

Religion and Embodied Cognition

with Fraser Watts, "Embodied Cognition and Religion"; John A. Teske, "From Embodied to Extended Cognition"; Daniel H. Weiss, "Embodied Cognition in Classical Rabbinic Literature"; Léon Turner, "Individuality in Theological Anthropology and Theories of Embodied Cognition"; and Warren S. Brown and Kevin S. Reimer, "Embodied Cognition, Character Formation, and Virtue."

EMBODIED COGNITION AND RELIGION

by Fraser Watts

Abstract. It is argued that there are good scientific grounds for accepting that cognition functions in a way that reflects embodiment. This represents a more holistic, systemic way of thinking about human beings, and contributes to the coordination of scientific assumptions about mind and body with those of the faith traditions, moving us beyond sterile debates about reductionism. It has been claimed by Francisco Varela and others that there is an affinity between Buddhism and embodied cognition, though it is argued here that they are less closely aligned than is sometimes assumed. Embodied cognition also accords well with the holistic strand of thinking about human nature in Judeo-Christian thinking. While accepting the persuasiveness of the general case for cognition being embodied it is suggested here that some forms of cognition are more embodied than others, and that it may be one of the distinctive features of humans that they have developed a capacity for relatively nonembodied forms of cognition.

Keywords: brain; cognition; embodiment; mind

The purpose of this series of articles (arising from the ISSR conference on embodied cognition in Loccum in September 2012) is to propose a new approach to one of the more difficult challenges that arises on the interface between theology and science. The problem is how to develop a view of the human person that safeguards *both* the broad view of the human person found in the religious traditions, especially the nonreductionist view that there is more to the person than the physical body, but *also* connects with the approach to the human person found in contemporary science that emphasizes the causal significance of physical processes. The response to

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this tension proposed here arises from within science itself, namely recent theory and research on “embodied cognition.”

This article will advance through several steps. I will begin by briefly putting this embodied cognition proposal in the context of other attempts to reconcile religious and scientific approaches to the human person. Second, I will set out the embodied cognition proposal itself, indicating both the background assumptions from which it arises, and the kind of research that supports it. Third, I will enter what I consider to be an important caveat about the proposal that human cognition is embodied, namely that some cognition is less embodied than others, and I will relate this to the question of human distinctiveness that is currently receiving much attention. Finally, I will look at how recent scientific work on embodied cognition relates to a sample of faith traditions, Buddhism, and the Judeo-Christian tradition.

EMBODIED COGNITION IN CONTEXT

In the postwar years there has been a growing consensus in favor of a view of the human person that does not assume a separation of body and mind. One of the key moves set out in Gilbert Ryle’s path-breaking book *The Concept of Mind* (Ryle 1949) was the recognition that philosophical problems and confusions arise over the noun “mind” that do not arise with the adjective “mental.” To put it another way, the reification of mind causes problems because it implies that “the mind” is similar to, indeed parallel to, “the body.” In contrast, talk of mental functions and capacities does not raise such problems.

Alongside this philosophical move away from dualism, modern neuroscience has provided abundant evidence for a tightening of the mind-brain link (Jeeves 1997). The most compelling evidence comes from research on the effects of head injury, which has shown that damage to slightly different areas of the brain can produce distinct and highly specific cognitive deficits. For example, you can get a dissociation between the ability to recognize faces head-on and sideways. Neuroscience gives a particular urgency to moving beyond the idea that the mind and the body are similar but separate substances.

Theologians who have reflected on the implications of such philosophical and scientific developments for conceptualizations of the human person have generally been optimistic about reconciling it with the Judeo-Christian tradition. As has often been noted, the Judeo-Christian tradition attaches considerable importance to the body (see below). Indeed, if there is a point of conflict between science and religion, it is probably not about the importance of the body (on which they largely agree), but about the reality and significance of other aspects of human nature such as mental functioning and soul qualities. About that science and religion have more

divergent views, though it should be noted that scientific views on “reductionism” are quite varied, and it would be a mistake to imagine that all science is committed to reductionism.

Reductionism takes many forms, as has often been noted (e.g., Watts 2002), but often takes the form of claiming that human beings are “nothing but” their physical nature. That is a position that cannot readily be reconciled with religious thought, though it is not only religious people who object to that form of reductionism. There is no theological problem with methodological reductionism that simply explores how far reductionism can be taken in any particular case; the problem is with strong reductionism that assumes that complete reductionism must be possible. Such strong reductionism is neither a necessary presupposition of science, nor a legitimate conclusion from it, but a feature of “scientism” that is only contingently associated with empirical scientific enquiry. Religious thought will resist the claim that nonphysical aspects of human nature (in as far as such aspects are allowed at all) can be explained completely in terms of physical factors, but it need have no problem in accepting the relevance of physical explanatory factors to people’s mental and spiritual life.

There have been various approaches to reconciling the nonreductionist commitments of the religious traditions with the apparent physicalism of modern neuroscience. One approach has been via “nonreductive physicalism,” which makes use of the notion of supervenience (Brown et al. 1998; Davidson 1980). Another has been via “emergentism” (Clayton and Davies 2006), which allows for the emergence of nonphysical realities, though it retains a residual physicalism in assuming nonphysical realities emerge from physical ones. Physicalism is concerned with the role of the body in giving rise to cognitive capacities, that is, with the dependence of cognition on the brain. Embodied cognition, in contrast, is concerned with the body as the context in which cognition occurs; that is, with how the body shapes and influences cognition. In addition, physicalism tends to focus just on the brain, whereas embodiment focuses on the body in a broader way.

To say that cognition is embodied is certainly compatible with physicalism, but it is making a different point. Embodied cognition is certainly physicalist in its assumptions in the broad sense of emphasizing the physical context of cognition, but it is not necessarily committed to physicalism in the narrower sense of seeing cognition as grounded in the physical brain and emergent from it (or supervenient to it), and perhaps even entirely explicable in terms of the physical brain. Embodied cognition could be equally compatible with a range of other positions such as “dual-aspect monism” (i.e., the view that there is a single reality, of which mind and body are two faces or aspects).

Though emergentism and embodied mind are readily compatible, I suggest that embodied cognition theory may nuance how we formulate what

exactly it is that is said to emerge. It might steer emergentism away from saying that what emerges is a mind that operates according to its own laws, rather than those of body and brain, and toward emphasizing that emergent mental capacities are very closely integrated with the physical body from which they emerge. From the point of view of embodied cognition, the body is not just the origin of mental capacities; it is the context within which those capacities operate.

SCIENTIFIC DATA AND BACKGROUND ASSUMPTIONS

Strong claims have been made for the importance of the paradigm shift to embodied cognition, and no one has emphasized that more strongly than George Lakoff. “The mind isn’t what we thought it was. Philosophy wasn’t even close in its speculations. For over two thousand years, philosophers have mostly viewed the mind as disembodied. The disembodied mind was not an empirical discovery, but rather a philosophical creation . . . But over the last two decades, something truly remarkable has happened . . . A new understanding of the mind has emerged, empirically based and freed from age-old philosophical baggage. The new view of mind changes everything, in an almost shocking way” (Lakoff 2003, 49).

The best approach to understanding the significance of the embodied mind proposal may be through recognizing what it is a reaction against. Embodied cognition is actually a broad and quite diverse set of theories which agree about what they are rejecting more than about what they are asserting. Embodied cognition is a rejection of the kind of “cognitivism” that assumes that cognition proceeds through the rule-governed manipulation of mental symbols that represent external realities. As is the case with many paradigmatic assumptions, cognitivism was really just a convenient *modus operandi* on which a wave of scientific work was based (and for a time a very fruitful one), but it was never really a conclusion from research. It was closely connected with artificial intelligence, which focused on programming computers to do the kind of symbol manipulation that it was assumed that humans performed.

However, there has been a gradual accumulation of empirical observations that sit badly with cognitivist assumptions, and which seem to require some kind of paradigm shift. The empirical claims on which embodied cognition theory is based are the subject of the next article by John Teske, so I will deal with them only briefly here, and follow a way of categorizing the relevant data used by Mark Williams and colleagues (Williams et al. 2013). As they see it, there are at least five key empirical claims that invite some form of embodied cognition theory.

First, perceptual judgments are determined by perceived effort and bodily skill; so, for example, a hill is perceived as steeper if you are carrying a heavy backpack. Second, perception is frequently associated with activation

of the motor system; so, when you are observing someone else perform an action, there are often subtle signs that people are simulating that action themselves. Third, motor activation is often involved in language comprehension; so, listening to an action sentence is often associated with evidence of motor activation. Fourth, there is evidence from lesion studies for the neural basis of semantic knowledge showing, for example, that specific categories seem closely linked to particular modalities. Semantics seems to be embodied, something that is particularly reflected in the way many metaphors link inner experience with the body. Finally, there is a growing literature showing the relevance of embodiment to social cognition; for example, priming people with social stereotypes seems to have far-reaching effects on their physical performance.

Though the accumulation of such empirical evidence in support of some form of embodied cognition is strong, there is still little consensus on how embodied cognition is best formulated theoretically (e.g., Shapiro 2010). The oldest theoretical model in the field comes from James Gibson's theory of perception, which emphasized the extent to which meanings, rather than being constructed in the head, are already implicit in how the world is perceived, and in the meaningful patterns that are found in it. Gibson's approach is still very influential, for example, in the work of Alva Noë (Noë 2010). There is quite a gulf between that and Barsalou's more recent theory of perceptual symbol systems, which emphasizes the role of simulation in cognitive processes (Barsalou 1999), as discussed by John Teske in the following article. On this view, perception is very much an enactive process, which often involves enacting simulations of what is being perceived.

Though embodied cognition theory is still coming into focus, the reasons for making some such paradigm shift in how we theorize about cognitive processes seem compelling. It is a sign of the times that even artificial intelligence has recognized the case for approaching cognition in a more embodied way (Anderson 2003; Foerst 1998). However, rather than going further into the scientific evidence for embodied cognition, I want to set out some of the background assumptions that render the embodied cognition approach attractive. I do not claim that these assumptions are shared by everyone who takes an embodied view of cognition, but they explain why I regard embodied cognition as an attractive position, theologically and in other ways.

First, I propose that we should start by thinking about the physical brain in the broader context of embodiment. Both emergentism and supervenience start from the physical brain, and try to understand how mental functioning can arise from it. However, to start from the brain alone is already to take the brain out of the context of the body of which it is part. Certainly the human brain is a remarkable aspect of the human body; in physical terms it is probably the most distinctive feature of the human

body. However, it is a bedrock assumption of the approach I want to explore here that we should start from the body as a whole rather than just the brain (while recognizing that the brain is, of course, an important part of the body).

Second, I am cautious about starting from too sharp a disjunction between brain and cognition. The question of how the brain can give rise to consciousness is one with which science has not so far made much headway, and the reason for that may be at least partly conceptual rather than, say, methodological. I see attractions in a “dual-aspect monism” that approaches the distinction between physical and mental aspects of human nature in terms of different, complementary descriptions. On this view, to ask about *causal* relationships between brain and mind is already to assume a greater degree of separation between them than is appropriate. We might do better to think in terms of a single “brain/mind” entity whose functioning can be described in different and complementary ways. There are, of course, questions to be asked about the relationship between the structure and functions of this brain/mind entity, and about how what is happening at one level of description can affect what is happening at another.

Third, I suggest that it is helpful to start from thinking more systematically about brain and cognition, that is, about how they are interconnected within a far-reaching functional system. Biology is emerging from a highly reductionist phase (e.g., Goodwin 1997; Noble 2006), which probably arose from the remarkable achievements of biochemistry. However, biology is now moving in a more organismic direction. The future of biology seems to lie with exploring interacting systems, rather than with a reductionist approach to biology in which an attempt is made to explain everything in terms of the lowest level. Epigenetics is a good example. It is now clear that there are important systemic mechanisms that regulate the operation of genes, regulatory mechanisms in which certain genes are involved but which are influenced by broader systemic processes. This makes old-fashioned genetic reductionism obsolete. More generally, the move toward organismic or systems biology puts the long-standing problems of reductionism in a new context, making them less vicious and problematic. Embodied cognition can be seen as part of that wider paradigm shift toward a more systemic biology.

From the perspective of those concerned with the interface of theology and biology this is a very welcome development, though it will come as no surprise. Arthur Peacocke was ahead of his time in arguing for the importance of “top-down causation,” or “whole-part constraint” as he later called it (Peacocke 1999). These are ideas that are becoming much more part of the normal currency of biology than was the case when Peacocke first proposed them. It is entirely in tune with this new wave of organismic, systemic thinking in biology to be thinking about cognition in

the context of embodiment, rather than as simply a product of the physical brain.

Finally, an emphasis on embodied cognition is consistent with the common-sense view that *we* do things in the world, something that Mary Midgley has emphasized in her characteristically robust way (Midgley 1992). Our minds don't make decisions or take actions; neither do our physical brains; nor even an integration of our brains and minds. It is people that make decisions and act in the world. We do so as creatures who are physically embodied and socially embedded. It ought to be unnecessary to emphasize this, but there is an atomistic strain in contemporary culture that prefers to attribute decisions and actions to something less than the complete person. It goes against common sense, and there is no scientific justification for adopting this odd, counterintuitive, and rather atomistic way of talking.

One of the key issues about embodied cognition that is still unresolved is whether a claim should be made just for the importance of embodiment in cognition, or whether there is a case for thinking about cognition in terms of a wider range of contextual factors, including social context (e.g., Fuchs 2009; Thompson 2007), as John Teske also argues in this volume. That has implications for whether "embodied cognition" is the right name for this new theoretical perspective. There are other broader terms being canvassed, such as "grounded cognition" or "contextual cognition," both of which suggest that the relevant context of cognition is broader than just embodiment.

There is something of a tension here between where the evidence is strongest, which is on the role of embodiment in shaping cognition, and a broader judgment about the kind of theoretical paradigm that will be most scientifically fruitful for future scientific work. From the latter point of view, I would favor a shift to a broader paradigm of contextual cognition that took social context into account as well as embodiment.

SOME COGNITION IS MORE EMBODIED THAN OTHERS

Though I am persuaded by the evidence and arguments in favor of embodied cognition presented by Alva Noë, John Teske, Mark Williams, and others, I want now to suggest that humans have a range of cognitive capacities, and that some cognition is more interconnected with embodiment than others. I assume that all cognition is subserved by the brain, and dependent on it. However, I suggest here that humans have at least two different modes of cognition, and that one mode of cognition is influenced by embodiment to a greater extent than the other, and affected by a broader range of somatic processes. This is a point that so far has been surprisingly neglected in the literature on embodied cognition, but which I suggest has quite far-reaching implications.

One can approach this issue, for example, in terms of recent work on brain lateralization. After initial excitement about lateralization, a reaction has set in against oversimplified versions of lateralization theory. For example, the claim that one hemisphere performs one set of functions, and the other hemisphere another set of functions should be set aside. As McGilchrist (2009) has emphasized in his magisterial review of research on lateralization, both hemispheres are capable of doing almost everything; they just have different cognitive styles in doing so. That is reflected, for example, in the right brain being more contextual in its style than the left brain. It is also important to emphasize that the contrast between the hemispheres is not the only important neural contrast; there are also important contrasts between the front and back in the brain, and between the neocortex and older/lower parts of the central nervous system.

The distinction between left and right brain modes of cognition maps roughly onto the widely accepted distinction between two different cognitive systems, one fast, with high capacity, operating in a schematic code and relatively intuitive; the other slow, with limited capacity, and operating linguistically and propositionally (Evans 2010). Philip Barnard has formulated this in terms of *Interacting Cognitive Subsystems* (Barnard et al. 2007; Watts 2013) which postulates two subsystems in the central engine of cognition, the “implicational” and the “propositional” subsystems. Significantly from the present perspective, the implicational subsystem has direct links to body state, but the propositional subsystem does not. It corresponds roughly to the distinction in folk psychology between “head” and “heart” (Watts and Dumbreck 2013).

The important point in this context is that in the majority of people (those in whom the left hemisphere is “dominant”) the left hemisphere is more interconnected within itself, whereas the right hemisphere is better connected with much of the rest of the body and, for example, has better proprioceptive awareness (McGilchrist 2009). Left hemisphere cognition is relatively encapsulated; whereas right hemisphere cognition is more somatically integrated, both anatomically and functionally. In that sense, it is more embodied. Language has given humans a capacity for cognition that in practice *operates* in a less embodied way than the cognition of the other species, and than the cognition subserved by the “nondominant” right hemisphere in humans (even if we accept the point made by Lakoff and others that all linguistic concepts *originate* in embodiment).

Another important anatomical fact is that the two hemispheres are more specialized in humans than in most species, and also relatively independent of each other, with less interconnection between them. It thus seems that, to some degree, they constitute two alternative modes of cognition, and McGilchrist (2009) implies that people vary about which cognitive system they mainly rely on in any given situation, that is, whether they rely on the relatively embodied mode of cognition of the right hemisphere, or

the less embodied mode of cognition of the left hemisphere. To some extent the same applies to whole cultures, and McGilchrist has argued that our present culture seems dangerously overreliant on a propositional, nonembodied mode of cognition of the dominant left brain.

Cognitive tests may bias people to one mode of cognition or the other, and there is a possibility that relatively artificial laboratory tasks may bias people to nonembodied, noncontextual forms of cognition. There thus seems a real possibility that laboratory-based experimental psychology has given a distorted impression of how human cognition operates in everyday life, and led us to underestimate just how embodied everyday cognition is. It is impressive that, despite this, the evidence for embodied cognition is as powerful as it is. In everyday situations cognition may well be more powerfully shaped by embodiment than the current evidence shows.

Recognizing that humans have two different modes of cognition also has important implications for human distinctiveness and evolution. Barnard's cognitive theory of evolution proposes that the crucial distinctive feature of humans is that they have two central cognitive subsystems (Barnard et al. 2007). What is novel in humans is the propositional subsystem, which operates at a high level of abstraction, propositionalizing meanings in a relatively nonembodied way. Though human cognition continues to be embodied, as in other species, it seems to be the capacity for relatively nonembodied cognition that is novel in humans. However, alongside this novel capacity for cognition that is relatively independent of embodied context, humans have also developed their capacity for embodied and contextual cognition in ways that have hugely enriched social and cultural life, as Wentzel van Huyssteen has emphasized (van Huyssteen, *in press*).

Watts (*in press*) has applied this perspective on cognitive evolution to the evolution of religion, arguing that it is the development of a second central subsystem that made religion possible, together with all other aspects of the "cultural explosion." The paradox is that, though religion continues to make much use of a relatively embodied, intuitive mode of cognition, it was the development of a separate propositional, nonembodied cognition that made it possible. Many religious practices seem designed to give the more embodied, intuitive "implicational" subsystem relatively free rein (Watts 2013). The implication is that embodied modes of cognition may be especially important in religion. Religious practices make use of a relatively embodied mode of cognition, and seem designed to emphasize the role of embodiment in religion.

EMBODIED COGNITION AND THE FAITH TRADITIONS

In this final section I will explore the emerging dialogue of embodied cognition with Buddhism and the Judeo-Christian tradition. (Relating

embodied cognition to other traditions such as Hinduism and Islam is work still to be undertaken.) The various world religions seem to have interestingly different relationships with ideas about embodied cognition. On the face of things, Buddhism has the closest relationship, and Francisco Varela et al. (1991) in *The Embodied Mind* argued for a close convergence between Buddhist thought and current scientific work on embodied cognition. However, on critical examination the convergence is not as close and convincing as Varela and colleagues claimed. The fact that the idea of the “embodied mind” was introduced into psychology in explicit dialogue with Buddhist thought suggested to many people that the convergence was in fact greater than was actually the case.

Buddhism and embodied mind probably agree more about what they reject than what they assert. They both reject a substantial, internal self, whether that is formulated in terms of the Cartesian “soul” or in more modern terms as a homunculus, an inner core at the heart of all cognitive processing. In fact, cognitivism often rejects the homunculus too. For example, Barnard’s model of *Interacting Cognitive Subsystems* explicitly rejects the notion of a homunculus, and sees a person’s cognitive state as arising from a coalition of mutually interacting subsystems, not from a “little man in the middle.”

Varela et al. advance a variety of other claims that, while consistent with a notion of an embodied mind, are not necessarily entailed by it. For example, they are keen to bring an introspectionist methodology, a key feature of Buddhism, into Western psychology. While I agree with them on the value of that move, their understanding of the embodied mind does not depend on it. They also propose a psychological examination of mindfulness, something that has been taken much further since they wrote, with exciting results, for example, in the work of the Oxford Mindfulness Centre (e.g., Williams and Penman 2011). But that is distinct from their description of the embodied mind. There are also significant divergences between Buddhist thought and current work on embodied cognition. One important divergence, as Federman (2011) has pointed out, is that values such as compassion are integral to Buddhism, though not in Western psychology.

Even though, on critical examination, Varela et al. established less of a convergence between Buddhism and embodied cognition than was originally thought, it remains a very fruitful interface for further exploration. The Buddhist approach to mind has the attractive “ecological validity” of being concerned with cognition in everyday life, rather than in the laboratory. As everyday cognition is necessarily embodied, that will tend to lead the Buddhist approach to mind along paths that converge with contemporary embodied cognition theory. However, in carrying that dialogue forward, it will be important to engage with the diversity in the Buddhist tradition more richly than Varela et al. attempt.

Turning to the Judeo-Christian tradition there has recently been a renewed emphasis on the importance of embodiment. It has been widely recognized that the Hebrew Bible takes a holistic view of the human person. Rather than seeing the human person as having a “body” and “soul,” people are seen as “ensouled bodies.” Though a superficial reading of St Paul can suggest that he takes a more dualist view of the human person, closer analysis indicates that he assumes a complex, nondualist view (Green 1998). Similarly, Michael Welker (2012) has recently undertaken a careful analysis of Pauline anthropology, in dialogue with modern scientific thought, recognizing the complexity of Pauline thought. Flesh, body, mind, soul, and spirit are all distinguished from one another, albeit not separated. Paul’s position is certainly more subtle and complex than a simple dualism.

Though the Christian tradition has been quite varied in how it has conceptualized the human person, there are certainly prominent Christian thinkers, such as Aquinas, who have made holistic assumptions, seeing the soul as the form of the body. Furthermore, the Judeo-Christian tradition has emphasized the resurrection of the body, as exemplified in the clause of the Apostles Creed that refers to the resurrection of the body, and building on the belief in the book of Job that “in my flesh shall I see God.” On the face of things, it can therefore be argued that both modern neuroscience and the Judeo-Christian tradition, in their different ways, place a strong emphasis on the human body. Though they might frame that in slightly different ways, at first glance there does not appear to be an irreconcilable difference between them. Of course, there are significant issues about exactly how the importance of the body is to be conceptualized, and there are many different ways of doing that.

The interface between embodied cognition and Judeo-Christian thought has only recently begun to be explored, especially by Professor Warren Brown and his colleagues at Fuller Seminary (Brown and Strawn 2012; van Slyke et al. 2012) and by Drs. Turner, Watts, and Weiss at the University of Cambridge. Three of the remaining articles in this group arise from work in progress on the interface between embodied cognition and the Judeo-Christian tradition (following the next article from John Teske which sets out theory and research on embodied cognition).

Daniel Weiss is breaking new ground in relating embodied cognition and Jewish thought (apart from the brief remarks of Daniel Boyarin to which he refers). He chooses to work on rabbinic texts which, while obviously drawing on the classic texts of the Hebrew Bible, elucidate the assumptions of the Jewish tradition about cognition and embodiment more clearly than the Biblical texts themselves. Weiss’s conclusion is that this is a fruitful interface between the Jewish tradition and embodied cognition theory, each helping to clarify the other. His initial work in this area suggests that there is a fruitful convergence between their assumptions.

Léon Turner brings embodied cognition into dialogue with the Christian tradition, which has given rise to an astonishingly wide range of viewpoints about the relationship of body, mind, and soul. Indeed the diversity is so great that it is hardly possible to talk about *the* Christian tradition on this subject. There are dualist strands in Christian thinking that make assumptions that are a long way from those of embodied cognition. However, there are other more holistic strands that may be convergent with it, as explored by Léon Turner in this issue.

In the final article in the set, Warren Brown and Kevin Reimer take things in a practical, ethical direction, recognizing that the ethical actions of human beings are always the actions of embodied creatures. Again, ethical theory has been quite diverse, and there has been a tendency to overemphasize moral decisions (as opposed to actions) and to envisage those decisions being taken in a lonely, disembodied, decontextualized way. Iris Murdoch protests vigorously against this approach to ethics, with its unrealistic idea of ethical decisions being taken without any relevant social context (Murdoch 1970). Brown and Reimer draw on theory of embodied cognition and the specific context of L'Arche as a set of ethical communities to develop a more embodied approach to ethical functioning.

It is also worth noting that the importance of embodiment is assumed in many religious practices, not just in religious thought. In the Buddhist practice of mindfulness, attention to the body is a key focus. In the sacramental worship of Christians in Catholic tradition, there are many important physical practices, such as use of the rosary, making the sign of the cross, genuflection, and so forth. Physical movement is almost important in much charismatic and Pentecostal worship. If the assumptions of religious communities are to be found in what they do as much as in what they say, the importance attached to embodiment is very clear.

CONCLUSION

In this article, I have argued that there are compelling scientific reasons for making a paradigm shift toward seeing cognition as deeply embedded in our physical nature. There may indeed be good reasons for seeing cognition as embedded in social context too, though there is currently less empirical data that compel that conclusion. I suggest that this leads us toward a more holistic view of human nature than has been evident in much neuroscience. This developing view that mental capacities not only arise from embodiment, but also function in ways that reflect our embodiment, is readily compatible with the holistic view of human nature to be found in how the world's faith traditions have thought about human nature.

Embodied cognition has, for the most part, not taken a very explicit stance on reductionism. However, equally, it does not seem to be

associated with any strong reductionist crusade. In some ways, that might be seen as surprising. However, from the point of view of finding common ground between religion and science, it is very welcome. The reductionist tendency in the mind sciences could be seen as an overreaction against the kind of radical dualism that separates mind from body. With embodied cognition, that ghost is finally exorcised, and there is no longer any need for overreaction. Also, in emphasizing the close interaction between cognition and embodiment, embodied cognition is, in a sense, conceding the reality and significance of cognition. It is implicit in embodied cognition that there is more going on in cognition than, say, just a folksy way of describing brain activity.

For those who aspire to a meeting of minds between science and religion, it is very welcome that science itself has been led, by its own empirical search for the truth, to a view of mental activity that is so readily compatible with the holistic thinking about human nature that has predominated in the world's religions (despite the widespread misconception that religion is inescapably committed to the kind of dualism that separates mind and body). Embodied cognition is a scientific development that marks a significant step toward convergence between science and religion about mind and body, and is one that I believe religious communities can welcome unreservedly.

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