



THE EMBODIED MIND

Cognitive Science and Human Experience

REVISED EDITION

FRANCISCO J. VARELA

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NEW FOREWORD BY JON KABAT-ZINN

NEW INTRODUCTIONS BY EVAN THOMPSON AND ELEANOR ROSCH

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new foreword by Jon Kabat-Zinn

new introductions by Evan Thompson and Eleanor Rosch

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*Those who believe in substantiality are like cows;
those who believe in emptiness are worse.*
Saraha (ca. ninth century CE)

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Foreword to the Revised Edition

Jon Kabat-Zinn

In the annals recording the remarkable and improbable confluence of dharma, philosophy, and science in this era, if such are ever written, *The Embodied Mind* will be found to have played a seminal and historic role.

I was elated and, in many ways, awed when I first discovered it shortly after it was published by the MIT Press in 1991. Not that I understood it all, or even most of it, since I am neither a cognitive scientist nor a philosopher by training. But I nonetheless was able to recognize its breadth and depth, the rigor, edginess, and bravery of its scholarly lines of argument, well beyond the thought lines of academic cognitive science, and sensed that its publication by the MIT Press was a landmark and momentous signature of something new and profound emerging at the interface of science and dharma.

What I did understand of the book at the time (which over the years I wound up reading, consulting, and highlighting on multiple occasions), I found very much in alignment with my own thinking from early on in my scientific career as a molecular biologist pondering questions such as what makes life *life* and how consciousness arises from cells. It was also germane to my work, beginning in 1979, offering relatively intensive training in mindfulness meditation and mindful hatha yoga to medical patients with a wide range of diagnoses and chronic conditions and documenting what ensued in their lives and health from such an engagement. In those early days, I found myself at times somewhat tongue-in-cheek referring to this approach—that we later came to call MBSR, for “mindfulness-based stress reduction”—as “Buddhist meditation without the Buddhism,” since mindfulness had been explicitly and authoritatively characterized as “the heart of Buddhist meditation.”¹ MBSR was meant from the start to be a clinical

program orthogonal to conventional narratives of health and well-being, a laboratory for a more experiential and participatory medicine, a vehicle for self-education, healing, and transformation rather than a new “therapy.” It was conceived as a public health intervention and as a “skillful means” for demonstrating the liberative potential of mindfulness practice in regard to conventional views of self and the world and their attendant, often imprisoning narratives, which we all experience to one degree or another. Without that underlying, if mostly implicit element, MBSR would not have been either “mindfulness-based” nor a vehicle for dharma and, therefore, to my mind, of little value from the perspective of healing, transformation, or liberation.²

I remember feeling confirmed and uplifted by the centrality the authors accorded to “mindfulness” and “mindful awareness” in their wholly radical yet compelling, rigorous, and challenging attempts to bring together the fields of cognitive science, phenomenology, and dharma to examine the larger connections between mind, body, and experience. This feeling was amplified by the fact that the analysis and arguments were coming from not one but three authors, who seemed to be speaking with one voice from an unusually deep collaboration, and who were obviously also speaking from their own direct, “first-person”³ experience of mindfulness meditation practice, in addition to being serious scientist-researchers, philosophers, and scholars with grounding in the worlds of cognitive science and phenomenology, as well as in the contemplative and philosophical traditions within Buddhism. So it felt that they were themselves embodying in their collaboration what they were putting forth, a new way of, in their words, “laying down a path in walking.” This impression is only strengthened now by the “correctives” the authors have added in their introductions to this edition to clarify a deeper understanding of mindfulness grounded in lived experience and, in particular, in relationality itself and in what they term “enaction.” These correctives are really evolving refinements indicative of ongoing learning and growing, and are based on continuing investigation, reflection, inquiry, dialogue among colleagues, and actual embodied and enacted cultivation/practice of mindfulness. They are themselves “vital signs” of health, if you will, indicators of the vitality of the evolutionary arc of thinking and praxis at the cutting edge where cognitive science and the meditative disciplines converge and radically challenge each other’s models and understanding. Stasis at this

interface would be tantamount to attachment to and self-identification with unexamined assumptions and particular views, habits of mind that are themselves root causes of so much ignorance and suffering according to the wisdom traditions that articulated so precisely and rigorously many of the lines of inquiry pursued by the authors in the original text. So such correctives are very welcome signs of a natural generativity, learning, and humility at play here—just what one hopes for in science, in meditative practice, and in life.

At the time of the first edition and for many years afterwards, the MIT Press was headed up by the late Frank Urbanowski, a practitioner and student of Buddhist meditation himself, and a friend. Frank knew exactly what he was doing by publishing *The Embodied Mind*. It became the first and among the most profound and transformative of a whole family of books on cognitive science and the mind that he acquired. It was a cardinal example of what Frank termed “focused disciplinary specialization,” a strategy that continues to be a signature feature of the MIT Press’s publishing approach to this day and that is responsible in many ways for its ongoing success. The reissuing of *The Embodied Mind* now, in this new edition, after almost twenty-five years, with new introductions by the surviving authors and with the original text unchanged, is evidence that the book’s analyses, arguments, and impact have only grown in importance and relevance over the intervening decades. Indeed, the world has become so much more receptive to mindfulness that this book’s republication heralds a new era in our deep collective investigation, appreciation, and possible understanding of some up-to-now fairly intractable domains: the nature of thought and emotion, the nature of what we call “mind” and its non-separation from “body,” and the nature of what we call “self” and its non-separation from “others” and from the surrounding embracing world out of which life and mind emerge.⁴ And let’s include as well the nature of sentience and of experience itself, what the authors now refer to as “first-person experience,” so much less biased and invalidating a term than its forerunner, “subjective experience.” Their expounding on Merleau-Ponty’s notion of “the lived body” alone is a major and ongoing contribution to this inquiry.⁵

I started graduate school at MIT in molecular biology in 1964, wanting naively and romantically to investigate the fundamental nature of life and how it relates to self and to mind. I worked on bacteria, bacteriophage,

and colicins, hoping that the experience would serve as a good foundation (it did) for ultimately investigating the human mind from both the outside (the “third-person perspective”) and the inside (the “first-person perspective”). Bacteria, of course, are single-celled organisms, with an inside that is “alive” and a cell membrane keeping the inside intact, the outside out, and facilitating a dynamical exchange of energy and matter that keeps the inside conditions just right for life to perpetuate itself. Bacteriophage (viruses that infect bacteria with their DNA or RNA) and colicins (proteins that kill certain bacterial cells from the outside, and that are encoded by plasmids within the DNA of the source bacterium) are not alive, but they both use the life of the cell to replicate more of themselves, using different strategies. Fundamental molecular and dynamical distinctions between inside and outside, life and non-life, lie at the heart of one of Francisco Varela’s many interests and contributions, namely the phenomenon of *autopoiesis* that, together with Humberto Maturana, he posited as the original emergence of rudimentary “cognition” in life. Evan Thompson wrote a whole book on the subject, tellingly entitled *Mind in Life*.⁶ But the subject implicitly and explicitly anchors a great deal of *The Embodied Mind* and its revolutionary orientation toward embodiment and “knowing”—what the authors put forth, following the terminology of the Buddha, as a middle way.

One might say that we are moving toward an intimate yet universal, non-reductionist, non-dual understanding of the phenomenal world and our place in it. This book was and is a major stepping-stone along that trajectory. Such an understanding cannot ignore the unique particulars of diverse cultures, viewpoints, meditative traditions, and their ethical underpinnings and aspirations, to say nothing of the unexplained but reliably documented mysteries that Eleanor Rosch points to in her introduction. As she says, the book “is about something real” (X): in essence, “another mode of knowing not based on an observer and observed” (X). What could be more real, more challenging, and more potentially liberating, transformative, and healing than that? She also cogently points out a range of critical issues that need precise clarification and understanding when it comes to determining what people are actually practicing or being taught to practice (very different things in all likelihood) within various curricula claiming to be “mindfulness-based,” as well as in programs based

on other consciousness disciplines. The complexities abound. This is both extremely healthy and, at the same time, a conundrum for scientific investigation, demanding new levels of precision both in the descriptions of what is being taught and in first person accounts of what is being attempted and experienced, moment by moment.⁷ Francisco Varela would have had a field day with the vast opportunities presented to us in this unique era of the confluence of cognitive science, phenomenology, and dharma that he contributed hugely to bringing about. But his vision, his insights, and his voice are enduring and timeless, intimately permeating this volume and residing in the hearts and perspectives of his coauthors, as well as in his friends and former students and colleagues around the world.

May this new edition touch the minds and hearts and imagination of many, far and wide, in many different disciplines, and contribute to the “profound transformation of human awareness” (X) that was its original aspiration and remains so, appropriately amplified, to this day. That profound transformation and the accompanying learning to inhabit the spaciousness and boundlessness of awareness itself as the core of our embodied being, and then taking wise action for the benefit of others and ourselves from that vantage point when called for, is more sorely needed now on this planet than ever before.

Woods Hole, Massachusetts
October, 2015

Notes

1. Thera Nyanaponika, *The Heart of Buddhist Meditation* (New York: Samuel Wiser, 1962).
2. J. Kabat-Zinn, Some reflections on the origins of MBSR, skillful means, and the trouble with maps, in *Mindfulness: Diverse Perspectives on Its Meaning, Origins, and Applications*, ed. J. Mark G. Williams and Jon Kabat-Zinn (London and New York: Routledge, 2013), 281–306.
3. See Francisco J. Varela and Jonathan Shear, eds., *The View from Within: First-Person Approaches to the Study of Consciousness* (Exeter, UK: Imprint Academic, 1999).
4. See, for example, David Abrams, *The Spell of the Sensuous* (New York: Vintage, 1996).

5. See S. Kay Tombs, *The Meaning of Illness: A Phenomenological Account of the Different Perspectives of Physician and Patient* (Dordrecht, Netherlands: Kluwer, 1992).
6. Evan Thompson, *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Cambridge, MA and London, UK: Harvard University Press, 2007).
7. K. A. Garrison, D. Scheinost, P. D. Worhunsky, et al., Real-time fMRI links subjective experience with brain activity during focused attention, *NeuroImage* 81 (2013): 110–118.

Introduction to the Revised Edition

Evan Thompson

Almost thirty years ago, in the summer of 1986 in Paris, Francisco Varela and I began writing what would eventually become this book. I was a first-year Ph.D. student in philosophy at the University of Toronto and Varela had just moved to the Ecole Polytechnique and the Institut des Neurosciences. We had met about ten years earlier in the summer of 1977 when he came to a conference at the Lindisfarne Association, an educational institute and contemplative community founded by my father, William Irwin Thompson. My father and Gregory Bateson, who was Lindisfarne's scholar in residence that summer, led the conference, called "Mind and Nature."¹ Varela in turn was a Lindisfarne scholar in residence in 1978. Living together at Lindisfarne in Southampton, New York, and Manhattan, he became a member of our family—a combination of uncle and older brother to me, as well as my intellectual mentor. That relationship was the context in which we worked together on *The Embodied Mind* in Paris from 1986 to 1989.

Varela had moved to Paris from Chile by way of the Max Planck Institute in Frankfurt (where he had collaborated with neuroscientist Wolf Singer for a year)² in order to set up his laboratory investigating the neurophysiology of vision. I had graduated from Amherst College, where I majored in Asian Studies and studied Buddhist philosophy. I planned to write my philosophy dissertation in cognitive science and the philosophy of mind. My first published paper—a revision of my undergraduate thesis on Martin Heidegger and the Japanese philosopher Nishitani Keiji—had just been published in the journal *Philosophy East and West*.³ Varela had read the paper (I still have the typewritten letter he sent me from the Max Planck Institute with his comments on an early draft) and he encouraged me to apply to a

German philosophy foundation for research support. A grant from the foundation—the Stiftung Zur Förderung der Philosophie—supported my stay in Paris in the summer of 1986. That summer Varela also suggested that I write my dissertation on theories of perception, using color vision, and specifically the investigation of color vision in different animal species, as my focus. Comparative color vision was the main focus of Varela's experimental work at the time, so I learned color vision science and wrote my dissertation in his lab while we worked together on this book.⁴

Eleanor Rosch joined us in 1989. I had moved to Berkeley, where I was a visiting postdoctoral scholar in philosophy, and where Rosch was a professor of psychology. Varela and Rosch had also been friends for many years. The three of us finished the book in 1989–1990.

By the end of our first summer working together in 1989, Varela and I had a first draft of the core chapters and a working title—*Worlds Without Ground*, which became the title of part V—suggested by my father. (We changed the title to *The Embodied Mind* in 1990.) The title came from one of our guiding ideas, the philosophical idea of *groundlessness*. In Buddhist philosophy, groundlessness means that phenomena lack any inherent and independent being; they are said to be “empty” of “own being.” In Western philosophy, groundlessness means that knowledge and meaning lack any absolute foundation. Biology and cognitive science were arriving at the same idea—that human cognition is not the grasping of an independent, outside world by a separate mind or self, but instead the bringing forth or enacting of a dependent world of relevance in and through embodied action. Cognition as the enaction of a world means that cognition has no ground or foundation beyond its own history, which amounts to a kind of “groundless ground.” At the same time, the discovery of groundlessness places us in an existential quandary because we habitually experience things as if they did have an absolute ground, either in what we take to be the outside world or in what we take to be our self. Is this discrepancy between scientific knowledge and lived experience inevitable and insurmountable? Or are cognitive science and human experience somehow reconcilable? Is it possible for cognitive science and human experience to reshape each other in a transformative way beyond our scientific and habitual, experiential reifications of a separate self and an independent world? These questions were the ones that motivated and inspired us when we set out to write this book.

Many things have changed in the intervening years, in ways that make this book more immediately accessible than when it was first published. The embodied cognition approach is now central to cognitive science.⁵ Whereas the dominant model of the brain in early cognitive science was that of a stimulus-driven, sequential processing computer, it is now widely recognized that brain activity is largely self-organizing, nonlinear, rhythmic, parallel, and distributed.⁶ The idea that there is a deep continuity in the principles of self-organization from the simplest living things to more complex cognitive beings—an idea central to Varela's earlier work with neurobiologist Humberto Maturana⁷—is now a mainstay of theoretical biology and is receiving increasing attention in neuroscience.⁸ Subjective experience and consciousness, once taboo subjects for cognitive science, are now important research topics, especially in cognitive neuroscience.⁹ Phenomenology now plays an active role in the philosophy of mind and experimental cognitive science.¹⁰ Meditation and mindfulness practices are increasingly used in clinical contexts and are a growing subject of investigation in behavioral psychology and cognitive neuroscience.¹¹ And Buddhist philosophy is increasingly recognized as an important interlocutor in contemporary philosophy.¹²

Nevertheless, the motivating questions of this book have only become more pointed. Consider the frequent pronouncements made in the name of neuroscience that the self is nothing but an illusion created by the brain's workings, that the world we experience is really a neural simulation, or that consciousness is nothing but a brain process. Our personal experience, however, presents things differently. We feel as if there is a real self that is the subject of our consciousness and that is in direct contact with an independent, real world. Although we may dispute the philosophical assumptions on which such neuroscientific pronouncements rest, such disputation by itself does nothing to change our lived experience. Hence the quandary: either accept what science seems to be telling us and deny our experience—thereby forgetting that lived experience is the source of science, and that science can never ultimately step outside it—or hold fast to our experience and deny science—thereby forgetting that experience itself constantly seeks to enlarge its own horizons through scientific investigation. Our present culture is still caught up in the constant oscillation between these two tendencies.

As this book describes, nihilism is the viewpoint that inevitably arises in this predicament. I use the term *nihilism* in Nietzsche's sense, which Nishitani Keiji elaborated in relation to modern science and Buddhism in his monumental work *Religion and Nothingness* (see chapter 11).¹³ The nihilist sees through the illusion of a real, independent self that would grasp a real, independent world, but he cannot find another way to be or live without the illusion. More generally, the nihilist sees that there is no absolute ground of meaning—for example, that meaning cannot be grounded on a transcendent God or a real, inner self—but he cannot find another way to be or live without the desire for such a ground. Eventually the nihilist mistakenly (and incoherently) concludes that even meaning is an illusion and that everything is really meaningless.

Our overriding aim in writing this book was to seek a way out of this impasse by charting a path for the transformation of both everyday human experience and the philosophy and practice of cognitive science.

Our approach was to create a “circulation” between cognitive science and human experience. Cognitive science tells us that the processes that bring about our experience of the world, including our sense of self, are dynamical, distributed in time and space, and extend across the complex couplings of the brain, the rest of the body, and the environment. Although it may seem as if there is a single, abiding self that functions as the controller of the mind, cognitive science indicates that what we call “the mind” is a collection of constantly changing, emergent processes that arise within a complex system comprising the brain, the rest of the body, and the physical and social environment, and in which we find no single, abiding, and controlling self. How are we to make sense of these discoveries in relation to our personal experience?

However we may choose to answer this question, we cannot begin to address it without relying on some kind of phenomenology, that is, on some kind of descriptive account of our experience in the everyday world. But where are we to find this phenomenology? One place to look is the Western philosophical tradition of phenomenology, inaugurated by Edmund Husserl and carried forward by Martin Heidegger and Maurice Merleau-Ponty. Although we relied on this tradition, especially its insights into groundlessness, we also argued that it had gotten bogged down in abstract, theoretical reflection and had lost touch with its original inspiration to examine lived experience in a rigorous way. (I no longer accept this

view of Western phenomenology, as I discuss below.) For this reason, we turned to Buddhist philosophy and psychology, which, we believed, were based on scrupulously attending to experience through mindfulness meditation (but see below). We focused on two, interrelated Buddhist ideas. One idea was that of *not-self* or *no-self*—that the sense of an abiding, controlling self is a construct arising from certain deep-seated cognitive and emotional tendencies to impute permanence and singleness to what is impermanent and multiple. The other idea was that of *dependent origination*—that all phenomena arise dependent on causes and conditions, and therefore all phenomena lack substantial being. We argued that these ideas could help to make sense of our lived experience in the everyday world in relation to the findings of cognitive science, while also correcting the tendency within cognitive science to dismiss our experience outright as an epiphenomenal illusion.

In this way, we juxtaposed three traditions—cognitive science, Western phenomenology, and Buddhism—and we used Buddhist philosophy and psychology to enrich phenomenology in ways that could also advance cognitive science. To use a term of art from hermeneutical philosophy, our aim was to “fuse the horizons” of cognitive science, phenomenology, and Buddhism in a new and larger understanding.¹⁴ On the one hand, we aimed to enlarge the horizon of cognitive science to include lived, human experience and the possibilities for transformation inherent in human experience—specifically, the possibility of our not being held hostage to the reification of an abiding self, but without our falling into the nihilistic denial of the everyday self, a nihilism to which cognitive science remains especially prone. On the other hand, we aimed to enlarge the horizon of human experience to include the insights into cognition, the body, and the self from cognitive science. Buddhist philosophy and the phenomenological importance of mindfulness meditation, together with the newly emerging embodied cognition approach in cognitive science, were the new critical resources we brought to this effort. In summary, our aim was to forge a mutually enlightening and transformative relationship between cognitive science and human experience via a pragmatic and open-ended phenomenology of embodiment.

Three decades later, I see this vision and effort to create a new kind of relationship between cognitive science and human experience as the book’s original and lasting contribution. It makes the book “about something

real,” to borrow the opening words of Eleanor Rosch’s introduction, while also making the book “not fit easily into any of the usual academic disciplines” (X). It is also responsible, I believe, for the book’s lasting influence in the study of embodied cognition—not just in cognitive science, but also in the arts and the humanities, as well as in somatics and the bodywork disciplines.

At the same time, when I reread the book now I cannot help but see it as limited by several shortcomings, ones that have become increasingly apparent to me over the years and that we need to leave behind in order to advance the vision and project of this book. Specifically, I no longer accept three of the rhetorical and argumentative strategies on which we relied.

The first strategy is our portrayal of Western phenomenology, in the tradition of Husserl, Heidegger, and Merleau-Ponty, as a failed or broken down philosophical project (see chapter 2). On the contrary, Western phenomenology remains a vital and important movement of continuing relevance to philosophy and cognitive science, as well as to practical disciplines of human transformation. My book *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* argues this point at length and includes an appendix specifically devoted to correcting and explaining the reasons for our mischaracterization of Husserl in *The Embodied Mind*.¹⁵ Other philosophers, notably Shaun Gallagher and Dan Zahavi, have shown the importance of phenomenology for cognitive science.¹⁶ Many important phenomenological works have appeared in the last two decades, making phenomenology a rich and active area of contemporary thought.¹⁷ These works include not just phenomenological philosophy, but also phenomenology as a way of doing qualitative research in tandem with cognitive science.¹⁸ Varela, in the last years of his life before he died in 2001, contributed to this revitalization of phenomenology, specifically in his contributions to the “naturalizing phenomenology” movement, his helping to found the new journal *Phenomenology and the Cognitive Sciences*, and especially in his scientific research program of “neurophenomenology,” which uses Western phenomenology as well as mindfulness practices in the investigation of the large-scale brain dynamics related to conscious experience.¹⁹ Neurophenomenology provides the framework for my most recent book, *Waking, Dreaming, Being: Self and Consciousness in Neuroscience, Meditation, and Philosophy*, which revisits many of the ideas and topics of *The Embodied Mind*.²⁰

The second strategy is our depiction of Buddhist philosophy, specifically the Indian Buddhist Abhidharma school and the writings of the Madhyamaka (middle way) philosopher Nāgārjuna, as based on meditation or as deriving from meditative experience. I now see this idea as being simplistic and inaccurate. As Buddhist scholars have discussed, the formation and evolution of Indo-Tibetan Buddhist philosophy were shaped by many factors, such as doctrinal constraints, scholasticism, and the pressing need to respond to non-Buddhist philosophers.²¹ For these reasons (among others), we cannot suppose that Indo-Tibetan philosophical ideas were derived directly from meditation. Indeed, it is equally possible that theoretical ideas, such as the momentariness of mental processes (see chapters 4–6), shaped certain kinds of meditative experience. The extent to which Buddhist philosophical ideas either shaped or were shaped by meditative experience remains an open and interesting question in the field of Buddhist studies.

In any case, classical Indian Buddhist philosophy was certainly not based on the kind of “Buddhist modernist” style of meditation that we call “mindfulness/awareness.” “Buddhist modernism” is a contemporary, transnational form of Buddhism that cuts across Asian and Western cultural and geographical contexts.²² One of its central elements is a style of mindfulness meditation practice that derives largely from the modern Theravada Buddhist meditation revival that occurred in Burma, Thailand, and Sri Lanka during the nineteenth and twentieth centuries.²³ The mindfulness meditation methods promoted by this movement influenced modern Asian Buddhist reformers and teachers, especially in the West, as well as Western teachers who studied in Asia and returned to teach in the West. Virtually all of the contemporary meditation instruction texts we list in appendix C and on which we relied in describing mindfulness meditation can be described as Buddhist modernist works. My point in calling attention to this fact is not at all to suggest that Buddhist modernism is somehow a less “authentic” form of Buddhism; on the contrary, such appeals to “authenticity” are unsustainable, for Buddhism is and always has been a constantly evolving tradition. Rather, it is to alert the reader to the fact that our assumption that Buddhist philosophy derives from meditation is a typically Buddhist modernist claim and one that does not do justice to the complex historical and interpretative issues that arise in trying to relate mindfulness meditation practices (especially in their Buddhist modernist form) to the Abhidharma and Madhyamaka philosophies.

As a philosopher, I also feel duty bound to declare that Buddhist philosophy is every bit as abstract, theoretical, and technical as Western philosophy, so the idea that Buddhist philosophy is somehow closer to direct experience and thereby more immediately phenomenological—as we state at certain points in the text—is misguided. Moreover, being able to be abstract, theoretical, and technical is a strength of Indian and Tibetan Buddhist philosophy, and also of the Indian and Tibetan philosophical traditions overall, not a weakness.²⁴

The third strategy is our tendency sometimes to depict “mindful awareness” or “mindfulness” as a special kind of inner observation of a mental stream whose phenomenal character is supposed to be somehow independent of such observation. This tendency is evident when we argue that mindful awareness reveals consciousness to really be discontinuous and gappy (rather than just appearing to be so in certain contexts and under certain conditions) (see chapter 4). Hubert Dreyfus, in his review of *The Embodied Mind*, rightly objected to this conception of phenomenology as inward observation.²⁵ As he pointed out, such an effort of inward observation alters experience, so no valid claim can be made on the basis of such observation about how experience is apart from such observation. Moreover, reading the results of such inward observation back into world-immersed, embodied experience would inevitably distort such experience. Besides wishing to acknowledge Dreyfus’s criticism,²⁶ I mention it here because the Buddhism–cognitive science encounter continues to be influenced by the idea of Buddhist mindfulness practice as offering a special kind of introspection that can serve the purposes of the cognitive neuroscience of consciousness. In my view, however, although mindfulness practices can facilitate a unique kind of acute awareness of what phenomenologists such as Merleau-Ponty call the “phenomenal field” of lived experience,²⁷ this kind of awareness is not inward observation in any introspectionist sense of “inward”—for example, it is not the inward perception of basic mental elements, whether these be sensations, after the fashion of Western introspectionist psychology, or momentary and elementary mental events, after the fashion of Abhidharma.

The Embodied Mind also contains another, better conception of mindfulness meditation. According to this conception, mindfulness practices should be understood as skillful ways of enacting certain kinds of embodied states and behaviors in the world, not as inner observation of an

observer-independent mental stream. This conception connects to the central, original idea of the book, namely, the view of cognition that we call *enaction* or the *enactive approach* (mentioned at the outset of this introduction).

In formulating the enactive approach, we drew on multiple sources: the theory of living organisms as self-producing or “autopoietic” systems that bring forth their own cognitive domains; newly emerging work on embodied cognition (how sensorimotor interactions with the world shape cognition); Merleau-Ponty’s phenomenology of the lived body; and the Buddhist philosophical idea of dependent origination, and specifically that cognition and the experienced world co-arise in mutual dependence. The basic idea of the enactive approach is that the living body is a self-producing and self-maintaining system that enacts or brings forth relevance, and that cognitive processes belong to the relational domain of the living body coupled to its environment.²⁸ One implication of this idea is that cognition requires the exercising of capacities for skillful action and that even abstract cognitive processes are grounded on the body’s sensorimotor systems, including the brain systems that, as we would say today, emulate sensorimotor processes in an “offline” way. Today, this idea of cognition as based on modal sensorimotor processes is central to the approach called “grounded cognition,” where “grounded” means based on body states, situated action, and modal perception-action systems.²⁹

From the enactive perspective, mindfulness practices should be viewed as forms of skillful know-how for enacting certain situated mind–body states and behaviors, not as a form of inner observation of a private mental realm. Notice that this contrast—between understanding mindfulness meditation as a kind of enactive cognition versus as a kind of inner mental observation—is a conceptual and phenomenological one. Notice also that each conception has implications for cognitive science. On the one hand, thinking of mindfulness meditation as inner observation of a private mental realm feeds the internalist tendency in cognitive neuroscience to model mindfulness as a kind of mental activity instantiated in neural networks inside the head and visible through brain imaging tools such as electroencephalogram (EEG) and functional magnetic resonance imaging (fMRI). This approach runs the risk of confusing the biological conditions for mindfulness with mindfulness itself, which, as classically described, consists of the integrated exercise of a whole host of cognitive and bodily skills

in situated and ethically directed action.³⁰ On the other hand, thinking of meditation as the enactment of situated mind–body states and behaviors requires us to distinguish clearly between the causally enabling conditions for mindfulness, which include neural systems but are not limited to them, and the cognitive processes that constitute mindfulness as a meaningful form of human experience and that cannot be fully understood unless described phenomenologically. This is one way in which thinking through the enactive approach returns us to the phenomenology of lived experience as a necessary complement to scientific investigation.

Since the publication of this book, the enactive approach has usually been understood as a particular version of the embodied cognition paradigm in cognitive science.³¹ According to this paradigm, the body plays a constitutive role in cognition, that is, cognition depends directly on the body as a functional whole and not just the brain. The enactive approach adds a number of specific ideas about the body and cognition; many researchers have extensively developed these ideas in the past two decades.³² First, what is meant by “body,” for the enactive approach, is not the body as a functional system defined in terms of inputs and outputs—as it is for functionalist cognitive science—but rather the body as an adaptively autonomous and sense-making system. An adaptively autonomous system is one that generates and maintains itself through constant structural and functional change (like a living cell), and in so doing brings forth or enacts relevance. In being a self-individuating system, it is also a sense-making one, and in being a sense-making system, it is also a self-individuating one. Cognition and world are interdependently originated via the living body. Second, the nervous system is accordingly understood as an adaptively autonomous dynamical system: it actively generates and maintains its own coherent and meaningful patterns of activity, according to its operation as a self-organizing network of interacting neurons. The nervous system does not process preexistent information in the traditional computationalist sense; it creates information in concert with the rest of the body and the environment. Third, cognition as sense-making is the exercise of skillful know-how in situated and embodied action. Cognitive structures and processes emerge from and constitutively depend on recurrent sensorimotor patterns of perception and action. At the same time, the sensorimotor coupling between the organism and its environment does not determine the ongoing, self-organizing brain activity; it modulates it while that brain

activity in turn informs the sensorimotor coupling. Fourth, a cognitive being's world is not a pre-specified, external realm, represented internally by its brain, but is rather a relational domain enacted or brought forth by that being in and through its mode of coupling with the environment. Finally, experience is not an epiphenomenal side issue but is central to any understanding of the mind, and accordingly needs to be investigated in a careful phenomenological manner. Hence, in the enactive approach, cognitive scientific and phenomenological investigations of human experience are pursued in a complementary and mutually informing way.

Less noticed, however, in the literature on embodied cognition, is that the enactive approach also implies a certain conception of science. This conception derives from reflexively applying the enactive ideas about cognition to science itself. Once we perform this reflexive operation we can no longer hold on to the traditional realist conception of science as revealing the way things are in themselves apart from our interactions with them. Yet neither is it the case that science is simply a creation or projection of our own minds. Rather, science is a highly refined distillation of our embodied sense-making. As Husserl originally argued in his last work, *The Crisis of European Sciences and Transcendental Phenomenology*, the implicit departure point and always-present background condition for science is our concrete, sensuous experience of the life-world.³³ In creating classical science, we set aside features of this kind of experience that vary individually and cannot be made the object of a stable consensus. Using logic and mathematics, we create an abstract and formal representation of certain invariant and structural features of what we experience under rigorously controlled conditions that we impose, and this formal model becomes an object of consensus and the basis for an objective description. Scientific models, according to this account, are formalized representations of the world as disclosed to our embodied cognition. Put another way, scientific representations map structural and dynamical features of how the world is disclosed to us at various spatiotemporal scales and of how we are able to act on or intervene in processes at these scales. In this way, scientific models are distillations of our embodied experience as observers, modelers, and interveners. In short, scientific knowledge is not the exhibition of the nature of reality as it is in itself; it is an expression of the relation between our embodied cognition and the world that it purports to know.³⁴

It is important to keep this enactive conception of science in mind when we think about the dialogue between cognitive science and phenomenology. Not keeping it in mind means falling back into an objectivist conception of science, for which embodied experience becomes simply another object of empirical investigation. But lived experience is inevitably distorted when we treat it this way, that is, as being completely comprehensible through scientific procedures of objectification. Embodied experience is precisely not objectifiable in this way, for it is that which makes possible any of our cognitive encounters with any object (as we depict in figures 1.2–1.5). Remembering this non-objectifiable dimension of embodied experience—that embodied experience is a necessary condition of possibility for anything showing up as an object of scientific investigation—prevents the relationship between phenomenology and science from becoming lopsided in favor of science. Science departs from and in the end must answer to embodied experience and does not provide understanding on its own. This is especially the case when the subject matter of scientific investigation is the human mind.

In presenting an enactive conception of science in this book, we used ideas from Madhyamaka philosophy (see chapters 10 and 11). In this way, Buddhist philosophy played a direct role in shaping the enactive approach. This point is especially important to remember when we think about the dialogue between Buddhism and cognitive science. This dialogue is not equivalent to the scientific investigation of mindfulness meditation—a research trend that is becoming increasingly widespread today but was virtually nonexistent when we wrote this book. Although this research is worthwhile, it is neither the same as nor sufficient for the kind of circulation between science and Buddhism that we tried to foster in this book. Buddhist philosophy and meditative practice, especially as informed by the Madhyamaka tradition, aim to undermine the objectifying and reifying tendencies of the mind. These tendencies, however, can easily be reinforced when one turns meditative experience into a scientific object—for example, by removing individual practitioners from their social context, placing them in an fMRI scanner, and projecting their meditative practice onto neural activation patterns. The Madhyamaka-informed, enactive conception of science serves to remind us that such research provides, at best, a heuristic handle on certain limited aspects of mindfulness meditation practices as they have been recontextualized in the cognitive neuroscience laboratory, not an exhibition of some underlying and objective “biological

reality” of meditation, let alone a determination of the value of meditative practice as a way of life. Moreover, without Madhyamaka philosophy and the reflexive application of the enactive approach to science itself, we will miss the radical transformative possibilities of the science–Buddhism circulation, and specifically the prospect of a different way of being in the world and doing science beyond our habitual cognitive reifications. In other words, we will miss the guiding vision of this book.

This vision—to undo or at least reduce our self-centered ways of being, especially as they shape and are shaped by science and technology—is decidedly normative and so makes this book different from many other scientific and philosophical works on embodied cognition. Many readers may take this vision to be a specifically Buddhist one. When I reread the book today, I cannot deny that much of its content and tone justifies such a reading. Nevertheless, promoting a “Buddhist cognitive science” or writing a work of Buddhist modernism has never been my intention. Indeed, the parts of the book that I like the least are the ones where we veer into that mode of discourse. Rather, my intention has always been to foster a new kind of wisdom, one rooted in a mature cognitive science that is deeply informed by experiential practices of ethical human transformation. Buddhism is an important source for this effort, but my aim is not to advocate for this tradition per se but rather to draw from its rich philosophy and practice in order to create a contemplative and cross-cultural cognitive science that does justice to our full developmental capacities for awakening. My hope is that this vision can inspire a new generation of readers who take up this book.

Notes

1. Bateson, *Mind and Nature*.
2. Varela and Singer, Neuronal dynamics in the visual corticothalamic pathway revealed through binocular rivalry.
3. Thompson, Planetary thinking/planetary building.
4. My dissertation on color vision was eventually published as the book *Colour Vision: A Study in Cognitive Science and the Philosophy of Perception*.
5. See Shapiro, *Embodied Cognition*.
6. See Buszaki, *Rhythms of the Brain*.
7. Maturana and Varela, *Autopoiesis and Cognition*, and *Tree of Knowledge*.

8. Friston, Free-energy principle.
9. See, for example, Dehaene, *Consciousness and the Brain*.
10. See Gallagher, and Zahavi, *Phenomenological Mind*.
11. For clinical perspectives on mindfulness, see Brown, Creswell, and Ryan, eds., *Handbook of Mindfulness*. For cognitive science perspectives, see Lutz et al., Investigating the phenomenological matrix of mindfulness-related practices from a neurocognitive perspective.
12. See Garfield, *Engaging Buddhism*.
13. Nishitani, *Religion and Nothingness*.
14. The idea of the “fusion of horizons” in interpretation comes from Gadamer, *Truth and Method*.
15. Thompson, *Mind in Life*.
16. See Gallagher, and Zahavi, *Phenomenological Mind*.
17. See especially Zahavi, *Subjectivity and Selfhood* and *Self and Other*.
18. See Hasenkamp and Thompson, eds., Examining Subjective Experience.
19. For naturalizing phenomenology, see Petitot et al., eds., *Naturalizing Phenomenology*. For neurophenomenology, see Varela, Neurophenomenology, and Specious present; and Lutz et al., Guiding the study of brain dynamics by using first-person data. For a more recent presentation, see Fazelpour and Thompson Kantian brain.
20. Thompson, *Waking, Dreaming, Being*.
21. For recent introductions to Indian Buddhist philosophy, see Carpenter, *Indian Buddhist Philosophy*, and Siderits, *Buddhism as Philosophy*.
22. See McMahan, *Making of Buddhist Modernism*, and Sharf, Buddhist modernism and the rhetoric of meditative experience.
23. See Sharf, Buddhist modernism and the rhetoric of meditative experience, and Braun, *The Birth of Insight*.
24. For a recent and important work of cross-cultural philosophy in which the technical precision of the Indian philosophical tradition is on display, see Ganeri, *Self*. For the Buddhist tradition specifically, see Garfield, *Engaging Buddhism*.
25. Dreyfus, Review of *Embodied Mind*.
26. I also discussed Dreyfus’s criticisms in Thompson, *Mindful body*.
27. See Merleau-Ponty, *Phenomenology of Perception*, 52–65.

28. For more recent statements of this idea, see Thompson, *Mind in Life*, and Di Paolo and Thompson, Enactive approach. See also Stewart, Gapenne, and Di Paolo, *Enaction*.
29. Barsalou, Grounded cognition.
30. See Garfield, Mindfulness and ethics.
31. See Wilson and Foglia, Embodied cognition, and Shapiro, *Embodied Cognition*.
32. For further discussion, see Thompson, *Mind in Life*, and Di Paolo and Thompson, Enactive approach.
33. Husserl, *Crisis of European Sciences and Transcendental Phenomenology*.
34. See Bitbol, Is consciousness primary?

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Introduction to the Revised Edition

Eleanor Rosch

This book is about something real. For that reason it does not fit easily into any of the usual academic disciplines. It is not science, it is not philosophy, it is not phenomenology, and it is certainly not Buddhism, although it touches on all of these. Nevertheless, for twenty-plus years the book has served as a *provocateur* for academic and nonacademic readers alike. During that time, the issues with which it deals, such as relations between the sciences of mind and human personal experience (*your* personal experience), have become more prominent and culturally visible, but by no means resolved.

A bit of history: I confess that working on *The Embodied Mind* with the late Francisco Varela sometimes felt to me like entering an Indonesian shadow-puppet play. A central part of these plays is a sequence in which the protagonists cross into “the forest,” a charmed space where it becomes possible for beings from different orders of reality—humans, gods, clowns, heroes, demons—to meet and interact, thereby propelling the drama on its way. In a somewhat analogous fashion, the aim of *The Embodied Mind* was to create an open space in which normally separated aspects of human knowledge represented by different modes of discourse and different academic disciplines could meet, speak, and perhaps cross-fertilize one another. We were particularly concerned with the gulf between the human mind as studied by science and the mind as personally experienced—now often spoken of as the disconnect between first person and third person knowledge. To approach this disconnect we juxtaposed three disciplines usually considered worlds apart: the new interdisciplinary science of the mind called cognitive science, the phenomenological tradition in philosophy, and some aspects of the Eastern religion of Buddhism. Through the interplay of these three voices we emerged with the outline of a new kind of cognitive science

called *enaction* that we argued would provide the ground for a science both embodied and experientially relevant.

Now, twenty-five years later, much has changed in the cultural and intellectual environment in which ordinary people live and in which research on body and mind is performed, changes that make *The Embodied Mind* even more relevant and probably more accessible than when first published:

- 1) This is the era of body, particularly of the brain. New techniques such as functional magnetic resonance imaging (fMRI) and an enhanced electroencephalogram (EEG) have made it possible to observe changes in blood flow and electrical activity in the brain in real time, thus providing a window into the relation between thoughts, emotions, and brain activity. Increasingly the prevailing assumption in psychology, cognitive science, and many other fields is that the mind (and hence experience) is just the brain and that the gold standard for studying anything human is to observe changes in the brain. Note our new vocabulary: not only is there neuroscience but also neuro-economics, neuro-ethics ... even neuro-theology. But *body* is not necessarily the same as *embodied*; what is that body that is under scrutiny?
- 2) This is also the era of personal technology. Hence it is not surprising that the brain (and thus the mind with its experiences) is increasingly assumed to work like a computer, that is, for all its subtlety to be a machine that should be studied accordingly. A personal side of this technological change may be the overriding of much self-awareness. Where once there were spaces in the day between events to digest information, reflect on occurrences, notice one's reactions, and be with one's thoughts and emotions, now there is only time to whip out the cell phone.

These first two trends have to do with the objectification of science and the externalization of our lives; they provide the background from which the quest of this book and our concept of enaction stand out as contrast. The next three, more local in scope but potentially of great generative importance, are efforts toward reclaiming the mind.

- 3) Interest in phenomenology is growing, particularly in Europe and Latin America. In strict usage, phenomenology refers to work stemming from the school of philosophy originated by Edmund Husserl,

Martin Heidegger, and Maurice Merleau-Ponty, but it is now also applied to research that looks into experience through a variety of other methods. While phenomenology is the province of my coauthor Evan Thompson, I wish to make just one point about it here. We began *The Embodied Mind* with a single phenomenological insight that can turn objectivist science (and one's world view) on its head if one allows it to. Everything perceived, believed, theorized, researched, and known is done so by an observer. The brain is seen, dissected, experimented on, believed to be the cause of mental events ... by the minds of scientists—and likewise for the other sciences. (This is what those circular diagrams in the first chapter are trying to convey.) From that point of view, the brain is inside the mind rather than vice versa. And it is from that point of view that phenomenology throws down the gauntlet and challenges cognitive science, thus initiating, though by no means closing, our conversation.

- 4) "Mindfulness" training derived from Buddhist practices has been shown to have both physically and mentally therapeutic effects, and use of it is spreading exponentially. There is a corresponding outpouring of research on mindfulness not only to confirm its clinical effectiveness but, as we might expect, to relate it to the brain and to develop methods to define it, measure it, and to understand it within the framework of our already existing mechanistic science. Such work has been anointed with names like *contemplative clinical science* and *contemplative neuroscience*, and one can only hope that this will be a case of "If you build it [here "if you name it"] they will come." One positive result is that Buddhism and the large family of concepts being called "mindfulness" are no longer treated as visits from an extraterrestrial as they were twenty-five years ago; both are now—however poorly understood—on the cultural and scientific radar. On the other hand, much that Buddhism and contemplative practices in other traditions could contribute to science, not to mention human life (some might say the heart of what they have to contribute), is being overlooked or downright banished in the name of science.
- 5) The theory of enaction has itself developed. It has been refined and more clearly described (Evan Thompson has been the leader in this),¹ and there have been advances in knowledge of the phenomenological background of the theory. Of most interest to cognitive

scientists, enaction is gaining traction as a philosophical paradigm and has staked claims to be a scientific program under which research can be performed.²

In the rest of this essay I will: 1) summarize the clarified version of enaction—twenty years of emails from confused readers of chapter 8 have shown how needed this is; 2) show how understanding enaction in full requires input from Buddhism, including its later forms; 3) appraise the new concept of Buddhist modernism being used in academia to delegitimize serious study of living Buddhism; 4) critique the research on mindfulness that is in vogue and suggest alternatives; 5) discuss the enaction–science interface; and 6) open questions about future contemplative neuroscience and the future of enaction.

Enaction Clarified

Phase 1 Enaction

Enaction can be understood in two stages. The core idea of enaction is that the living body is a self-organizing system. This is in contrast to viewing it as a machine that happens to be made of meat rather than silicon. Mechanisms act and change their state only because of input and programming from sources outside of themselves, whereas the living body continuously reorganizes itself to survive and maintain its own homeostasis. (Notice how this alone is a radical departure from the dominant view of the body in present research.) Survival means that the organism must preserve the integrity of its boundaries while having constant interchange with the environment. Even the simplest one-celled organism exchanges materials through the semipermeable membrane of its cell walls and performs overt actions relevant to its self-maintenance, such as swimming toward a detectable food source or away from insupportable temperatures. Actions of the organism are thus purposive and have been said by enactivists to be the embryonic forms of cognition, of mind, and even of values.

The *environment* of a given living body of whatever degree of complexity can only be what is knowable and known to its sense organs and cognitions, and that environment is in turn constantly changed by the organism's actions on it—in the terms we use in the book, neither side is pregiven. The lived body, lived mind, and lived environment are all thus part of the same process, the process by which one enacts one's world (in

phenomenology speak, “brings forth a world”). Humans, of course, can enact self, boundaries, survival, environment, exchange, desire, and aversion into symbolic castles of great subtlety, but that does not change the basic processes.

This is a phase 1 account of enaction. It seems self-contained as it is; what need is there for Buddhism? In fact a description of sentient beings almost identical to the above portrayal of enaction is provided in the teaching of the five *skandhas* (heaps) of early Buddhism. We present the *skandhas* in chapter 4 as an example of the Buddhist deconstruction of the self, but they can also be seen as a logical and temporal account of how the false sense of self is constructed. It begins with a living body with its dualistic senses; develops through that living being’s perception of the world through the filter of what is felt to be good, bad, or indifferent for the subject pole of the dualism; develops yet further into habits based on actions to get the good, shun the bad, and ignore the indifferent; and ends with birth into a moment of consciousness already situated in a complete inner and outer “world” stemming from whichever of the basic impulses (desire, aversion, or indifference) of the subject toward its objects predominates.³ But there is one major difference between the phase 1 enactive and the Buddhist accounts: in Buddhism, this is the beginning of the story, not the end.

Phase 2 Enaction

From the Buddhist point of view, both phase 1 enaction and the *skandhas* are portraits of the confused and ignorant body, mind, and world that is called *samsara*, that is, the wheel of life through which sentient beings cycle in ignorance and suffering (see chapters 4 and 6). The good news is that there is an alternative. There is another mode of knowing not based on an observer and observed. This ushers in phase 2 of enaction, what in the book we call *groundlessness* (chapter 10).

At this point we have gone beyond phenomenology. Yes, this is a controversial claim given Heidegger’s account of Being-in-the-World (*in-der-Welt-sein*) where there is no split between subject, object, consciousness, and world,⁴ followed by Merleau-Ponty’s psychology that extends this foundational idea.⁵ Added to these are the new interpretations of Husserl based partly on material of his not available when our book was originally written.⁶ But there is a difference between such ideas as philosophy or sci-

entific theory and what results from the actuality of a mind in the nondual awareness that can be brought about (*uncovered* is probably a better term) by Buddhist meditations, contemplations, transmissions, and other practices.

Here is the difference. In foundational European phenomenology (for convenience I will use Heidegger's terminology), the central image of a mind that does not make distinctions between subject and object, that is, of a mind in the pre-reflective natural state, is of a person actively engaged in the world, a person with interests, cares, concerns, and goals who is vigorously pursuing those goals using whatever comes before him as a tool. It is when there is some breakdown in that state (something doesn't work) that the person will draw back, assume the abstract attitude, reflect on experience, and give birth to those distinctions. From the Buddhist point of view, this is a romanticization of *samsara*. What that actively engaged person is engaged in is vigorously trying to grasp and cling to what he wants, flee from or attack what he does not want, and ignore what he feels is irrelevant to himself—all while using objects, other people, and the environment only as instruments to foster his desires. The opposition between self and other is not a matter of abstract reflection but is built into the engagements of a consciousness birthed via the *skandhas* or, in our terminology, *enacted* without awareness of its nature. When the unaware person is actively, even skillfully or harmoniously, engaged in his life, he is generally in a state of absorption, his mind cushioned by a cloud of fragmented perceptions, attentions, intentions, fantasies, thoughts, efforts, feelings, and memories that give him the sense of who he is and what he is about, but do not make him fully present (in Buddhist terms he is in "the ghostly confusion of phenomenal existence"). And when that person attempts to stop and look at his experience, the shadow of an ever present but slippery separate observer already present in the cloud comes to the fore, another kind of fragmented duality that makes it difficult to look. There is no first person here and only a ghostly sense of any second or third person.

What Buddhist practices have to contribute to this conundrum is that there is a different mode of knowing altogether in which the mind is neither absorbed nor separated but simply present and available. There is no longer that observer claimed in the first chapter here; experience is simple and self-known. This is the mind that can actually know firsthand the

groundlessness of the enacted edifice in which humans live (chapter 10), thereby clearing the way for transformative wisdom to emerge (hinted at in chapter 11). (A note to phenomenologists: if Nishida and Nishitani⁷ appear to be counterexamples to what I have said in general about phenomenology, remember that both are speaking from a background of Japanese Zen Buddhism.)

What next? The title of our book promises insight into the relation between personal experience and cognitive science, perhaps even a rapprochement between them. Enaction was proposed as the form of cognitive science that could accomplish this. What is there to say about such claims now twenty-five years later? I will discuss the experience side first, and then the science.

Personal Experience: Why Buddhism?

If you are going to look into personal experience in a manner sufficiently rigorous to make it relevant to science, you need some method for doing so. We turned to Buddhism because, in our judgment, it provided what both Western psychology and phenomenology lacked, a disciplined and non-manipulative method of allowing the mind to know itself—a method that we (in retrospect naively) simply called *mindfulness*. There are currently two main objections to using Buddhism in this manner that need to be addressed.

The first is called *Buddhist modernism*. Buddhism has changed throughout its history, and a recent book, *The Making of Buddhist Modernism*,⁸ has argued for a link between changes occurring in Buddhism since its contact with the West and aspects of modern Western culture. Interestingly, although the evaluative import of the historical data detailed in this wide-ranging work is sufficiently ambiguous that it could have led equally to the title *The Decline and Fall of Buddhism* or to *The Making of the Buddhist Renaissance*, the Buddhist studies community seems to have landed primarily on the negative side to the point of using the term *Buddhist modernism* almost as an epithet. From this viewpoint our assumption that Buddhist teachings are related to Buddhist meditations and that both can reveal important aspects of the mind is itself just another expression of Buddhist modernism.⁹

I come to these issues not from a context of historical scholarship but from the study of Buddhism as a living tradition and from a background in psychology and the cognitive and social sciences. That makes for a different lens. There is a sharp contrast, for example, between the ways Buddhist texts are treated by academic scholars and by contemporary Buddhist practitioners. Some of the Buddhist doctrines, texts, and teachings that the scholar would claim unrelated to meditation experience (because meditation was so rare historically and/or because Buddhist treatises and classification systems bear the marks of ordinary scholastic discourse) I see being used in contemporary Buddhist centers as guides to meditation, pointers to experience, and programs for action in life. Furthermore, if you look again at the textual record you find that the attribution of doctrinal origins to meditative realization is not new but actually as old as the canonical story of the Buddha himself, a pattern that is repeated in the origin stories of major texts and the hagiographies of important teachers throughout Buddhist history. If not a reality, it was certainly an ideal, as was meditation itself. In contemporary Buddhist *sanghas* (communities), there is often a core of dedicated practitioners who are working toward such ideals in their meditation—also their lives and community—and some consider themselves pioneers in a Buddhist renewal. It is easy to miss such communities if sidetracked by the penumbra of new age and other cultural banalities that tend to surround contemporary Buddhist movements—a cautionary note about judging contemporary activities from too great a distance.

Of course neither meditation nor writing is ever done in a vacuum. Previous texts and teachings provide the view for what is to be done and the rationale for why; meditations and life practices provide the experience to instantiate or amend what was given; and out of that will come new teachers and, perhaps, new teachings, all of this at play within the social structures and background of cultural beliefs and practices of the time. Buddhists look on this as natural, not as somehow a disconfirmation of their teachings. In fact it is considered part of the skillful means of a realized teacher to be able, in response to the needs of people of a particular time and place, to generate new meditation techniques (as occurred in the burst of creativity in Theravada countries upon liberation from colonial rule), new teachings (such as Shambhala and Socially Engaged Buddhism), and perhaps new social structures for the sangha (as in Shambhala

and Sarvodaya Shramadana). Evan Thompson describes this kind of cycling back and forth in enactive language in his introduction; in Buddhism it is known as path.

The second main objection to our use of Buddhism as a window into personal experience is a variant of the general argument that experience cannot be used as a basis for research either in science or religious studies (in psychology, for example, this is the view that gave rise to behaviorism). The particular form of this view leveled at us is the phenomenological objection that by looking at experience closely or in any other particular way, one is thereby changing the experience¹⁰ (an argument that would apply equally, of course, to phenomenological investigation). For Buddhism this critique is a confusion of path with results and a misunderstanding of the nature and purpose of path meditation.

From the nondual perspective there is no you looking inwardly at a separate experience, but from the beginner's dualistic viewpoint there appears to be; thus meditation instructions make use of the marvelous human capacity to move one's attention in order to direct that attention in ways that will reveal aspects of experience hitherto unnoticed or unacknowledged. For example, a practitioner may be told to attend to her breath as it goes in and out. Shortly she sees that this is difficult; her mind leaps around and she cannot control or even find the looker. Here you find the seeds of later recognition of impermanence (the movement) and egolessness (no separated looker to look). Such discoveries are not about particular contents of experience but of parameters of its nature, and they are the necessary forerunners for even a glimpse of the nonduality of the *Madhyamaka* as direct experience rather than only as philosophical theory.

Science and Buddhism

Because Buddhist practices involve working with experience, one would expect the science–Buddhism interchange to be a poster child for what we have asked for in a dialogue between experience and science. Instead it may presently be a cautionary tale.

Mindfulness

In the years since we wrote our book, the word *mindfulness* has achieved rock star status and attracted an exponentially expanding amount of

research. Various trends have fed into this. In 1979 Jon Kabat-Zinn at the University of Massachusetts Medical Center put together a pioneering program consisting of two Theravada mindfulness meditations, hatha yoga, and a number of exercises allied to Western clinical techniques. He called the program Mindfulness Based Stress Reduction (MBSR)¹¹ and it proved remarkably successful at helping chronic pain patients who had hitherto been finding no relief from standard medical techniques. Since then the use of mindfulness in therapies, many modeled on MBSR, has burgeoned, with corresponding research showing its benefits for a large variety of physical and psychological ills as well as benefits for people without clinical diagnoses.¹² A further encouragement for research has come through support from His Holiness the Dalai Lama who holds conferences in which he dialogues with Western scientists and supports research in other ways through his Mind and Life Institute.

There are endemic problems with research on mindfulness. My coauthor has provided a critique of this work through the perspective of enaction; here I want to indicate briefly some of its weaknesses as ordinary science. It is basic scientific logic that if you want to study the effect of something (the independent variable) on a resultant mental or physical state (the dependent variable), you have to know what the independent variable is and have evidence that it is actually present in your subjects. You must also be able to define and measure the appropriate outcome variables(s). However, defining and measuring mindfulness, as either kind of variable, is problematic. Even in early Buddhism there were debates over just what kinds of attention constituted mindfulness (Pali: *sati*, Sanskrit: *smṛti*) and about what other virtues were or were not to be included in it.¹³ The situation today is even more intricate since some teachers in all the forms of Buddhism have begun to use the word *mindfulness* to refer to everything from the most beginning practice to their version of presence with a fully enlightened mind. Therapists contribute their own mindfulness descriptions, as do popular authors in a variety of genres. Researchers usually settle on a single verbal definition, perhaps from another researcher, without considering what it might imply or questioning whether their subjects are in fact doing that.

Here are some of the problems with the resultant research:¹⁴ 1) The major mindfulness measurement scales basically measure Western mental health variables with little reference to any of its prior meanings. Not only does

this elide what might be new and interesting about mindfulness, but methodologically the operational definition of mindfulness becomes the same thing as the desired outcome of being mindful—a circular process. 2) A widely used de facto definition of mindfulness is that subjects have taken MBSR, but the genius of that multifaceted program is that people can benefit from it in many different ways,¹⁵ and so benefits may well not correspond to the researcher's definition of mindfulness. 3) If a would-be mindfulness instruction is given, and subjects show a brain response, it is assumed that this is the brain signature of mindfulness—but as every meditator knows, instruction is not equivalent to performance, and as every neuroscientist is coming to know, anything that one does affects the brain. 4) Mindfulness is often treated as a mechanism, a pill that should work in the same way regardless of context, but, as we have seen (and as is basic in enaction), context is important in how people interpret and proceed with what they are doing—even for pills.

Perhaps the final indignity is that when researchers come to explain mindfulness, they inevitably assimilate it to an already established and well-domesticated theory in clinical or, increasingly, brain science. This assumes that our scientific knowledge is already complete with nothing new to learn. Is it?

Beyond Mindfulness: Basic Knowledge Questions

Are the mind and its experiences only the brain? Is the mind limited to the body? Mainstream neuroscience assumes the affirmative to both questions, but the only evidence for that position is that changes in the brain can affect experience and behavior, and vice versa. To take such two-way interactions as a brain monism depends on a scientific materialist metaphysics, not on science itself. It also depends on the assumption that we now know everything basic that there is to know about matter and living bodies. And finally it assumes that there is no faculty of knowing beyond the dualistic mind of samsara and phase 1 enaction.

Evidence contrary to these assumptions has been slowly accumulating for the past century. Best known by Westerners are the alternative physiologies offered by the yogic (and Asian medical) views of the body in which the body is regarded as a pattern of energy. The energy channels described in these systems do not correspond to the nervous system of Western physiology but can nonetheless be manipulated by techniques such as

acupuncture to produce both experiences and health benefits. In Tibetan Buddhism, inner subtle-body visualizations and guidance are a part of advanced practices, at least one of which, the inner heat practice of *tummo*, has readily observable physical effects; for example, practitioners can raise their body temperature enough to sit in freezing temperatures and to dry wet sheets wrapped around them.¹⁶ Less dramatic, but perhaps more to the point, is that movements of energy in the subtle body are understood in Hindu, Buddhist, and Daoist yogas to be the origin of mental effects, such as wildness versus stability of mind. In fact both later Buddhism and Daoism offer inner-energy paths that can transform both the actual embodiment of the practitioner and, if comprehended, could potentially transform the understanding of embodiment of the scientific community as a whole. Interestingly, hatha yoga and/or qi gong exercises form an integral, though in research generally ignored, part of MBSR and thus may play a correspondingly important role in its health benefits. In short, what we have here is an organized and detailed alternative map of a body-mind, consonant with enaction, that cries out for serious scientific investigation.¹⁷

Even more scientifically challenging is evidence that there could be aspects of mind that are separable from the brain and perhaps even the body. Tibetan lamas give mind-to-mind transmission of various kinds of wisdom states. Unlike the design of multitudes of failed extra sensory perception experiments in the West, such transmissions are not of mental contents but of what are considered deeper aspects of mind. Although the transmissions are not conveyed by ordinary sensory or intellectual means, they can be experienced—as is attested by many Western students of Tibetan teachers. Less exotic phenomena such as experimenter bias or placebo effects may or may not be in the same category as this.

Evidence for separation of the deep mind from the brain occurs in even more paradigm-challenging circumstances. At death Tibetan high lamas enter into what is called the *death samadhi*. The lama is medically dead: no brain activity, no organ activity, but his heart center remains warm, and transmissions of enlightened mind states can emanate from him even more strongly and clearly than in life. This may continue for days, even weeks or longer. The Vajrayana yogic explanation is that the subtlest energies of the nondual mind have withdrawn from the outer body into the central channel, have then united in the heart center, and are now radiating to the world.¹⁸ Typically when the lama's mind, in its most subtle yogic sense, is

judged to have merged with the *dharmakaya* (the fundamental ground of being), and his body is cremated, rainbows appear. I have witnessed all of this twice; it definitely shakes one's scientific preconceptions.

Science and Enaction

The idea of the mind as embodied—now generally called *embodied cognition*—has become an active field of research, often hailed by its adherents as the new paradigm for cognitive science. Such research occurs under a loosely knit consortium of headings that include: embodied cognition, enaction, embedded cognition, extended mind, grounded cognition, situated cognition, nonrepresentational cognition, emergent cognition, and anti-Cartesian cognition. The differences in name, to some extent, map differences in theoretical orientation and research methods. Thus you can see that enaction, in its particulars, has now become one part of a more general scientific movement. Interestingly, *The Embodied Mind* is commonly cited as one origin of this entire movement.

All of this makes sense if one thinks in terms of the sociology of science. New theories should not only be able to generate multiple experimental or observational results that older theories could not, but they are even more likely to gain prominence if they are in direct opposition to those previous theories. In cognitive science and psychology it helps if some of the new results are provocatively, perhaps charmingly, counterintuitive. Embodied cognition meets all of these criteria. It sets itself in clear opposition to what it sees as the prevailing stance in cognitive science and psychology, that is, cognitivism and computational methods that abstract mental performance from the full functioning of the body in its environment (see chapter 3). It is likewise in adamant disagreement with the mind seen as a product of the brain alone. From this quite general basis (perhaps “battle cry” in Wittgenstein's sense), it is relatively easy to generate a torrent of experiments and studies by showing that a particular movement of the body or interaction with the physical or social environment makes a measurable difference in cognition or vice versa, all of which count as confirmation of the basic proposition of embodiment. A final spur to interest in embodiment as a new paradigm is its ability to generate surprise. One example: holding a cup of warm versus cold liquid in one hand changes how experimental subjects evaluate other unrelated stimuli.

The content of what is being studied and of what is or is not considered confirmation varies with the particular theory and aspects of embodiment under consideration—as might be expected from the proliferation of names for embodiment. However, the overall relationship of these differing perspectives to one another is more like an extended family than an adversarial court case; the adults (the theories) may bicker and dispute, but the children (the experiments) can be shared. In fact, older experimental work, particularly in psychology, done under rather different auspices, may be repurposed as examples of embodiment, cognitive dissonance being one obvious example.

Enaction as such has fared well in this environment. It has not lost its integrity amid the other forms of embodied cognition and has maintained its close association with phenomenological thought. Enaction brings a distinctive perspective into the embodiment conversation. Whereas most embodiment research focuses on the interaction between body and mind, body and environment, or environment and mind, enaction sees the lived body as a single system that encompasses all three.¹⁹ Systems analysis thus becomes the basic framework that guides much enaction research. Although at its most abstract theoretical level enaction could be considered a philosophy too broad to be subject to empirical testing (is there anything that *cannot* be interpreted in an enactive framework?), at present a coterie of enthusiastic enactivists are finding ways to translate that overarching view into hierarchies of increasingly specific descriptions, hypotheses, and mechanisms that at their most concrete can connect with science.²⁰

Work on social interaction appears emblematic of enaction research and can illustrate this process. Embodied social interaction is seen as “mutual participatory sense-making.” How is this to be translated into specifics? In the first place it is *mutual* and thus system based; this differentiates it strongly from theory-of-mind and other current models that place the internal cognition of individuals (who must use verbal and physical cues to guess one another’s states of mind) as the nexus of social dynamics. Second it is *participatory*; the participants who are interacting are doing something, thereby creating a system that is changing. Such systems can be subjected to a dynamical systems analysis using variables within that method such as dynamical transitions in coordination patterns. Finally there is *sense-making*, which is defined as the ongoing emergence of roles, values,

dispositions to act, and meanings. These terms could potentially be given operational definitions and then be measured by whatever methods are available considering the species under study and other particulars of the situation. Because all of this is seen as enabled by lower-level mechanisms in the body and brain, a universe of possibilities is opened for specific hypotheses and research. For example, according to the enactive “interactive brain hypothesis,”²¹ the brain is primarily an organ of relational cognition. Thus it has evolved so that organisms have “quasi-automatic attunement to others.” Evidence for this can be gathered from a wide range of sources, from the stereotypical threat displays and maternal behaviors of many species to the brain patterns of humans that characterize being “ready to act.” While much of the experimental research presently cited in enaction papers comes from work previously performed within theoretical frameworks remote from enaction, increasingly studies are appearing that are inspired (at least in part) by enaction itself.

The Future

Neuroscience and the Mind

In *The Structure of Scientific Revolutions*, Thomas Kuhn argues that science proceeds by increments within a given accepted paradigm until the usefulness of that paradigm for new discoveries wanes, and observations that do not fit accumulate sufficiently to force a shift to a new paradigm. At this particular juncture of historical time, discovering brain correlates of experience is new enough to enthrall researchers and the public alike and to appear to explain everything. But ten years from now? Richard Davidson, a pioneer in brain research on emotions and on mindfulness puts it this way: “... it wasn’t that surprising that meditation produces distinct patterns of brain activity. That goes without saying—anything the mind and therefore the brain does is marked by specific patterns of neuronal firing in specific areas, just as your muscles have particular patterns of electrical activity when you work out.”²² Davidson is looking for changes that last over time and are part of a more general theoretical understanding. We can predict that increasingly the dialogue between experience and science called for by *The Embodied Mind* will require more than finding simple brain correlates of mental activity.

Meanwhile observations that do not fit the mind-is-only-brain (or even mind-is-only-body) paradigm are building. In recent years, two books have thoughtfully addressed this issue. Edward Kelly and Emily Kelly²³ provide a compendium of well-documented case studies and experiments indicating that the mind is something in its own right apart from the brain. Some examples are: extreme psychosomatic effects, out-of-body experiences during clinical death while undergoing surgery, feats of Hindu yogis who remained alive and cognizant for long periods with heartbeat and respiration suspended, physiological changes induced by hypnosis, and many others. The death samadhi of Tibetan lamas is the most extreme example. Charles Tart²⁴ offers a similarly motivated collection. He also ranks categories of such paradigm-challenging phenomena as to how well documented they are.

What would put these presently marginal studies center stage, of course, would be if physics were to discover something measurable about the mind, apart from the brain, that fit within the ever-expanding domain of what is considered material. We now have particles without mass, dark energy, bosons of various types, and, at least theoretically, vibrating strings of energy that constitute the universe—how about massless *mentons* that operate within a mental energy field? Not impossible; we don't know everything.

The Future of Enaction

Enaction occupies a liminal and potentially fertile place in cognitive science. It is a philosophy that is shape shifting into science. As such it may be unique, but it runs some risks. One of the signatures of enactive language, inherited from phenomenology, is its ability to evoke a sense of humanity and deep respect for life. But as it reaches the level of specificity where it is reframed into the impersonal world of dynamic systems analysis, brain mechanisms, and so on, it can easily lose the mind/experience aspect of the lived body and drift toward a body-based reductionist materialism much like brain reductionism. Retaining input from Buddhism or one of the other contemplative traditions could be helpful for anchoring it in its original roots.

Enaction would also do well to continue to expand its analysis of the processes that psychology calls "higher-level cognition." In complex

organisms like humans, how does the principle of self-organization (survival, boundaries, exchange with environments, purposiveness) relate to the multiple and possibly hierarchical systems that make up the body and mind? How does enaction account for and work in relation to symbol systems, language, and all of the vast symbolic extensions of the human definition of self and its boundaries? And what is it that breaks down in pathologies of self-organization and self-maintenance such as autoimmune disease, cancers, and emotive thought patterns so self-destructive that they may even lead to suicide?²⁵ What might enaction have to say about social systems and their pathologies or about other challenging societal endeavors such as warfare and peace negotiations?

Is there a place in all this, either in the philosophy or science of enaction, for its type 2 counterpart? At present, this would seem to rest on the intelligence and awareness of individual people. For example, there are forms of therapeutic bodywork based on the principle of self-organization and possible reorganization,²⁶ but beyond the theory, what is so striking about them is that from numerous case studies and patient narratives, one can see the therapist, operating perhaps from a vantage point past the ordinary restricted consciousness of phase 1 enaction, reaching out to connect with the inner intelligence of the client and probing for what will initiate the needed reorganization. The same can probably be said for founders and skilled practitioners of other kinds of therapies. For example, the Bill Moyers documentary on MBSR²⁷ reveals Kabat-Zinn as an inspired and inspiring teacher who is tangibly conveying more to his patients than any simple automated technique. Perhaps the extreme of this kind of intelligence is the presence felt from some religious teachers whose wisdom seems to go well beyond their doctrine—a specialty of Tibetan lamas whose ability to function and palpably transmit beyond concepts is almost part of their job description. And, of course, in our not-yet-very-enlightened society, it is at the level of the individual that some people will be able to break out of the constraints of dynamically escalating destructive interactive systems (such as domestic quarrels, obedience-to-authority psychology experiments, and group aggression). Something of this type of vision may also be needed for scientists; that is, researchers need to be able to look at their subject matter from a position of understanding beyond where their field already is in order to make creative contributions.

Ending Note

For a real dialogue (or triologue) to occur, all sides need to speak and be heard equally. That has not happened yet for the topics we explore in *The Embodied Mind*. Where science, as it is done now with its mechanistic and materialist assumptions, meets experience, Buddhism, or anything else, the science simply takes over like a colonial ruler. This is body imperialism, not dialogue. It need not always be that way. There is also a quantity of goodwill being generated, and that could become fertile ground for a more responsive future.

We have offered enaction as a form of science that may help bridge the communication gap between experience and science. It will not do this automatically. Ideas such as the lived body and enaction can easily become merely a romanticization of the old paradigm of a corporeal form limited to self-survival and self-aggrandizement; on the other hand, such ideas could be a transition to a new paradigm for what body and mind are altogether. The key to progress is to keep an open mind—and while we are at it, it would not hurt to also have an open heart. Actually that is good advice for doing anything, including reading this book. So bon voyage, and enjoy!

Notes

1. Thompson, *Mind in Life*.
2. Stewart, Grapenne and Di Paolo, *Enaction*.
3. Rosch, Grinch who stole wisdom, and Trungpa, *Myth of Freedom*.
4. Heidegger, *Being and Time*.
5. Merleau-Ponty, *Phenomenology of Perception*, and *Structure of Behavior*.
6. Thompson, *Mind in Life*.
7. Nishida, *Place and Dialectic*; Nishitani, *Religion and Nothingness*.
8. McMahan, *Making of Buddhist Modernism*.
9. Sharf, Buddhist modernism and the rhetoric of meditative experience.
10. Dreyfus, Review of *Embodied Mind*.
11. Kabat-Zinn, *Full Catastrophe Living*.
12. Baer, *Mindfulness Based Treatment Approaches*; Brown, Ryan, and Creswell, *Mindfulness*; Didonna, *General Handbook of Mindfulness*; Grossman et al.,

Mindfulness-based stress reduction and health benefits; and Ostafin, Robinson, and Meier, *Handbook of Mindfulness and Self-Regulation*.

13. For accounts of the first texts on mindfulness and subsequent debates, see Grossman and Van Dam, Mindfulness by any other name, and the whole issue of *Contemporary Buddhism* 12 (1).

14. Everything in the following paragraphs is treated in detail in Rosch, Emperor's clothes.

15. From interviews in Rosch, Emperor's clothes.

16. Benson, *Beyond the Relaxation Response*, and Cromie, Meditation changes temperatures.

17. There is one related study; it describes and brings neuroscience to bear on movement-based Eastern practices. See Schmalzl, Crane-Godreau, and Payne, Movement-based embodied contemplative practices.

18. Sogyal, *Tibetan Book of Living and Dying*; Rosch, Tibetan Buddhist dream yoga and the limits of Western psychology. At an even deeper level, the mind is understood to be nonmaterial and not measurable—in life as well as death.

19. This should help explain phenomenological terms such as “intentional tissue,” “life space,” and “phenomenal field.”

20. A prime example of this is the multitude of materials available on the website of Ezequiel Di Paolo, <https://ezequieldipaolo.wordpress.com>, accessed October 5, 2015 through October 26, 2015.

21. Di Paolo and De Jaegher, Interactive brain hypothesis.

22. Davidson and Begley, *Emotional Life of Your Brain*, 196.

23. Kelly and Kelly, *Irreducible Mind*.

24. Tart, *End of Materialism*.

25. One example is Hanne de Jaegher's detailed and movingly sympathetic account of the multiple factors that can compose the experienced world of a person with autism. See De Jaegher, Embodiment and sense-making in autism.

26. Alexander, *Eutony*; Baniel, *Kids Beyond Limits*; Feldenkrais, *Awareness Through Movement*.

27. Moyers, *Healing the Mind Vol. 3*.

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Acknowledgments

The inspiration for this book began in the late seventies when Francisco Varela was teaching at the summer Science Program of the Naropa Institute in Boulder, Colorado. Naropa Institute tried to create an intellectual space for a dialogue between the cognitive sciences and the Buddhist traditions of meditative psychology and philosophy by offering a variety of courses and by gathering teachers and students for discussion in an informal atmosphere. In this enterprise and in the ideas that grew from it, the contributions of Newcomb Greenleaf, Robin Kornman, Jeremy Hayward, Michael Moerman, Joseph Goguen, and Charlotte Linde were invaluable. In 1979, the Alfred P. Sloan Foundation funded what was probably the very first conference on “Contrasting Perspectives on Cognition: Buddhism and the Cognitive Sciences.” This conference, which gathered scholars from various universities in North America and Buddhist scholars from many schools and traditions, was so unsuccessful in establishing a genuine dialogue that we learned a great deal about how not to go about the exploration.

Over the next few years Francisco Varela continued to work privately on developing the dialogue between cognitive science and the Buddhist tradition, only occasionally presenting ideas in public. One particularly helpful discussion took place as a series of talks given in 1985 at Karma Choeling in Vermont.

The overall shape of this book first came into being when Evan Thompson, supported by a research grant from the Stiftung Zur Förderung der Philosophie (Germany), joined Francisco Varela at the Ecole Polytechnique in Paris in the summer of 1986. During this time a tentative first draft of the book was completed. We are grateful to the Stiftung and to Uri Kuchinsky for support during this period.

In the fall of 1987, the ideas of this first draft were presented at another conference on cognitive science and Buddhism, this one held at the Cathedral Church of St. John the Divine in New York City and organized by the Lindisfarne Program for Biology, Cognition, and Ethics. We are especially grateful to William I. Thompson and to the Very Reverend James Parks Morton for their interest and support of our work.

From 1987 to 1989, Varela and Thompson continued writing in Paris, supported by grants to the Lindisfarne Program for Biology, Cognition, and Ethics from the Prince Charitable Trusts of Chicago. In the fall of 1989, Eleanor Rosch, who had been teaching and doing research in both cognitive psychology and Buddhist psychology for many years at Berkeley, joined the project as a third author. In 1990–91, Varela, Thompson, and Rosch, working sometimes together and sometimes at a distance in Berkeley, Paris, Toronto, and Boston, produced several further drafts, resulting finally in this book.

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Introduction

This book begins and ends with the conviction that the new sciences of mind need to enlarge their horizon to encompass both lived human experience and the possibilities for transformation inherent in human experience. Ordinary, everyday experience, on the other hand, must enlarge its horizon to benefit from the insights and analyses that are distinctly wrought by the sciences of mind. It is this possibility for circulation between the sciences of mind (cognitive science) and human experience that we explore in this book.

If we examine the current situation today, with the exception of a few largely academic discussions cognitive science has had virtually nothing to say about what it means to be human in everyday, lived situations. On the other hand, those human traditions that have focused on the analysis, understanding, and possibilities for transformation of ordinary life need to be presented in a context that makes them available to science.

We like to consider our journey in this book as a modern continuation of a program of research founded over a generation ago by the French philosopher, Maurice Merleau-Ponty.¹ By *continuation* we do not mean a scholarly consideration of Merleau-Ponty's thought in the context of contemporary cognitive science. We mean, rather, that Merleau-Ponty's writings have both inspired and guided our orientation here.

We hold with Merleau-Ponty that Western scientific culture requires that we see our bodies both as physical structures and as lived, experiential structures—in short, as both “outer” and “inner,” biological and phenomenological. These two sides of embodiment are obviously not opposed. Instead, we continuously circulate back and forth between them. Merleau-Ponty recognized that we cannot understand this circulation without a detailed investigation of its fundamental axis, namely, the embodiment

of knowledge, cognition, and experience. For Merleau-Ponty, as for us, *embodiment* has this double sense: it encompasses both the body as a lived, experiential structure and the body as the context or milieu of cognitive mechanisms.

Embodiment in this double sense has been virtually absent from cognitive science, both in philosophical discussion and in hands-on research. We look to Merleau-Ponty, then, because we claim that we cannot investigate the circulation between cognitive science and human experience without making this double sense of embodiment the focus of our attention. This claim is not primarily philosophical. On the contrary, our point is that both the development of research in cognitive science and the relevance of this research to lived human concerns require the explicit thematization of this double sense of embodiment. This book is meant as a first step in this task.

Although we look to Merleau-Ponty for inspiration, we nonetheless recognize that our present-day situation is significantly different from his. There are at least two reasons for this difference, one from science and the other from human experience.

First, in the days when Merleau-Ponty undertook his work—the 1940s and 1950s—the potential sciences of mind were fragmented into disparate, noncommunicating disciplines: neurology, psychoanalysis, and behaviorist experimental psychology. Today we see the emergence of a new interdisciplinary matrix called cognitive science, which includes not only neuroscience but cognitive psychology, linguistics, artificial intelligence, and, in many centers, philosophy. Furthermore, most of cognitive technology, which is essential for the contemporary science of mind, has been developed only in the past forty years—the digital computer being the most significant example.

Second, Merleau-Ponty addressed the lived world of human experience from the philosophical standpoint elaborated in the tradition of phenomenology. There are many direct heirs to phenomenology in the contemporary scene. In France, the tradition of Heidegger and Merleau-Ponty is continued in authors such as Michel Foucault, Jacques Derrida, and Pierre Bourdieu.² In North America, Hubert Dreyfus has long been the Heideggerian gadfly of the cognitive science enterprise,³ more recently joined in that critique by others who link it to various scientific domains, such as Terry Winograd, Fernando Flores,⁴ Gordon Globus,⁵ and John Haugeland.⁶ In another direction, phenomenology as ethnomethodology has been recently

pursued in the studies of improvisation by D. Sudnow.⁷ Finally, phenomenology has given its name to a tradition within clinical psychology.⁸ These approaches, however, are dependent upon the methods of their parent disciplines—the logical articulations of philosophy, interpretive analysis of history and of sociology, and the treatment of patients in therapy.

Despite this activity, phenomenology remains—especially in North America, where an important volume of current research in cognitive science is being done—a relatively uninfluential philosophical school. We believe that it is time for a radically new approach to the implementation of Merleau-Ponty's vision. What we are offering in this book is thus a new lineage of descent from the fundamental intuition of double embodiment first articulated by Merleau-Ponty.

What challenges does human experience face as a result of the scientific study of mind? The existential concern that animates our entire discussion in this book results from the tangible demonstration within cognitive science that the self or cognizing subject is fundamentally fragmented, divided, or nonunified. This realization is, of course, not new to Western culture. Many philosophers, psychiatrists, and social theorists since Nietzsche have challenged our received conception of the self or subject as the epicenter of knowledge, cognition, experience, and action. The emergence of this theme within science, however, marks a quite significant event, for science provides the voice of authority in our culture to an extent that is matched by no other human practice and institution. Furthermore, science—again unlike other human practices and institutions—incarnates its understanding in technological artifacts. In the case of cognitive science, these artifacts are ever more sophisticated thinking/acting machines, which have the potential to transform everyday life perhaps even more than the books of the philosopher, the reflections of the social theorist, or the therapeutic analyses of the psychiatrist.

This central and fundamental issue—the status of the self or cognizing subject—could, of course, be relegated to a purely theoretical pursuit. Nevertheless, this issue obviously touches our lives and self-understanding directly. It is therefore not at all surprising that those few eloquent books that do engage this issue, such as Hofstadter and Dennett's *The Mind's Eye* and Sherry Turkle's *The Second Self*, meet with considerable popularity.⁹ In a more academic vein, the circulation between science and experience has surfaced in discussions of “folk psychology” or in forms of investigation such as “conversational analysis.” An even more systematic attempt to

address the relation between science and experience can be found in the recent book by Ray Jackendoff, *Consciousness and the Computational Mind*,¹⁰ which addresses the relation between science and experience by attempting to provide a computational foundation for the experience of conscious awareness.

Although we share the concerns of these various works, we remain dissatisfied with both their procedures and their answers. Our view is that the current style of investigation is limited and unsatisfactory, both theoretically and empirically, because there remains no direct, hands-on, pragmatic approach to experience with which to complement science. As a result, both the spontaneous and more reflective dimensions of human experience receive little more than a cursory, matter-of-fact treatment, one that is no match for the depth and sophistication of scientific analysis.

How do we propose to remedy this situation? Considerable evidence gathered in many contexts throughout human history indicates both that experience itself can be examined in a disciplined manner and that skill in such an examination can be considerably refined over time. We refer to the experience accumulated in a tradition that is not familiar to most Westerners but that the West can hardly continue to ignore—the Buddhist tradition of meditative practice and pragmatic, philosophical exploration. Though considerably less familiar than other pragmatic investigations of human experience, such as psychoanalysis, the Buddhist tradition is especially relevant to our concerns, for, as we shall see, the concept of a nonunified or decentered (the usual terms are *egoless* or *selfless*) cognitive being is the cornerstone of the entire Buddhist tradition. Furthermore, this concept—although it certainly entered into philosophical debate in the Buddhist tradition—is fundamentally a firsthand experiential account by those who attain a degree of mindfulness of their experience in daily life. For these reasons, then, we propose to build a bridge between mind in science and mind in experience by articulating a dialogue between these two traditions of Western cognitive science and Buddhist meditative psychology.

Let us emphasize that the overriding aim of our book is pragmatic. We do not intend to build some grand, unified theory, either scientific or philosophical, of the mind-body relation. Nor do we intend to write a treatise of comparative scholarship. Our concern is to open a space of possibilities in which the circulation between cognitive science and human experience

can be fully appreciated and to foster the transformative possibilities of human experience in a scientific culture. This pragmatic orientation is common to both partners in this book. On the one hand, science proceeds because of its pragmatic link to the phenomenal world; indeed, its validation is derived from the efficacy of this link. On the other hand, the tradition of meditative practice proceeds because of its systematic and disciplined link to human experience. The validation of this tradition is derived from its ability to transform progressively our lived experience and self-understanding.

In writing this book, we have aimed for a level of discussion that will be accessible to several audiences. Thus we have attempted to address not only working cognitive scientists but also educated laypersons with a general interest in the dialogue between science and experience, as well as those interested in Buddhist or comparative thought. As a result, members of these different (and, we hope, overlapping) groups may occasionally wish that we had devoted more time to some specific point in the scientific, philosophical, or comparative discussions. We have tried to anticipate a few of these points but have placed our comments in notes and appendixes so as not to detract from the flow of the discussion, which, once again, is intended for a wide audience.

Now that we have introduced the reader to the main theme of this book, let us outline how it unfolds into five parts:

- Part I introduces the two partners in our dialogue. We indicate what we mean by “cognitive science” and “human experience” and provide an overview of how the dialogue between these two partners will develop.
- Part II presents the computational model of mind, which gave rise to cognitive science in its classical form (cognitivism). Here we see how cognitive science uncovers the nonunity of the cognizing subject and how the progressive realization of a nonunified self provides the cornerstone of Buddhist meditative practice and of its psychological articulation.
- Part III addresses the issue of how the phenomena usually attributed to a self could arise without an actual self. Within cognitive science, this encompasses the concepts of self-organization and emergent properties of cognitive processes, especially in connectionist models. Within Buddhist psychology, it includes the emergent structure of mental factors within a single moment of experience and the emergence of the karmic causal patterning of experience over time.

- Part IV provides a further step, which consists in the presentation of a new approach in cognitive science. We propose the term *enactive* for this new approach. In the enactive program, we explicitly call into question the assumption—prevalent throughout cognitive science—that cognition consists of the representation of a world that is independent of our perceptual and cognitive capacities by a cognitive system that exists independent of the world. We outline instead a view of cognition as *embodied action* and so recover the idea of embodiment that we invoked above. We also situate this view of cognition within the context of evolutionary theory by arguing that evolution consists not in optimal adaptation but rather in what we call natural drift. This fourth step in our book may be the most creative contribution we have to offer to contemporary cognitive science.

- Part V considers the philosophical and experiential implications of the enactive view that cognition has no ultimate foundation or ground beyond its history of embodiment. We first situate these implications within the context of the contemporary Western critique of objectivism and foundationalism. We then present what was probably the most radically nonfoundationalist understanding in human history, the Madhyamaka school of Mahayana Buddhism, the school on whose insights all major subsequent Buddhist thought has relied. We conclude our discussion by considering some of the more far-reaching ethical implications of the journey undertaken in this book. Part V may be the most creative contribution that we have to make within our larger cultural context.

We intend these five parts to express an ongoing conversation in which we explore experience and the mind within an expanded horizon that includes both the meditative attention to experience in daily life and the scientific attention to mind in nature. This conversation is ultimately motivated by a concern: without embracing the relevance and importance of everyday, lived human experience, the power and sophistication of contemporary cognitive science could generate a divided scientific culture in which our scientific conceptions of life and mind on the one hand, and our everyday, lived self-understanding on the other, become irreconcilable. Hence in our eyes, the issues at hand, though scientific and technical, are inseparable from deeply ethical concerns, ones that require an equally deep reunderstanding of the dignity of human life.

I The Departing Ground

1 A Fundamental Circularity: In the Mind of the Reflective Scientist

An Already-Given Condition

A phenomenologically inclined cognitive scientist reflecting on the origins of cognition might reason thus: Minds awaken in a world. We did not design our world. We simply found ourselves with it; we awoke both to ourselves and to the world we inhabit. We come to reflect on that world as we grow and live. We reflect on a world that is not made, but found, and yet it is also our structure that enables us to reflect upon this world. Thus in reflection we find ourselves in a circle: we are in a world that seems to be there before reflection begins, but that world is not separate from us.

For the French philosopher Maurice Merleau-Ponty, the recognition of this circle opened up a space between self and world, between the inner and the outer. This space was not a gulf or divide; it embraced the distinction between self and world, and yet provided the continuity between them. Its openness revealed a middle way, an *entre-deux*. In the preface to his *Phenomenology of Perception*, Merleau-Ponty wrote,

When I begin to reflect, my reflection bears upon an unreflective experience, moreover my reflection cannot be unaware of itself as an event, and so it appears to itself in the light of a truly creative act, of a changed structure of consciousness, and yet it has to recognize, as having priority over its own operations, the world which is given to the subject because the subject is given to himself. ... Perception is not a science of the world, it is not even an act, a deliberate taking up of a position; it is the background from which all acts stand out, and is presupposed by them: The world is not an object such that I have in my possession the law of its making; it is the natural setting of, and field for, all my thoughts and all my explicit perceptions.¹

And toward the end of the book, he wrote, "The world is inseparable from the subject, but from a subject which is nothing but a project of the world,

and the subject is inseparable from the world, but from a world which the subject itself projects."²

Science (and philosophy for that matter) has chosen largely to ignore what might lie in such an *entre-deux* or middle way. Indeed, Merleau-Ponty could be held partly responsible, for in his *Phenomenology* at least, he saw science as primarily unreflective; he argued that it naively presupposed mind and consciousness. Indeed, this is one of the extreme stances science can take. The observer that a nineteenth-century physicist had in mind is often pictured as a disembodied eye looking objectively at the play of phenomena. Or to change metaphors, such an observer could be imagined as a cognizing agent who is parachuted onto the earth as an unknown, objective reality to be charted. Critiques of such a position, however, can easily go to the opposite extreme. The indeterminacy principle in quantum mechanics, for example, is often used to espouse a kind of subjectivism in which the mind on its own "constructs" the world. But when we turn back upon ourselves to make our own cognition our scientific theme—which is precisely what the new science of cognition purports to do—neither of these positions (the assumption of a disembodied observer or of a dis-worlded mind) is at all adequate.

We will return to a discussion of this point shortly. At the moment, we wish to speak more precisely about this science that has come to take such a turn. What is this new branch of science?

What Is Cognitive Science?

In its widest sense the term *cognitive science* is used to indicate that the study of mind is in itself a worthy scientific pursuit.³ At this time cognitive science is not yet established as a mature science. It does not have a clearly agreed upon sense of direction and a large number of researchers constituting a community, as is the case with, say, atomic physics or molecular biology. Rather, it is really more of a loose affiliation of disciplines than a discipline of its own. Interestingly, an important pole is occupied by artificial intelligence—thus the computer model of the mind is a dominant aspect of the entire field. The other affiliated disciplines are generally taken to consist of linguistics, neuroscience, psychology, sometimes anthropology, and the philosophy of mind. Each discipline would give a somewhat different answer to the question of what is mind or cognition, an answer

that would reflect its own specific concerns. The future development of cognitive science is therefore far from clear, but what has already been produced has had a distinct impact, and this may well continue to be the case.

From Alexandre Koyré to Thomas Kuhn, modern historians and philosophers have argued that scientific imagination mutates radically from one epoch to another and that the history of science is more like a novelistic saga than a linear progression. In other words, there is a human history of nature, a story that is well worth telling in more than one way. Alongside such a human history of nature there is a corresponding history of ideas about human self-knowledge. Consider, for example, Greek physics and the Socratic method or Montaigne's essays and early French science. This history of self-knowledge in the West remains to be fully explored. Nonetheless, it is fair to say that precursors of what we now call cognitive science have been with us all along, since the human mind is the closest and most familiar example of cognition and knowledge.

In this parallel history of mind and nature, the modern phase of cognitive science may represent a distinct mutation. At this time, science (i.e., the collection of scientists who define what science must be) not only recognizes that the investigation of knowledge itself is legitimate but also conceives of knowledge in a broad, interdisciplinary perspective, well beyond the traditional confines of epistemology and psychology. This mutation, only some thirty years old, was dramatically introduced through the "cognitivist" program (discussed later), much as the Darwinian program inaugurated the scientific study of evolution even though others had been concerned with evolution before.

Furthermore, through this mutation, knowledge has become tangibly and inextricably linked to a technology that transforms the social practices which make that very knowledge possible—artificial intelligence being the most visible example. Technology, among other things, acts as an amplifier. One cannot separate cognitive science and cognitive technology without robbing one or the other of its vital complementary element. Through technology, the scientific exploration of mind provides society at large with an unprecedented mirror of itself, well beyond the circle of the philosopher, the psychologist, the therapist, or any individual seeking insight into his own experience.

This mirror reveals that for the first time Western society as a whole is confronted in its everyday life and activities with such issues as: Is mind a manipulation of symbols? Can language be understood by a machine? These concerns directly touch people's lives; they are not merely theoretical. Thus it is hardly surprising that there is a constant interest in the media about cognitive science and its associated technology and that artificial intelligence has deeply penetrated the minds of the young through computer games and science fiction. This popular interest is a sign of a deep transformation: For millennia human beings have had a spontaneous understanding of their own experience—one embedded in and nourished by the larger context of their time and culture. Now, however, this spontaneous folk understanding has become inextricably linked to science and can be transformed by scientific constructions.

Many deplore this event, while others rejoice. What is undeniable is that the event is happening, and at an ever increasing speed and depth. We feel that the creative interpenetration among research scientists, technologists, and the general public holds a potential for the profound transformation of human awareness. We find this possibility fascinating and see it as one of the most interesting adventures open to everyone today. We offer this book as (we hope) a meaningful contribution to that transformative conversation.

Throughout this book, we will emphasize the diversity of visions within cognitive science. In our eyes, cognitive science is not a monolithic field, though it does have, as does any social activity, poles of domination so that some of its participating voices acquire more force than others at various periods of time. Indeed, this sociological aspect of cognitive science is striking, for the "cognitive revolution" of the past four decades was strongly influenced through specific lines of research and funding in the United States.

Nevertheless, our bias here will be to emphasize diversity. We propose to look at cognitive science as consisting of three successive stages. These three stages will be taken up in parts II, III, and IV respectively. But to help orient the reader, we will provide a short overview of these stages here. We have drawn them in the form of a "polar" map with three concentric rings (figure 1.1). The three stages correspond to the successive movement from center to periphery; each ring indicates an important shift in the theoretical framework within cognitive science. Moving around the circle, we have

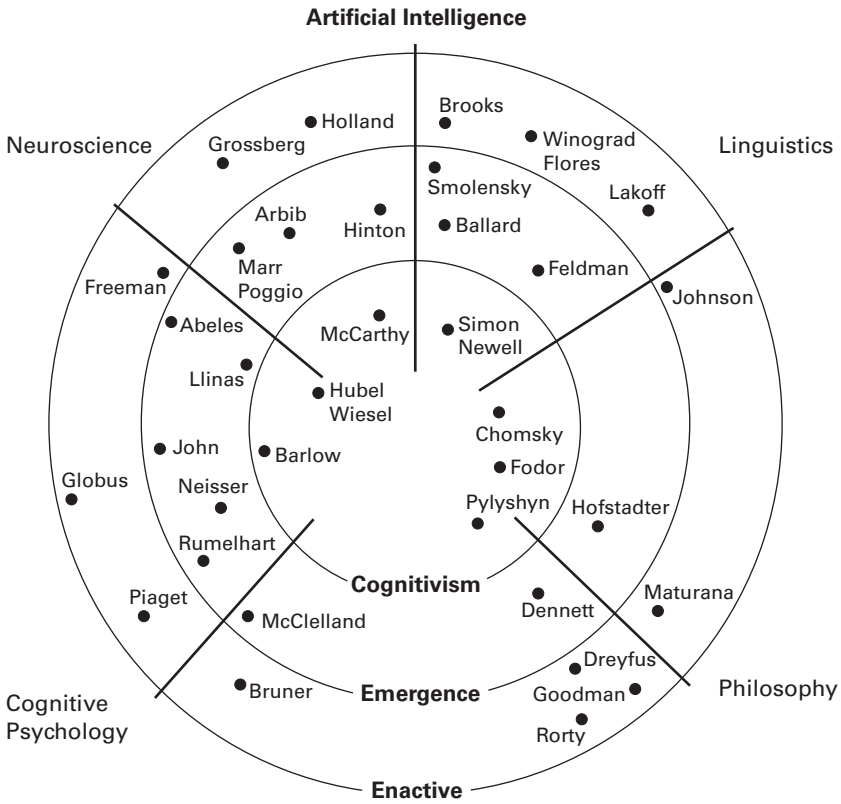


Figure 1.1

A conceptual chart of the cognitive sciences today in the form of a polar map, with the contributing disciplines in the angular dimensions and different approaches in the radial axis.

placed the major disciplines that constitute the field of cognitive science. Thus we have a conceptual chart in which we can place the names of various researchers whose work is both representative and will appear in the discussion that follows.

We begin in part II with the center or core of cognitive science, known generally as *cognitivism*.⁴ The central tool and guiding metaphor of cognitivism is the digital computer. A computer is a physical device built in such a way that a particular set of its physical changes can be interpreted as computations. A computation is an operation performed or carried out on symbols, that is, on elements that *represent* what they stand for. (For example,

the symbol “7” represents the number 7.) Simplifying for the moment, we can say that cognitivism consists in the hypothesis that cognition—human cognition included—is the manipulation of symbols after the fashion of digital computers. In other words, cognition is *mental representation*: the mind is thought to operate by manipulating symbols that represent features of the world or represent the world as being a certain way. According to this cognitivist hypothesis, the study of cognition qua mental representation provides the proper domain of cognitive science, a domain held to be independent of neurobiology at one end and sociology and anthropology at the other.

Cognitivism has the virtue of being a well-defined research program, complete with prestigious institutions, journals, applied technology, and international commercial concerns. We refer to it as the center or core of cognitive science because it dominates research to such an extent that it is often simply taken to be cognitive science itself. In the past few years, however, several alternative approaches to cognition have appeared. These approaches diverge from cognitivism along two basic lines of dissent: (1) a critique of symbol processing as the appropriate vehicle for representations, and (2) a critique of the adequacy of the notion of representation as the Archimedes point for cognitive science.

The first alternative, which we call *emergence* and explore more fully in part III, is typically referred to as connectionism. This name is derived from the idea that many cognitive tasks (such as vision and memory) seem to be handled best by systems made up of many simple components, which, when connected by the appropriate rules, give rise to global behavior corresponding to the desired task. Symbolic processing, however, is localized. Operations on symbols can be specified using only the physical form of the symbols, not their meaning. Of course, it is this feature of symbols that enables one to build a physical device to manipulate them. The disadvantage is that the loss of any part of the symbols or the rules for their manipulation results in a serious malfunction. Connectionist models generally trade localized, symbolic processing for distributed operations (ones that extend over an entire network of components) and so result in the emergence of global properties resilient to local malfunction. For connectionists a representation consists in the correspondence between such an emergent global state and properties of the world; it is not a function of particular symbols.

The second alternative, which we explore and defend in part IV, is born from a deeper dissatisfaction than the connectionist search for alternatives to symbolic processing. It questions the centrality of the notion that cognition is fundamentally representation. Behind this notion stand three fundamental assumptions. The first is that we inhabit a world with particular properties, such as length, color, movement, sound, etc. The second is that we pick up or recover these properties by internally representing them. The third is that there is a separate subjective “we” who does these things. These three assumptions amount to a strong, often tacit and unquestioned, commitment to realism or objectivism/subjectivism about the way the world is, what we are, and how we come to know the world.

Even the most hard-nosed biologist, however, would have to admit that there are many ways that the world is—indeed even many different worlds of experience—depending on the structure of the being involved and the kinds of distinctions it is able to make. And even if we restrict our attention to human cognition, there are many various ways the world can be taken to be.⁵ This nonobjectivist (and at best also nonsubjectivist) conviction is slowly growing in the study of cognition. As yet, however, this alternative orientation does not have a well-established name, for it is more of an umbrella that covers a relatively small group of people working in diverse fields. We propose as a name the term *enactive* to emphasize the growing conviction that cognition is not the representation of a pregiven world by a pregiven mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs. The enactive approach takes seriously, then, the philosophical critique of the idea that the mind is a mirror of nature but goes further by addressing this issue from within the heartland of science.⁶

Cognitive Science within the Circle

We began this chapter with a reflection on the fundamental circularity in scientific method that would be noted by a philosophically inclined cognitive scientist. From the standpoint of enactive cognitive science, this circularity is central; it is an epistemological necessity. In contrast, the other, more extant forms of cognitive science start from the view that cognition and mind are entirely due to the particular structures of cognitive systems. The most obvious expression of this view is found in neuroscience, where

cognition is investigated by looking at the properties of the brain. One can associate these biologically based properties with cognition only through behavior. It is only because this structure, the brain, undergoes interactions in an environment that we can label the ensuing behavior as cognitive. The basic assumption, then, is that to every form of behavior and experience we can ascribe specific brain structures (however roughly). And, conversely, changes in brain structure manifest themselves in behavioral and experiential alterations. We may diagram this view as in figure 1.2. (In this diagram and those that follow, the double arrows express interdependence or mutual specification.)

Yet upon reflection we cannot avoid as a matter of consistency the logical implication that by this same view any such scientific description, either of biological or mental phenomena, must itself be a product of the structure of our own cognitive system. We may diagram this further understanding as in figure 1.3.

Furthermore, the act of reflection that tells us this does not come from nowhere; we find ourselves performing that act of reflection out of a given background (in the Heideggerian sense) of biological, social, and cultural beliefs and practices.⁷ We portray this further step as in figure 1.4.

But then yet again, our very postulation of such a background is something that *we* are doing: we are *here*, living embodied beings, sitting and

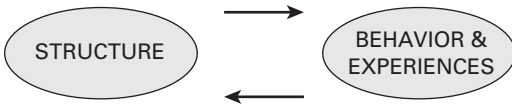


Figure 1.2
Interdependence or mutual specification of structure and behavior/experience.

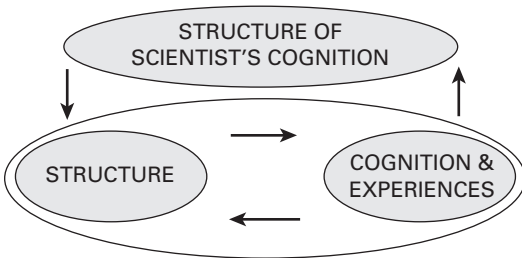


Figure 1.3
Interdependency of scientific description and our own cognitive structure.

thinking of this entire scheme, including what we call a background. So, in all rigor, we should caption our entire endeavor with yet another layer indicating this embodiment here and now as in figure 1.5.

Plainly, this kind of layering could go on indefinitely, as in an Escher drawing. This last move makes it evident that, rather than adding layers of continued abstraction, we should go back where we started, to the

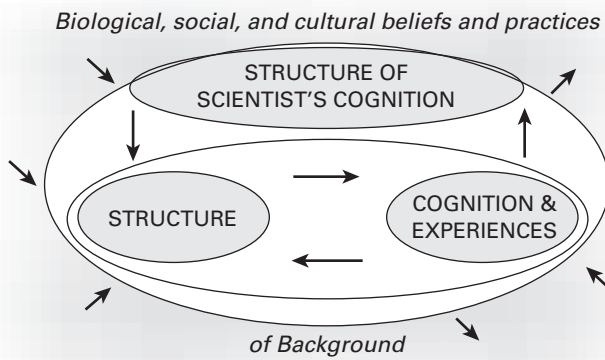


Figure 1.4
Interdependency of reflection and the background of biological, social, and cultural beliefs and practices.

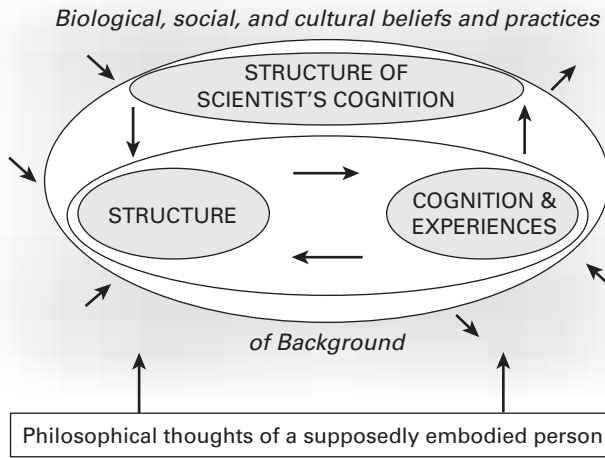


Figure 1.5
Interdependency of the background and embodiment.

concreteness and particularity of our own experience—even in the endeavor of reflection. The fundamental insight of the enactive approach as explored in this book is to be able to see our activities as reflections of a structure without losing sight of the directness of our own experience.

The Theme of This Book

This book is devoted to the exploration of this deep circularity. We will endeavor throughout to keep in mind our theoretical constructs about structure without losing sight of the immediacy of our experience.

Some aspects of the basic circularity of our condition have been discussed by philosophers in various ways at least since Hegel. The contemporary philosopher Charles Taylor refers to it when he says that we are “self-interpreting animals” and so wonders “whether features which are crucial to our self-understanding as agents can be accorded no place in our explanatory theory.”⁸ The usual response on the part of cognitive scientists is well put by Daniel Dennett when he writes that “every cognitivist theory currently defended or envisaged ... is a theory of the sub-personal level. It is not at all clear to me, indeed, how a psychological theory—as distinct from a philosophical theory—could fail to be a sub-personal theory.”⁹ For Dennett, our self-understanding presupposes cognitive notions such as believing, desiring, and knowing but does not explain them. Therefore, if the study of mind is to be rigorous and scientific, it cannot be bound to explanations in terms of features essential to our self-understanding.

For the moment we wish simply to emphasize the deep tension in our present world between science and experience. In our present world science is so dominant that we give it the authority to explain even when it denies what is most immediate and direct—our everyday, immediate experience. Thus most people would hold as a fundamental truth the scientific account of matter/space as collections of atomic particles, while treating what is given in their immediate experience, with all of its richness, as less profound and true. Yet when we relax into the immediate bodily well-being of a sunny day or of the bodily tension of anxiously running to catch a bus, such accounts of space/matter fade into the background as abstract and secondary.

When it is cognition or mind that is being examined, the dismissal of experience becomes untenable, even paradoxical. The tension comes to the surface especially in cognitive science because cognitive science stands at the crossroads where the natural sciences and the human sciences meet. Cognitive science is therefore Janus-faced, for it looks down both roads at once: One of its faces is turned toward nature and sees cognitive processes as behavior. The other is turned toward the human world (or what phenomenologists call the “life-world”) and sees cognition as experience.

When we ignore the fundamental circularity of our situation, this double face of cognitive science gives rise to two extremes: we suppose either that our human self-understanding is simply false and hence will eventually be replaced by a mature cognitive science, or we suppose that there can be no science of the human life-world because science must always presuppose it.

These two extremes summarize much of the general philosophical debate surrounding cognitive science. At one end stand philosophers such as Stephen Stich and Paul and Patricia Churchland who argue that our self-understanding is simply false.¹⁰ (Note the Churchlands’ suggestion that we might come to refer to brain states instead of experiences in actual daily discourse.) At the other end stand philosophers such as Hubert Dreyfus and Charles Taylor who seriously doubt the very possibility of cognitive science (perhaps because they often seem to accept the equation of cognitive science with cognitivism).¹¹ The debate thus recapitulates—though with new twists—the typical oppositions within the human sciences. If, in the midst of this confusion, the fate of human experience has been left to the philosophers, their lack of agreement does not bode well.

Unless we move beyond these oppositions, the rift between science and experience in our society will deepen. Neither extreme is workable for a pluralistic society that must embrace both science and the actuality of human experience. To deny the truth of our own experience in the scientific study of ourselves is not only unsatisfactory; it is to render the scientific study of ourselves without a subject matter. But to suppose that science cannot contribute to an understanding of our experience may be to abandon, within the modern context, the task of self-understanding. Experience and scientific understanding are like two legs without which we cannot walk.

We can phrase this very same idea in positive terms: it is only by having a sense of common ground between cognitive science and human experience that our understanding of cognition can be more complete and reach a satisfying level. We thus propose a constructive task: to enlarge the horizon of cognitive science to include the broader panorama of human, lived experience in a disciplined, transformative analysis. As a constructive task, the search for this expansion becomes motivated by scientific research itself, as we will see throughout this work.

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