume, and contemporary argument, using the contemporary cognitive neuroscience sampling notion to criticize both the 'Fodorian' standard and the 'action-oriented' representations of the embodied mind school.

The work is ambitious and multidisciplinary, drawing upon an array of conceptual resources, historical material and empirical data. The results show that suitably modernized Aristotelian representations are naturalistic, such that bodies may have evolved so that Aristotelian representations can underlie organisms' flourishing. The book concludes with rich discussions bringing Jacobson's contribution to bear on contemporary discussions of perception, emotions and actions.

Acknowledgements

This book is a stage in a large and long project. I will not be able to remember all the people who made valuable comments, and I apologize to those I omit. I am grateful for all the help I received. I talked about the project first with Johnathan Schaffer in a very useful discussion. I learned a lot from objections at various meetings, particularly some of the American Philosophical Association Meetings and the Society for Philosophy and Psychology. I vividly remember comments from people who disagreed, especially Louise Antony and Barbara von Ekhardt.

Though the central notion in the book is a very ancient one, asking contemporary audiences to work with it has meant asking them to rethink the terms in which some fundamental philosophical issues are cast. I rightly foresaw that the reviewers would not necessarily want to subject their technical terms to a substantive reconception. I am extremely grateful to Bill Bechtel, who published my essays on this topic from 2003 and 2008. Encouragement by Jesse Prinz, Jackie Taylor, Alva Noe, and Edouard Machery, as I took it to be, was very important. Comments provided by Rupert Read and Mark Curtiss have made a large difference to the final form of the book. Read has always been a source of valuable criticism.

I worked on the book against two backgrounds that have been extremely important. One has been the Center for Neuro-Engineering and Cognitive Science at the University of Houston. I have long felt, even in my early days at Oxford, that philosophy disassociated from related sciences would be more provisional than seemed desirable. Meeting and discussing cognitive neuroscience for now nearly twenty years has been wonderful.

A second background has been formed by the bloggers at FeministPhilosophers.wordpress.com, and by the implicit bias workshops that Jenny Saul has been running. While seldom direct commentary on the topic of this book, discussions that illuminate some of the nearly incomprehensible workings of academic society became invaluable to me in trying to function in that context.

Conversations with Brian McLaughlin and Frances Egan at Rutgers many years ago helped me gain access to philosophy of mind. Jerry Fodor's classes were always amazing. I must also thank Rosalind

Hursthouse, Gavin Lawrence, and Philippa Foot, as discussions with them over several decades helped raised the background questions that I have tried to address. I think Elizabeth Anscombe's valuable influence is also evident at some points. I still miss talking to David Pears, Michael Woods, and Gilbert Ryle, all such fine philosophers. Elisabeth Reid has herself been a model of many virtues.

As I completed the final manuscript, I was helped by William Langley, whose careful reading pointed out both large and small errors. I am grateful for his help.

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Introduction

1 The initial question

This book records research that began with a simple question; ‘What are mental representations?’ The question may seem surprising, because mental representations, as commonly understood in standard Anglophone philosophy today, can seem unproblematic. The inference from ‘Mary believes that her keys are on the table,’ to ‘Mary has a state with the content, “My keys are on the table,”’ may look obvious.

Further, the result of so inferring is the attribution of internal states with content about objects in the world. Hence, a theory endorsing such inferences seems to contain a solution to a very important question: how do our minds relate cognitively to our environment? The answer is that they have states that are about the environment.

In the history of philosophy, there is another theory about how our minds relate cognitively to our environment. This theory claims that our minds sample the environment by getting instances of it. Of course, the idea that when Mary thinks about her keys, the keys are literally present inside her head is simply incredible. Hence, the theory has to be accompanied by a compensating ontology. In Aristotle and Aquinas, the ontology is one of forms and matter. Forms are multiply realizable; further, they can be realized in the world or they can be realized in us. Thus, Mary’s thoughts about keys and tables involve the intelligible species, KEY and TABLE, because FORMS go well with capital letters. If she sees the keys on the table, then she gets a number of sensible forms or species realized in her senses and processed by various components of her sensory system until the mind extracts the intelligible forms or species.

Signs of this ontology appear in early modern philosophy, but taken literally it seems to beg fundamental questions being raised about the

objective reality of what were counted as sensory forms such as colors and feels. For Aristotle and Aquinas, sensory forms are simply among the fundamental features of reality. The rise of a mechanistic science had placed that view thoroughly into question. Nonetheless, as we see, the picture of the mind as containing colors and feels occurs in some philosophers of the period, and, in particular, within Hume's writing. The overall ontology, however, is importantly different.

At the same time, the rise of modern physics offers a very simple solution to the problem of how the mind can sample the world when instances of colors and objects are not to be found in the brain or the mind. The simple solution is to hold that there is a commonality between the mind, the brain and the material environment. Thus, Hobbes tells us:

All which qualities, called 'sensible' are in the object that causeth them but so many several motions of the mater [sic], by which it presseth our organs diversely. Neither in us that are pressed are they anything else but divers motions; for motion produceth nothing but motion (Hobbes & Gaskin, 1998).

From such a perspective, motion in the world causes motion in our brain, and that's the end of it, at least for sensory experience.

There are, then, two different sorts of representations. We call one 'Fodorian' and the other 'Aristotelian,' but these categories are not limited to philosophies that share much with Fodor or Aristotle. One central thesis of this book is that the sort referred to from Aristotle onwards flourishes in ordinary discourse and in much of cognitive neuroscience. An implication of this thesis, which emerges by the end of this book, is that we can make clear sense of much that is coming out of cognitive psychology and cognitive neuroscience about actions and emotions. Perhaps most surprising, we can see how rapid, sub-doxastic actions can be both intentional and finely attuned to a changing environment. It is an awkward fact that though even though books from learned scholars are currently introducing this idea to laypeople (Kahneman, 2011; Montague, 2007), philosophers' still 'standard account' makes it seem impossible (Schlosser, 2011; Stueber, 2006).

Representations and theories of embodied cognition

It can seem obvious to theorists, particularly in this era of brain science, to identify the mind with the brain or the brain's functioning.

This view is being extensively challenged today. Embodied cognition theorists such as Dreyfus & Wrathall (2006), Noë (2004), Gallagher (2005), Hutto (2008), Chemero (2009), Wheeler (2005) and others have brought in notions from philosophers and scientists outside those traditionally considered in Anglophone philosophy. In doing so, they have stressed actions of the lived body in its environment as grounding our understanding of cognition, even if, with the exception of Chemero, they have still found some use for a notion of mental representation. Nonetheless, as 'mental representation' is currently understood in philosophy today, theories developing accounts of such representations tend to solidly locate the bearer of mental content wholly inside the head (Adams & Aizawa, 2008; Block, 2005; Rupert, 2009). Hence, embodiment theorists typically downplay the use of representations and can be very hostile toward them. For example, in his review of Ramsey (2007) and Hutto (2011) remarks:

when [researchers in cognitive science] talk of representations these researchers really lack a proper understanding of their own theoretical commitments. They are misled and confused because of their attachment to a certain way of talking; a certain way of characterizing what goes on in the brain.

Because neuroscience is replete with discussions of representations, these philosophers tend to eschew neuroscience, or at least minimally engage with it. This response to the use of 'representation' in neuroscience seems to me quite tragic. Cognitive neuroscience forms one of the most vital areas in research today, and it is revolutionizing our view of our selves. To sever philosophy of mind from this enterprise is at least to risk a great loss. Further, it is an unnecessary risk, or so I shall be arguing in this book. That is, our representations as samples have a very significant contribution to make to embodiment theorist. These representations are not content carriers, still less content carriers wholly in the head.

One central theme of this book that we develop early on is that the notion of representation in the cognitive neurosciences is often a very different one from that dominant in Anglophone philosophy of mind. But even without such an investigation, we can see that cognitive neuroscience engages with topics in the 'embedded cognition' movement in important ways that should not be disregarded. One area where the importance of neuroscience comes in concerns affordances, which are frequently discussed in embodied cognition theories as well as in more

classic approaches, such as those by Siegel (2006, 2010). One can just see, it is sometimes said, that an object or setting affords one the opportunity, for example, to sit comfortably, to eat well, to rest a burden and so on. There are, however, aspects of the phenomena of affordances that are under the purview of cognitive neuroscience, which for well over a decade now has moved away from the classical cognitive science of Marr's *Vision* (Marr, 1982) into investigating the organism as shaped for flourishing in its niche.

A neuroscientist, along with some embodied cognition theorists, may notice, then, that what an object can afford one varies even for one individual. Osteoimmunology can tell us why a chair that once was so comfortable no longer affords one a good resting place; neuroscience attempts to explain not just what the resulting pain consists of but also how the change in what the world affords is recognized and acted upon. An experience after an accident that reveals one's skeleton's weakness might lead one to see over-stuffed chairs as foes and not friends. What about us allows one-trial learning in this sort of situation? Cases such as this have been studied extensively, and we now have theories that promise to explain at least parts of very puzzling features of human life (McClure, York & Montague, 2004; Montague, Dayan, Person & Sejnowski, 1994; Montague, 2003; Montague & Quartz, 1999). One such feature, connected with the chair example, has been long recognized; instinct may win out over reason as a guide even to quite sophisticated parts of human life, as we see in following chapters. And neuroscience has a very good story to tell about how one instinctively updates oneself on many of the changing contingencies in one's environment. The story also may yield an explanation of why updating can radically fail in cases of cigarette smoking or risky behavior on the stock market, for example (Rangel, Camerer & Montague, 2008).

A related case is the idea of 'action-oriented representation,' which is posited to capture the phenomenon of something's presence to us being a prompt for action (Wheeler, 2005). The cat is present as for petting, the glass of ice tea as for drinking, and the towel as for wiping. Situations or things can call for action. In embodied cognition theories, the idea of an action-oriented representation appears to be bedrock, and the notion of representation is employed to explain what they are, but not how we can have them. However, we can easily discern such an explanation being developed in cognitive neuroscience. There are investigations confirming the idea that experiences of rewards alter vision at a very early stage in visual processing. Thus, a chair literally looks different to someone who sees it as a comfortable place to rest than it does to

someone who does not (Shuler & Bear, 2006). Further, according to an important theory, what affects vision also activates a relevant motor program (Montague, 2007). One result of the latter work in reinforcement learning is that the idea that perception itself prompts action may be not quite accurate. That is, in many cases, some event such as a burst of dopamine may both alter one's vision and initiate the movement, so that the vision and the prompt are co-effects of a cause.

Chemero (2009), largely correctly I think, takes his radical embodied cognitive science to be the only sort of theory of embodied cognition that avoids representations with content; what this means is that almost all theorists of non-radical embodied cognitive science do admit mental representations, however attenuated the roles of such representations may be. Let me stress that I am following Chemero in trying to generalize about all theorists in recent philosophy *who have any definite commitment to what representations are*. Chemero and I roughly agree that theorists of representations all hold that representations have content. Some of these philosophers may be hesitant to use 'content,' but nonetheless the representations have aboutness and satisfaction conditions. That is, they are about some bit of the world and they either fit it or fail to fit it. Thus, for example, we might understand 'action-oriented representations' as Clark (1997) does, in which case they have a declarative component and an imperative one. These representations say something like, 'This X is before you; use it.' In such a case, the representations have two satisfaction conditions; they need to fit the world, but the world also needs to fit them, if both conditions are satisfied. If there is an X here before you, the first component is satisfied; if you use it, then the second component is also. (I use the 'fit' metaphor in parallel with the 'corresponds to the facts' locution; thus, true statements fit the world, while with fulfilled commands, the world fits them. This is in contrast with the more standard use of the 'fit' metaphor, which I find intuitively puzzling.)

A philosopher, such as Wheeler (2005, 2008), may want to focus quite entirely on the action part of the representation. The representation still appears to have aboutness and satisfaction conditions. Rather like a shopping list, the action-oriented representation is only satisfied by the environment's fitting it. Another alternative, which may also suit Wheeler and other philosophers, would be to say that the philosopher's task is to specify simply how the representation fits into the phenomenology. That is, the representations are simply action-originating reactions, and that they are so is not to be understood in the semantical terms of aboutness and satisfaction conditions.

As we see in the following chapters, this conception of representation is tied to a language-based picture of the mind. Once we recognize it, we can see that employing it can make a considerable difference in how we approach problems concerned with concepts, emotions, beliefs and actions. Among other things, we find a way to understand human cognition as intimately related to its evolutionary sources.

Chapter 1 introduces the two major themes of this book: an alternative conception of representation and a different setting in which to understand cognitive neuroscience. One important result is that we see good grounds for thinking intentional content cannot be part of a causal theory of the mind that cognitive neuroscience is developing. With regard to the different setting, for well over ten years neuroscience has been moving beyond a model of its project presented by David Marr, which still has philosophy in its grip. The alternative conception of representation is further explicated in Chapters 2 and 3. Chapters 4 and 5 locate it historically. We concentrate on Hume because he employs a version that we use in Chapter 7.

Chapter 6 makes good a promise in Chapter 1, which is to explain why the leading theories of the dominant sense of 'representation' have a radical, though unnoticed flaw; this problem is additional to that presented in Chapter 1. A related problem is raised in Chapter 7, which more importantly looks at how our alternative representations can figure in an account of human thought. Chapter 8 brings out an implication of the new setting for cognitive neuroscience, and contrasts certain accounts favored in cognitive neuroscience with those typical in philosophy. With regard to vision, that is, philosophical accounts typically aim to draw the line between seeing and not-seeing. For cognitive neuroscience, the central line is to be drawn between seeing well and not-seeing well. The final chapters take the two central themes to perception, emotions and actions. The book's project is not eliminativist, and the concluding task is not to see how ordinary descriptions of ourselves fit the selves described by cognitive neuroscience.

1

Regarding Representations

1 Introduction

What makes these different theories – from Aristotle, Aquinas, Hume and current cognitive neuroscience – all theories about the mind or brain sampling the world? Hobbes certainly did not see himself as updating Aquinas and Aristotle in such a direct fashion, but he might have. This is because we can find a sense to saying that the patterns in the two domains – world and brain – are the same. And the sameness here is mathematico-empirical inter-derivability (Dayan & Abbott, 2001). That is, there is a description of the environmental cause from which, given the appropriate empirical algorithms, a description of the effect can be derived and *vice versa*. At the core of sampling theories is a notion of instantiating the same things, forms, qualities or patterns of activity.

The transition from matter and form to such inter-derivability is very significant because it points to the various theoretical commitments theoreticians have taken on in order to solve the problem that, in a perfectly ordinary sense, the mind does not get samples of the world in it. As we previously noted, we need a compensating ontology. That which is found in cognitive neuroscience is exactly what one should expect from the kind of mechanical science that we have. Forms have become, we might say, empirically equivalent patterns.

As we see at many different points in these initial chapters, we have two kinds of access to the two very different kinds of representation. On the one hand, we have the familiar and quite ordinary distinction between displaying and describing. I can inform you of my tastes in wines by showing you examples or by describing wines I like. On the other hand, more apparatus needs to be introduced if these ideas are to feature in philosophy of mind. Recently many philosophers have found it quite