MIND ECOLOGIES

Columbia University Press
Publishers Since 1893
New York Chichester, West Sussex
cup.columbia.edu

E-ISBN 978-0-231-54880-9

Library of Congress Cataloging-in-Publication Data
Names: Crippen, Matthew, author. | Schulkin, Jay, author.
Title: Mind ecologies : body, brain, and world / Matthew Crippen and Jay Schulkin.
Description: New York : Columbia University Press, 2020. | Includes bibliographical references and index.
Identifiers: LCCN 2020006020 (print) | LCCN 2020006021 (ebook) | ISBN 9780231190244 (cloth) | ISBN 9780231190251 (paperback)
Subjects: LCSH: Philosophy of mind.
Classification: LCC BD418.3 .C745 2020 (print) | LCC BD418.3 (ebook) | DDC 128/.2—dc23
LC record available at https://lccn.loc.gov/2020006020
LC ebook record available at https://lccn.loc.gov/2020006021

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Cover design: Julia Kushnirsky
Cover illustration: Adobe Stock

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PREFACE AND ACKNOWLEDGMENTS

For one of us, the origins of this book go back to the 1970s. For the other, the immediate impetus was more recent: a 2012 conference paper fusing pragmatism, phenomenology, and work on artificial intelligence (AI). This was combined with the suggestion from Lana Kühle (then a doctoral candidate under the supervision of Evan Thompson) that embodied, embedded, enactive, and extended perspectives—otherwise known as 4E cognitive science—be added to the mix.

The last decade has brought us both into repeated contact with the 4E idea. Numerous conferences have also brought reoccurring intercourse with rising and established scholars weaving comparable threads, and who have in various ways shaped the trajectory of this book. Among those we wish to acknowledge are Tony Chemero, Ewa Chudaba, Joerg Fingerhut, Mark Johnson, Matthias Jung, Oliver Kauffmann, Roman Madzia, Richard Menary, Donata Schoeller, and Tibor Solymosi. Roman Madzia and Matthias Jung in fact organized a conference on pragmatism and cognitive science at the University of Koblenz-Landau, which most of the preceding scholars attended. Less than a half year later, another conference on the same topic took place at the American University in Cairo, with some of the above contingent presenting and contributing to a special issue of *Contemporary Pragmatism*. During this same period, Roberto Frega and Pierre Steiner organized still another conference on pragmatism and 4E cognitive science in Paris, where many of us met once more. In the spring of 2016, a few of our paths crossed yet again at a conference on pragmatism and the brain, organized to some extent around the work of John Shook and Tibor Solymosi, and held at the University of North Carolina at Ashville. This is where the two of us began talking in earnest.

The two of us found that we got along personally and stayed in contact. It helped that we thought alike on most matters pertaining to mind. Over the next months we increasingly discovered that our interests intersected and mutually complemented one another's. By Christmas of 2016, we were toying with the idea of writing some papers together. A few months later, this evolved into plans for this book.

Any major academic endeavor owes debts to others. In addition to those already mentioned, we would like to acknowledge teachers and scholars whom we cite too little or not at all, but who have nonetheless had a lasting influence on our intellectual development and this book. These include Catarina Belo, Kent Berridge, Jeanette Bicknell, Evan Cameron, Matthieu de Wit, Chris Green, Henry Jackman, David Jopling, Scott Jordon, Alexander Kremer, David Moffat, Ian McGregor, Phillip McReynolds, Bob Neville, Diego Nigro, Hal Pashler, Bryony Pierce, Elaine Powney, Jeff Rosen, Paul Rozin, Stuart Shanker, Rebekah Smick, Mog Stapleton, Susan Stuart, and Bob Sweetman. Among others who have left an imprint on us are Patrick Heelan, Sam Mallin, Curt Richter, George Scanlon, Eliot Stellar, and George Wolf, all now passed on. We offer especial thanks to Rob Switzer for his friendship and encouragement, and for suggesting alternative approaches when funding for a preliminary project that was to lay the seeds for this book collapsed. We are grateful to John Shook for permission to use amended fragments of a 2017 article published in *Contemporary Pragmatism*. We

likewise acknowledge the largely invisible work of those in support roles who make scholarship possible, including administrative and student assistants, along with individuals at Columbia University Press. Among these are Sherifa Amin, Cristal Del Biondo, Reem Deif, Christine DeMichieli, Salma El-Galley, Zack Friedman, Lowell Frye, Ahmed El-Kosheiry, Salma El-Nager, Hadeel El-Sayed, Marwa Adel Farid, Khadeega Ga'far, Yossra Hamouda, Hagar Hod, Kat Jorge, Isa Kundra, Julia Kushnirsky, Aya Morsi, Monica Abed Ramsis, Sherif Salem, and Heba Youssry. We offer especially hearty gratitude to Audra Sim for her superb and very thoughtful copyediting.

Wendy Lochner at Columbia University Press dedicated herself to getting this book published, offering fruitful suggestions while exhibiting patience with several missed deadlines, and we offer thanks to her. Sarah Hammad—an exceptional former student and research assistant—did superb work contributing to chapter 3. Farida Youssef—another outstanding ex-student and research assistant—went above and beyond, preparing over 1,000 endnotes and catching errors in the text and references along the way. Carly Prowdley, funded by and studying at Grand Valley State University, rendered figures 1.1 and 2.1 and the brain diagrams in appendixes 1 and 2. Other institutions have lent forms of support, especially the American University in Cairo, Georgetown University's Department of Neuroscience, and Humboldt University's Berlin School of Mind and Brain. They are joined by O. P. Jindal Global University, Pusan University, and the University of Washington. For various kinds of additional support, we would also like to thank Arwa Al-Magariaf; Ramy Amin; Amy Carrillo; Sean Collard; Franca DeAngelis; Stuart Dennie; Diane, Peter, and Matthew Dixon; Steve Formaneck; Taha Gebril; Senica Gonzalez; John and Karine Hauser; Betty and Daniel LaBrash; Jeff Langman; Adham Mandour; Mariam Matar; Gord McClennan; Fred Nix; Ian Rennie; Aislinn Rose; Sandy Schulkin; Judy Straut; Susan Straut-Collard; and Günther and Mathilde Struck. Our thanks extend to Pegge Crippen, Marion Hawkins, Rosalind Schulkin, and other family relations, especially Chick Straut, who was a fellow intellectual traveler until he passed away at the end of 2018.

Some of those mentioned have been particularly inspirational on an intellectual level. With this in mind, we dedicate this book to Evan Cameron, Tony Chemero, Mark Johnson, and Tibor Solymosi. We also dedicate it to our immediate families: Bob, Paula, Marc, Najma, and Shannan, and April, Danielle, and Nick.

INTRODUCTION

After having fallen out of favor, pragmatism is resurging. This is especially so in cognitive science and value theory, two fields increasingly intertwined. Cognitive science, especially, is undergoing a pragmatic turn away from representational models, with proponents from competing quarters embracing embodied approaches that recognize the centrality of aesthetics, emotions, and interests to human experience. This development is clearly in the spirit of the classical pragmatists, not to mention phenomenologists, who are fellow travelers throughout this book. A number of neuroscientifically literate philosophers and philosophically literate neuroscientists are approaching comparable conclusions and, accordingly, embracing pragmatism; Antonio Damasio, among others, cites it as an "anchor" of his thought.[1]

In what follows, we have three goals. The first is to explicate pragmatism, which means looking at it in the context of the history of philosophy, psychology, and science with the ultimate aim of applying it to contemporary work. Classical pragmatists, of course, recognized the importance of the brain. However, many pragmatists—including John Dewey, William James, George Herbert Mead, and C. S. Peirce—also appreciated the role of active bodies in constituting perception and cognition. A few neurobiologists have picked up on this.[2] They are joined by a larger number of scientifically and historically informed researchers normally lumped together as philosophers.[3]

Our second goal is relatively modest: to more tightly integrate classic and contemporary views, detailing how actions and less considered bodily functions, such as gustation and digestion, bring perception and cognition into being. We do this as a corrective against the brain-centered outlooks that currently dominate, and to further advance the work that other historically sensitive scholars have already begun. At the same time, and as our book title indicates, we think any reasonably thorough account of mind must be grounded in an understanding of neuroscience.

Classical pragmatists made some of their more impressive breakthroughs when focusing on the arts and emotions, and something similar is occurring today. A third, more ambitious goal of this book, therefore, is to integrate hints from classical pragmatism with contemporary cognitive science and neurobiology to demonstrate that emotional, aesthetic, and interested capacities—what we term affective or valuative life—are at the heart of action, perception, and cognition. In sum, we aim to show that behavior, perception, and cognition, along with anticipatory patterns of emotion, mood, and arousal, are mutually coordinating, often aesthetic, and emphatically co-constituting.

Though framed in neurobiological and cognitive scientific terms, our work draws heavily on historical texts. As the archeologist and philosopher R. G. Collingwood observed, texts answer questions specific to the time in which they were written, and these questions determine much of a text's meaning.[4] This point applies broadly: misunderstood context may cause confusion. It also applies specifically, where the connotations of a statement like "The ring is in the garbage" may vary depending on whether the inciting question was "Where's your wedding ring?" or "Where's the cheap novelty ring you found on the way to the park?"[5] This suggests that we cannot adequately appreciate texts just by reading their words. An important step is looking at

the historically specific problems and questions that prompted authors to say what they did. Accordingly, in chapter 1, we offer a historical account of the pragmatic ideas that are critical to our arguments.

In line with Collingwood's approach, chapter 1 specifically considers how pragmatists were provoked by discoveries in biology, by debates between empiricistic and *a priorist* psychologists, and by developments in scientific methodologies,[6] especially those tied to late nineteenth- and early twentieth-century physics. Further, we examine the efforts of pragmatists to wed old and new ideas—for example, how ancient Greek thought inspired Dewey's concept of experience, which is cutting edge by today's standards.[7] Building on past traditions and the intellectual movements of their day, especially rising experimentalism and evolutionary theory, pragmatists insisted that perception is primarily enacted through doings in the world and the effects that this, in turn, has on organisms. This anticipated and, indeed, influenced J. J. Gibson's landmark ideas about perception.[8]

Pragmatists also foresaw—sometimes in exact detail—understandings advanced in the decades following Gibson by cognitive scientists and neurobiologists. This includes ecologically oriented theorists who emphasize environmentally-embedded bodily actions as bases of perception and cognition. It also includes the recent insistence of Damasio and others that emotion underpins rational decision making. In classical pragmatic literature, this embodied, biologically-based, valuative view is grounded to a significant extent in evolutionary ideas stressing the adaptability of affective capacities. In the case of William James, it is founded in an assimilation of Darwinian thinking into a theory of mind, albeit without the need for accepting the biological theory.

Specifically, James held that ideas can emerge somewhat independently of an environment that either reinforces or extinguishes them afterwards. He also held that valuative capacities such as interests could increase or decrease susceptibility to stimuli received from our surroundings, leading us to abstract from our worlds and rationally connect selected targets of attention in certain ways. In effect, therefore, we register things by cognitively altering and messing with them in ways loosely analogous to experimental scientific methods. The application of experimental frameworks to models of mind is all the more apt because valuative considerations enter both scientific and everyday decision making—for example, an aesthetic and emotional preference for elegance and economy when evidence weighs equally in favor of two competing alternatives. For pragmatists, valuations and beliefs are completed and measured in the context of environmental action. Pragmatists accordingly laid groundwork for the thesis that perception, cognition, and affective life mutually coordinate around doings and undergoings in environments, a process wherein environments are also defined.

Along with phenomenologists such as Maurice Merleau-Ponty,[9] a companion throughout this book, pragmatists introduced a more literal analogue to experimentalism in their account of mind. They did so by arguing that bodily structure and objects encountered limit action, thereby shaping the way we manipulate and alter things, bringing rhythm and form to doings and undergoings and hence to experiences arising out of them. As Dewey reasoned as early as 1896 in a landmark *Psychological Review* article, experience is not simply the world eliciting sensory excitations that are then wired to and interpreted by the brain. Though all of this is involved, experience is an outcome of the way sensory stimuli coordinate with motor activity and thus also the world. In Dewey's terminology, perception is sensorimotor, and is accordingly shaped by immediate movements, but also habits, emotions, and anything else relating to actions. In this way, Dewey and others such as Mead and Merleau-Ponty suggested that bodily action achieves many of the integrative functions traditionally attributed to inner mechanisms of mind.

Many readers will immediately recognize the resonance between these views and embodied, embedded, enacted, and extended theory—what has come to be known as 4E cognitive science. Chapter 2 details this. Mark Rowlands credits Shaun Gallagher for

coining the expression "4E."[10] Laid out schematically, the term suggests:

1. That perceptual and cognitive processes are *embodied*—that is, comprised of neural and extraneural bodily structures engaging with the world
2. That perceptual and cognitive functions are *embedded* and scaffolded by structures in the surrounding physical and social environment
3. That perceptual and cognitive processes are *enacted* not only in neural systems, but also as consequences of interactions in the world
4. That perception and cognition *extend* into the world, including that of human technology; for example, notepads deployed as external memory enhancers, or canes that blind people use to engender spatial perception of their surroundings

These four views overlap and largely imply one another, with the example of the cane applying equally to all of them. Arguably, differences are not so much between perspectives as between the individuals championing them. Thus, self-identified enactivists tend to emphasize nonneural mechanisms; they also largely eschew concepts of inner experience and mental representation, pushing the perceptual and cognitive outside the brain, albeit without denying the latter's importance. Extended theorists like Andy Clark pay comparatively more attention to the role of tools in mental life.[11] While likewise pushing beyond the head, extended-mind proponents are more comfortable inside of it. They talk about internal representations, and their models of mind are more squarely influenced by computer science, often adopting its language.

In line with the pluralism of pragmatism, we do not cling to any single perspective. So while advocating 4E approaches, we are unconcerned with fleshing out differences, and we obviously accept Mark Johnson's suggestion that an emotional "E" be added.[12] Moreover, although we think the theoretical machinery of representation is far too broadly assumed, often adding nothing or just confusing discussions, we grant that it may occasionally capture what occurs in human interactions. Thus, while avoiding such terminology, we do not go to lengths to dismantle it. Instead, our primary critique is of views that suggest that experience is built up inside our heads. These typically invoke the language of representation to defend an outlook that has become utterly mundane in philosophy, psychology, and neuroscience, even if edgy in everyday life and movies such as *The Matrix* (1999) and *Inception* (2010).

In connecting pragmatism to 4E views, and attempting to thereby augment both, we particularly focus on enactivism, which closely aligns with the classic American movement. As Rowlands puts it, enactivists hold that perception and cognition "are constituted in part by the ways in which an organism acts on the world and the ways in which world, as a result, acts back on that organism."[13] This is a word-for-word formulation of what Dewey repeatedly expressed from the late 1890s until the end of his career, but there is very little recognition of pragmatism in landmark enactivist statements. The similarities are perhaps most painfully apparent in Kevin O'Regan and Alva Noë's work.[14] Similarities also show up in treatments by Daniel Hutto and Erik Myin and by Evan Thompson,[15] the latter of whom is one of the movement's founders along with Francisco Varela and Eleanor Rosch.[16]

Though favoring extraneural approaches, we do not—as stated uncontroversially at the outset—bar the nervous system and brain from our account. Chapter 2 accordingly includes discussions about neurobiological factors in bodily synchronization.[17] It additionally looks at how perceptual, habitual, grammatical, semantic, and motor functions, along with probability prediction, are handled by overlapping and indeed sometimes the same brain regions. This lends further credence to the claim that perception, action, and cognition knot together. So too does the fact that pragmatic treatments of perception—in company with phenomenological and Gibsonian interpretations—presaged ideas increasingly important in artificial intelligence (AI) and robotics, particularly the precept that human-like intelligence requires a human-like body

in addition to a CPU capable of brain-like functions.[18] Insofar as pragmatic, phenomenological, and Gibsonian approaches stress that perception occurs through total coordinations of bodily capacities, they suggest that multiple modalities always mobilize in actions and hence habits. This provides avenues—underexploited by enactivists—for understanding intermodal perception, which we examine in the context of contemporary experimental and neurobiological work.

Chapter 2 generally considers the body as a synergistic system that falls into coordination around environmental contours such that organic activity structures and constitutes perception and cognition. This embodied position challenges accounts dominant since the early modern era that see the mind or brain primarily as a mechanism that generates internal representations of the external world. Insofar as the world of representation is one of appearance, this epistemological dualism of inner-versus-outer leads directly to skepticism. Challenging this standpoint, embodied views (especially ones grounded in pragmatism and phenomenology) overwhelmingly counter the conclusion—to put it crudely—that the human mind is feeble.

Continuing with the idea of perception and cognition as bodily coordination, chapter 3 explores how synchronized activity among groups of organisms achieves similar functions. Though sometimes stated more than defended, this idea is again introduced in classical pragmatism, especially Dewey's work, which advances a notion of experience as culture that parallels phenomenological concepts of worldhood. In addition to resonating with 4E positions, these views also enrich and are enriched by empirical research on child development that suggests cognition is co-defined by caregivers. Theoretical work in psychology suggests something similar in adult relations, and everyday observation affirms that we remain dependent throughout life, with even simple tasks relying on the collective efforts of many. Social life, in turn, characteristically involves the deployment of emotional capacities, thus accentuating links between action, affect, cognition, and perception—links that persist even when a lone perceiver scans a space for openings and threats. We focus on aesthetic aspects of social cohesion in discussing group activity, drawing on experimental psychology to augment our account of perceptual and cognitive coherence. Emotion is central to almost any study of aesthetics, and it is also part of what unifies human action in group settings, giving additional reason to suppose that affect knits together with action, cognition, and perception.

Neurobiological research supports this view. Broca's area, to consider an example, is classically associated with language capacities. However, in different neural coalitions, it also appears to facilitate movement preparation and action recognition and imitation.[19] It also contributes to music perception, and thus aesthetic experience.[20] Interinnervated with Broca's area, the basal ganglia likewise connects to movement and habit organization and cognitive functions, including the syntax of regular verbs, the probabilistic prediction of events, reward appraisals, and emotional evaluation.[21] This neural coalition points to the knotted character of action, affect, cognition, and perception. Moreover, motor-related neural areas in the brain appear to mobilize when an agent either witnesses another agent moving or engages in a task. Perhaps more interestingly, activation in the former case seems to depend not on observed movements alone, but awareness of goals and their achievability.[22] Together with other evidence, this suggests that recognition of intentions in others is important, highlighting links between standard sensorimotor accounts and social cognition.

After laying out connections between pragmatic, developmental, neurobiological, and experimental work, chapter 3 next examines Gibson's perceptual theory of affordances, along with recent research tying it to aesthetic experience and social life. While emphasizing physical movement, chapter 3 reiterates that our psychological landscape begins as social and remains so throughout life. In other words, movement knits with social life all along, so that the latter is not built up from the former in a reductive way. By emphasizing that things registered by us are consequences of our conduct in primarily

shared worlds, we once again challenge the skeptical notion that experience is an exclusively private, subjective phenomenon.

In chapter 4, we attend to the affective or valuative side of embodied cognition. This is a fairly central point in classical pragmatic literature, which frames cognition as knotted with emotional, interested, and aesthetic dimensions. Pragmatists were not exactly original in positing this. However, up until their time, those who saw cognition as affectively infused largely suggested that this degrades the epistemic basis of human thought and beliefs. Pragmatists stood out in arguing that the aesthetic, emotional, and interested sides of cognition enhance its rationality. More specifically, they held that thinking, abstraction, and—indeed—experience fruitfully knit together with emotional, interested, and aesthetic life, bringing us more in touch with what may colloquially be called "reality." This, in turn, aligns with conclusions increasingly accepted in neurobiology, especially since the 1990s—conclusions that collectively suggest that little in the way of differentiated thought and reasoning occurs absent emotions and interests.[23] However, pragmatic and recent accounts also share a common oversight. This is a neglect for ties between emotions and interests in spite of obvious conceptual, experiential, and neurobiological overlap—an oversight that arguably follows from treating emotions as visceral and interests as other than that.[24] Without denying, for instance, that emotions typically have visceral components, there are clear counterexamples to this. There are also cases in which interests are emphatically visceral. We argue that standard separations of emotions and interests are conceptually, experientially, and neurobiologically unwarranted and prevent what might otherwise be a more expansive account of valuative cognition.

In addition to resonating with neurobiology, pragmatic views align with perspectives from psychology and cognitive science. This includes outlooks stressing satisfying closure and coherence[25] and research emphasizing emotional motivations behind inquiry.[26] It also includes experimental work that identifies a meeting of cognition and affect in environmental exploration.[27] We focus on the active, anticipatory, and searching sides of cognition and perception implied in both pragmatic and recent accounts. This encompasses not only literal manipulation and selective gathering that lead to knowledge, but also outcomes achieved through selective attention and emotional weighing. Both imply a kind of cognitive foraging[28] understood as an appetitive process—that is, a driven and active search for what is cognitively satiating. This search, once again, entails doings and undergoings, coordinated in immediate and longer time frames with emotions systematically directing attention and action, which circles back on affective life.

It should be evident that all this applies not only to cognition, but perception too, a topic we return to in chapter 5, once again focusing on affective or valuative dimensions. Though more squarely directed at cognition, James's treatment of interests can be expanded into an account of perception that emphasizes valuations as information-rich ways of being perceptually in touch with the world. This aligns with more recent scholarship in philosophy, neurobiology, and cognitive science. James, in company with Dewey, Gestalt theorists, and phenomenologists—all at their height in roughly the same period—also anticipated Gibson's theory of affordances and, by extension, 4E cognitive science.[29] This is not surprising since Gibson's intellectual lineage leads back to these historical schools.[30] Inasmuch as all these perspectives hold that we perceive according to what our bodies can do in environments, they suggest that our experience is grounded in what is biologically needful and aversive. This, in turn, highlights human perceptual systems as valuative and, more specifically, as organized around attractions, preferences, satisfactions, and aversions. In this sense, they are structured according to aesthetics, too.

In chapter 5, we specifically elaborate on exploratory sensorimotor activity, not just in humans, but in organisms ranging from unicellular life to insects to warm-blooded vertebrates. Connecting these diverse forms of life are the activities of foraging for

nourishment and avoidance of hostile elements, which, even in the case of single celled organisms, involve complex strategies. For example, the unicellular species *Physarum polycephalum* coordinates in groups to explore their environments, secreting trails of slime to mark where they have already been, leaving external chemical recordings similar to what extended cognitive scientists in the vein of Clark have described;[31] insects and warm-blooded vertebrates achieve the same with pheromone markers,[32] as do humans by technological means. All of this—especially in the cases of unicellular and insect life—matches what the prominent roboticist and AI researcher Rodney Brooks has proposed: that intelligent behavior is achieved through direct sensorimotor coupling with the world, combined with layered behavioral tendencies that might include random wandering, collision avoidance, approach of distant or certain kinds of objects, and more. On a general level, it affirms Brooks's dictum that the world is better than any model of it that can be constructed in central processing units or brains.[33]

In articulating these points, we do not go so far as to claim that unicellular and insect life are valuative. However, such organisms exhibit preconditions for valuative and aesthetic experience, realized fully in the case of human beings and arguably a range of other cephalic species as well. An important point we add—building on chapter 4—is that much of this is driven by the interweaving of visceral, neural, and motor activity. Put another way, many affordances link to core drives such as gustation, digestion, and the search for mates or shelter from predators.[34] Exploratory behavior largely moves towards these ends. This is part of the evolutionary past of humans, and according to experimental psychologists such as Rachel and Stephen Kaplan, it provides explanations as to why humans take aesthetic pleasure in exploration and discovery of environments promising reasonable degrees of navigability.[35]

Indeed, while many of us do not face the extreme exigencies of our evolutionary predecessors, we may still find ourselves exploring restaurants and other spaces in search of food or mates, to flee inclement weather, or to escape someone harassing us on the streets. At a more global level, we may find certain spaces emotionally tempting and others threatening, suggesting valuative—which is to say, emotional, interested, and aesthetic—dimensions in perception. Insofar as this connects to exploration and movement, action is knitted in too, along with cognition, since such behavior entails judgment and evaluations of surroundings. Moreover, this account suggests that valuative aspects of surroundings, like perceptual ones, are qualities of interactions in which both extra-organic things and organisms partake.[36] Accordingly, they are not projections of mind onto the world. This is in keeping with the antiskeptical flavor of pragmatism, phenomenology, and Gibsonian psychology.

As the book title suggests, our general aim is to detail how embodiment, neurobiology, and affective aspects merge into an integrated ecology of mind, psychic life, or self. A more specific goal is to show that affect, cognition, motility, perception, and valuations fuse in human life. By virtue of being embodied, and therefore structured around doings and undergoings in the physical and social world, these processes are simultaneously embedded, enacted, and extended. Classic commentators—pragmatic, phenomenological, and Gestalt—stressed the last point in various ways. For instance, they tended to agree that affective life delineates situations in which decisions, perception, and behaviors take shape: we commonly speak of finding ourselves in moods, as opposed to characterizing emotions merely as states discovered inside of us. They further suggested that emotions and interests bring world-changing shifts in attention, and this means alterations in thought and worldly action as well. Dewey more specifically observed that emotions are attached to objects and events, and are only private and internal in cases of breakdown. These views anticipate a variety of more recent work.[37] It should be added, however, that many recent accounts in this vein lack the biological justification we supply. Classic theories necessarily lacked the same because of the comparatively ill-developed state of biological knowledge on which they were based.

In our sixth and final chapter, we offer a philosophical and biological culmination of the view that action, cognition, perception, and affective life do not merely contribute to one another. In the case of human beings, they are essential to one another; they make one another what they are. These endowments function in global contexts, which include bodies, capacities for movement, viscera, and a great deal else synchronizing through total interactions with surroundings to compose the fabric of psychic life. In other words, mind is ecological.

The word "ecology" typically evokes the environment and systems in it. What goes unrecognized in most philosophical treatments of mind is that we have ecologies within us. In one sense this is literal: a variety of species—including humans—host vast populations of microorganisms, which play critical roles in bodily functioning generally, and psychic life specifically.[38] We explore this in our final chapter. As intimated, psychic life can also be said to be ecological insofar as the body, including organs such as brain, viscera, limbs, and more, form mutually dependent, integrated systems that bring about *mind*. In our last chapter, we argue that this in fact undersells the situation when it comes to what is conventionally divided into action, cognition, perception, and emotion. That is, we argue that cognition is emotional, and emotion, cognitive. Perception is likewise cognitive and emotional, and emotion, being perceptual and cognitive, helps us grasp what is occurring in the world, accentuating possible ways of acting to handle issues that arise. This implies motor potentialities, whether or not they are actualized.

In noncephalic creatures such as the earlier mentioned *P. polycephalum*, this similarly holds, albeit obviously without intervention from brains. These organisms explore environments in groups with the help of slime trails left to externally mark where they have been. They can successfully navigate mazes while selecting from diverse ranges of nutrient options and avoiding harmful substances. These behaviors are sensorimotor and hence perceptual in fairly standard ways. They are cognitive, too, insofar as they involve weighted selections, approach, and avoidance according to what is life-promoting or life-diminishing. For just this reason, they might be said to be at least prevaluative. Importantly, a single response—for example, movement towards food—is all of this at once, suggesting that action, cognition, perception, and valuation (or something like it) fuse in even relatively simple instances of life. In human beings, action, cognition, perception, and affective life similarly bind together, but with help from brains in addition to bodies and environments.

Views contrary to this are longstanding and are advanced in the notion of the brain as the seat of human psychic life. This notion persists in standard interpretations of mind that maintain separation between action, cognition, emotion, and perception. Likewise, neuroscientific literature often divides the brain in terms of interpreting versus responding to external events. Certain neural structures may indeed be geared towards interpreting the environment, while others may be more oriented towards generating emotional reactions. However, evidence converges to indicate that different neural structures perform these and other operations together, with individual regions simultaneously executing more than one role. Experimental, neurobiological, and theoretical work on the psychology of aesthetic experience reinforces this point. Aesthetic responses are obviously perceptual, but there is behavioral and neurobiological evidence suggesting that they are simultaneously affective and thus visceral, and, in this way, embodied.[39] Moreover, they are explainable in terms of motor potentialities[40] and have been observed to activate motor areas in the brain.[41] They are simultaneously cognitive insofar as they involve immediate appraisals of situations and what it is possible to do in settings. Some of these points connect aesthetic experience to Gibson's affordance theory. Given that Gibson's work is a development of pragmatism, phenomenology, and Gestalt theory and is a widely accepted antecedent to 4E views, all of this fits within our general framework.[42]

Although we reject modularity, some regions in the brain are fairly specialized. For example, Broca's area, while not operating alone, appears dedicated to speech

comprehension and production, with lesions in this neural region associated with language impairment; likewise, the fusiform gyrus is crucial to facial recognition, since damage to it often impedes this ability.[43] Yet facts such as these do not stand as strong evidence that these regions solely handle the aforesaid capacities; nor does this undermine the broadening ecology we seek, since the aforementioned pathologies may be consequences of interrupted pathways. More critically, most brain structures—and perhaps all of them—seem to perform more than one task.[44] Thus, although active during language processing, Broca's area also appears involved in music perception.[45] This is perhaps not the most compelling example, since Broca's area is rather large. However, much the same occurs even at the level of individual neurons, which in some brain regions handle multiple functions, as seen in organisms ranging from roundworms to mammals.[46] Outside the brain, the human body also has specialized appendages and organs, but many of these likewise can perform multiple operations. This is the case with hands, which predominantly grapple with things, but can also be deployed in language expression and comprehension, as when signing and reading braille. Moreover, activities such as signing typically entail a global coordination of posture, gaze, and more, once again highlighting the integrated nature of organic existence. All of this resonates with classical pragmatic views, not to mention phenomenological ones advanced by thinkers in the vein of Merleau-Ponty.

The organization of action and bodily sensibility are replete with cognitive function. This supplies a nonneural explanation as to why life mostly unfolds prereflectively,[47] though we do not completely reject brain-based accounts of the unconscious. We do, however, think they are overplayed because a great deal of what constitutes psychic life in fact happens outside the brain. Evidence suggests that moods, thoughts, and psychiatric conditions are moderated by what goes on in the viscera.[48] Pragmatists, Merleau-Pontian phenomenologists, and 4E cognitive scientists add that a great deal of processing occurs through body-environment interactions. This includes general doings and undergoings in the world that supply integrative fabric for experience. It encompasses more specific body-environment interactions, such as mountains funneling monarch butterflies towards destinations on migratory paths,[49] with light cues and basic magnetic sensitivity providing further guidance.[50] Much the same holds across species, whether in humans navigating less through mentation and more through coordinating with contours of paths; or in *P. polycephalum* doing the same by means of external traces of slime; or in a variety of organisms adapting to physical laws not by performing brain-based calculations but rather by virtue of appendages that behave according to those laws.[51] Along comparable lines, neurobiology and other internal factors are not sufficient for explaining emotions. Neither inner feelings nor nerve firings alone specify emotions independently of worldly contexts; the same tremor might be fear or excitement depending on the environmental situation.[52] In addition to this, theoretical reasoning and tentative evidence suggest that expression and action make particular emotions more distinctly identifiable.[53] This is in line not only with pragmatic and phenomenological standpoints, but also enactive views, all of which suggest emotional experience is part of a sensorimotor loop.

At the same time, none of this suggests ignoring neurobiology, as findings from that field reinforce pragmatic, phenomenological, Gestalt, Gibsonian, and 4E renderings of psychic life. To offer an example, the cerebellum—a rostral structure abutting the brain stem—is involved in both motor coordination and emotional experience along with cognition and perception.[54] This is exactly the kind of finding that the aforementioned traditions would predict, and it points to something nearly everybody accepts: that the brain is always involved in the psychic life of cephalic organisms.

Although 4E theorists know that sensorimotor activity, which is fundamental to many of their accounts, requires a brain to occur in humans, too few attend to the nervous system in detail. Noë, to give one example, asserts that sight substitution devices (see chapter 2 for more detail) do not activate the visual cortex, even while citing evidence

that they do in some circumstances and despite there being no dearth of other studies testifying to this at the time that he made the claim.[55] This error might have come from ideological commitment to a tenet that has become something of a slogan, especially in enactive quarters: that we are not our brains. While agreeing with this sentiment, we obviously advocate careful discussions of neurobiology. The earlier illustration of the cerebellum is but one in a long list of neurological cases that align with 4E accounts, and there are a variety of others. To name one, leading experts on phantom limb pain have suggested that the unpleasantness of such cases arises partly from motor signals going out without receiving normal motor feedback, so that sufferers might have the experience of continually clenching and tightening hands.[56] This supplies neurobiological support for what Merleau-Ponty specifically said about the phenomenon.[57] It also generally accords with pragmatic, phenomenological, and 4E standpoints that conceive of perception in terms of sensorimotor loops. Such explanations of phantom limb discomfort, along with current understandings of the cerebellum, offer noncontroversial neurobiological affirmations of 4E accounts.

Pragmatists and, later, Merleau-Ponty insisted that mind is not traceable to any one structure. This is because it arises out of a totality of sensitivities and capacities working in concert with the world, not to mention the microbiome within us, though classic thinkers were obviously not in a position to know this. The reticular formation in the brain stem does not equal consciousness, nor do the amygdala bulbs, nor still the brain and nervous system in their entirety, nor the body. Bodily engagement and practiced patterns that characterize psychic life distribute across brain regions and infuse action as it occurs in the world. This and more constitute the integrated organization of cognition, motility, perception, and affective life. Feelings and emotions are not detached from cognitive and perceptual systems in the brain, and they are not separate from bodily conditions and actions either. These are the points we defend in this book and bring together in the final chapter.

1

LIFE, EXPERIMENTALISM, AND VALUATION

Although we primarily aim to advance contemporary cognitive science and neurobiology along pragmatic lines, we begin with a historical examination. This is, as intimated in the introductory chapter, to explicate relevant pragmatic ideas. It is also to show it is no accident that pragmatism remains relevant, for it bears the imprint of major nineteenth- and twentieth-century scientific shifts that continue to dominate our understanding of the universe. It also reflects longstanding debates in the philosophical world, with pragmatists negotiating tensions between empiricism and post-Kantian rationalism, the legacy of Greek philosophy, and more. Many of these debates have evolved and continued in psychology, for example, where empiricist versus rationalist debates parallel disputes between behaviorists and cognitive linguists.[1]

Dewey insisted that the very task of "thought is to establish working connections between old and new subject-matters."[2] We attempt to live up to this charge. In this chapter, we look at intellectual contexts that led pragmatists to emphasize embodiment (taken broadly in the 4E perspective) along with valuative theories of mind, which is to say that we concentrate on accounts that regard cognition and perception as emotional, aesthetic, and interest-based. In the broad view of this book, pragmatism lays the groundwork for the integrated ecologies of mind that we hope to advance.

Obviously, biology is central to our argument. It is also important in pragmatic philosophy, and among classical pragmatists, James had the most formal biological training. After stints as a student of painting and then chemistry, James studied anatomy and physiology, finally graduating with an MD in 1869. He had the added advantage of attending Lawrence Scientific School at Harvard (at that time a center of the Darwinian debate) and began his career as an anatomy and physiology instructor. Not unexpectedly, therefore, James came to believe that psychology must presuppose a certain amount of brain science, and opened his *Principles of Psychology* with a statement to this effect.[3]

Dewey and especially Mead upheld the same premise, albeit—in keeping with the ecological orientation of nineteenth-century evolutionary views—warning not to replace mind-body dualisms with brain-body ones.[4] These slightly later pragmatists emphasized the brain as an organ for coordinating bodily doings and undergoings in the world. Less obviously, they also saw coordinations of sensory and motor activity as more than mere brain functions, conceiving of them as the basis of human perception and cognition. While forward-thinking, this idea was also emblematic of its time. One reason was that evolutionary theories abounded, with Darwinian and non-Darwinian variants both stressing adaptation as something connected to the body but also to intelligence, thus introducing links between motoricity and mind.[5] Dewey and Mead were therefore not alone in their views. Henry Calderwood,[6] John Hughlings Jackson,[7] Francis Galton,[8]

Edward Titchener,[9] Margaret Floy Washburn,[10] and others from that era took comparable positions, often invoking evolutionary theory in formulating what some of them called "sensorimotor" accounts of mind. Chauncey Wright, though still locked in early modern concepts of mind, was an early defender of Darwin. He was influential upon the pragmatists, and also made baby steps towards a motor theory of consciousness.[11] Herbert Spencer—similarly a proponent of evolutionary theory, albeit more Lamarckian than Darwinian—did much the same, even while likewise trapped in early modern empiricist suppositions and despite his ideas being relentlessly dismembered by James.[12] Classical pragmatists were therefore part of a general movement towards embodied views, but, unequivocally, their positions were more developed than those of most of their contemporaries, not to mention many of today's theorists.

In addition to evolutionary themes, pragmatists and especially Dewey assimilated the other two major scientific shifts that rocked the late modern period—namely, relativity and quantum mechanics. This, too, fits the ecological thrust of pragmatism. In the case of relativity, as the name suggests, it fits because the framework holds that determinable properties cannot be expressed outside interrelations, such that specifying mass, physical dimensions, and the like mean taking up a standpoint relative to the object described. Quantum mechanics does the same in its assertion that observing the microscopic world means changing it. One of Dewey's breakthroughs was to realize that this is not a peculiarity of extreme circumstances (e.g., subatomic sizes or high relative velocities). Instead, the notion that we come to know reality by mucking about with it is endemic to experimental methods, which pragmatists assimilated before scientists formalized them. It also characterizes everyday life, where we perceive and know things by mentally and physically altering them, in some cases literally hefting them, pushing into them, feeling their resistance, and otherwise changing them through our observational activities. This insight is central to the classical pragmatists' embodied theories of mind and knowledge,[13] and also key to recent 4E variations.[14]

By developing embodied positions, which are ecological by definition, pragmatists moved beyond standard inner-versus-outer divides that ruled the modern era and that still dominate today. Peirce, James, and Dewey all anticipated ecological psychology,[15] guiding future trendsetters such as Gibson.[16] Dewey and Mead further foresaw—sometimes in exact detail—extraneural accounts advanced by 4E proponents, especially the enactive position of O'Regan and Noë.[17] That the classical pragmatists proposed that bodily action is constitutive of mind is more remarkable in light of recent neuroscientific work, which is at least consistent with the thesis. For instance, the basal ganglia are critical for motor control and the organization of behavior and habits, simultaneously linking to cognitive functions, including linguistic activity, probabilistic prediction of events, and reward appraisal.[18] Also remarkable is the fact that pragmatists identified cognition and perception as emotional and aesthetic. They thereby anticipated recent work in neurobiology, experimental psychology, and philosophy[19] while offering means of expanding and enriching it. This is what we, too, hope to accomplish in this book.

EVOLUTION AND PRAGMATISM

While evolutionary accounts of life date to antiquity, the late eighteenth and early nineteenth centuries saw outpourings of them, the most prominent among them being Charles Darwin and Alfred Russell Wallace's theory of evolution by natural selection. The theory influenced both Dewey and Peirce, though Peirce leaned more on Lamarckism. It also informed pragmatist thought in more general ways that did not require allegiance to the biological components of the theory.[20] Darwin and Wallace's influence on Mead was arguably deeper, and it connected to his embodied account of mind. Mead suggested that perceptual adaptations are, in effect, environmentally

scaffolded capacities evolved to enact objects—that is, realize properties of objects through perception-engendering action.[21] For example, the tactile exploration of a beer bottle enacts its roundness and glassy smoothness, and simultaneously the perception of these qualities; yet we are only able to enact these properties and experiences insofar as selective pressures have endowed us with hands and connected organic structures. While Lamarckian and other evolutionary and perhaps even non-evolutionary schemes would imply comparable outcomes, the prominence of Darwin's theory motivated Mead's views.

Darwinism likewise influenced James and is central to his work,[22] but, again, one can accept James's views on mind while rejecting Darwin's biological theory. This is because, despite assimilating Darwinism, the main target of James's argument was not evolutionary. Specifically, James's primary objection was to British empiricist psychologies, and he saw neo-Lamarckism as biologically extending these models of mind.[23] Darwinian frameworks offered alternatives to either view. Simultaneously, and because neo-Kantian *a priorist* schools were rivals to empiricist psychologies, James—with help from Darwinism—developed his alternative in the neo-Kantian vein. However, by emphasizing how interests and emotions (or what might be called personal affectivity) structure our experience and cognition, he deviated from the *a priori* logical schemes of post-Kantian psychologists. At times, he also expressed unmitigated hostility towards traditional Kantianism despite assimilating tenets from it.[24]

To appreciate how and why James synthesized all these outlooks, it is important to recognize that Herbert Spencer was a main target of his attacks. Spencer was not only a British empiricist, but also an evolutionary theorist committed to the neo-Lamarckian notions of direct adaptation and inheritance of acquired traits. Direct adaptation holds that environmental pressures elicit adaptive variations rather than merely reinforcing them, a point illustrated by the overused example of a giraffe's neck elongating by virtue of habitually reaching up to eat leaves. In this scheme, the organism gets the adaptation it needs during its lifetime directly from its activity in its surroundings. Inheritance of acquired traits simply means that characteristics gained in this way are passed to the next generation. By adopting these standpoints, Spencer obviously abandoned the blank-slate position of earlier British empiricists. However, he retained the core empiricist tenet that environments are the prime shaper of minds, extending it only to include both the environments of individuals and those of ancestors. In James's view, therefore, Spencer did what other empiricists did. And as is often the case when people attempt to define philosophical schools, James put it in exaggerated terms: he complained that British empiricists reduced the organism to a passive recipient of sensations, ideas, and dispositions, so that the world molds the mind through "a kind of direct pressure, very much as a seal presses … wax into harmony with itself."[25]

When it came to neo-Lamarckism, James detested the idea of the inheritance of acquired traits, particularly its applicability to human psychology, and urged that there was little evidence for it.[26] He concluded that any existing inborn adaptations are legacies of "congenital variations, 'accidental' in the first instance, but then transmitted as a fixed feature."[27] Even more fervently, James protested direct adaptation and the analogous empiricist claim that experiences—understood as impositions of impressing environments—directly mold minds. Impressions, he maintained, could not by themselves do this because things usually interrelate in myriad ways, meaning that multiple instantiations are typically possible in perception.[28] With a Necker image, for instance, we can see different planes as front or back, or, alternatively, we can see the figure as a two-dimensional pattern (figure 1.1). Seeing the figure all ways at once, on the other hand, would render it unpicturable.[29] This is one example among many, and it suggests our experience would be chaos if it were simply a raw outward order impressed on the senses.[30] Moreover, were environment the sole shaper, as stock empiricist accounts suggest, people raised in the same circumstances ought to develop identical minds—an outcome not supported by evidence, according to James.[31]

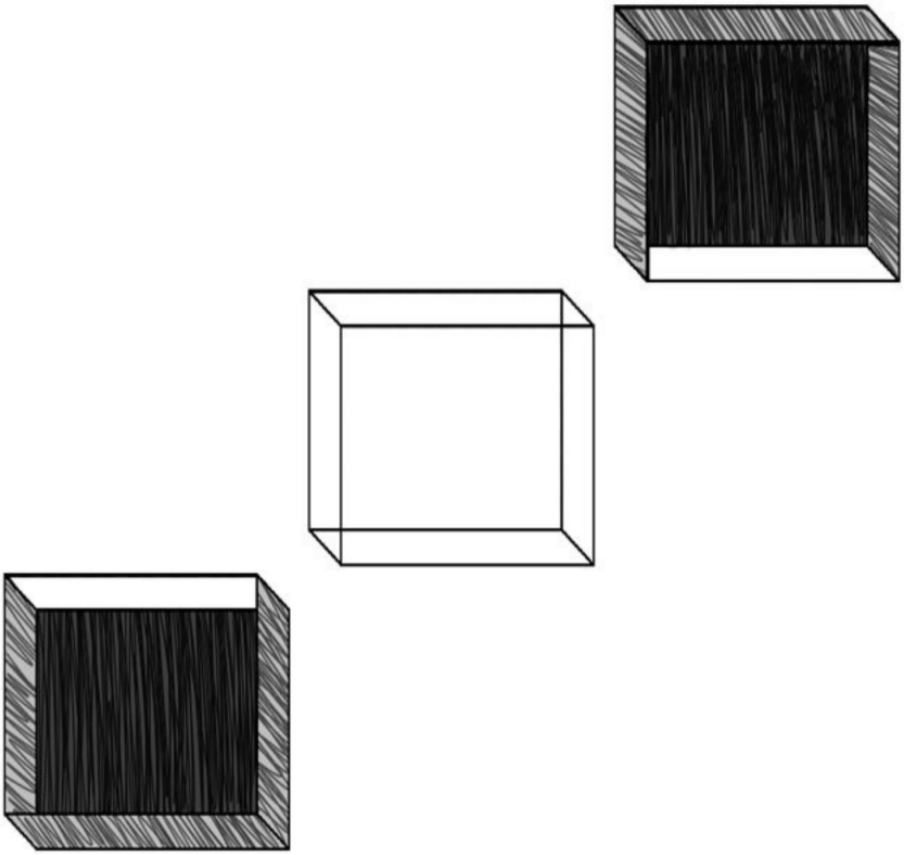

FIGURE 1.1 Necker images
By alternating your focus between the two square planes in the middle figure, you can make either pop forward so that the overall form looks like either the top-right or bottom-left figure.

Empiricist accounts further suggested that the strongest beliefs should correspond to our most frequent observations. While granting that this can happen, James cited science as a domain that sometimes progresses "by ignoring conditions which are always present."[32] Thus it was that Galileo established kinematic laws of motion by envisaging marbles rolling over nonexistent frictionless surfaces, or Isaac Newton conceived his laws by reducing celestial bodies to point-like objects. This suggests that outward observation alone does not impress justified beliefs on us. As a result, James proposed the reverse of what empiricists argued: that ideas sometimes precede things noticed.[33]

James's problem, in short, was not with empiricists' emphasis on experience, but their conceptualization of it as the world impinging on a passive mind. He noted that we encounter overwhelming numbers of stimuli, most of which do not enter our experience.[34] This is repeatedly affirmed by researchers after him.[35] Thus, James held that "consciousness is at all times primarily *a selecting agency*" that focuses on "one out of several of the materials so presented to its notice, emphasizing and accentuating that and suppressing as far as possible all the rest."[36] For James, the mind operates on the basis of interests, ideas, and functionally similar mechanisms, working on sense data "very much as a sculptor works on … stone,"[37] by which it "*makes* experience" of the world.[38] Insofar as the aforesaid mechanisms influence action, and actions change the world, the world-making power of mind extends to the material conditions of life.[39] James insisted, therefore, "that the knower is not simply a mirror … passively reflecting an order that he comes upon … existing. The knower is an actor [who registers that] which he helps to create."[40]

James, of course, did not deny that experience sometimes elicits interests. However,

without the shaping influence of interests, coherent experience would not exist in the first place, as might be the case if one were absorbing everything simultaneously at a cocktail party. This position relates back to the Darwinian idea of indirect evolution. James lauded the standpoint as triumphantly original for recognizing separate cycles of operation in nature;[41] in other words, he appreciated the theory for highlighting that variations arise for reasons independent of the environmental pressures that select or discourage them. By applying this evolutionary idea on the scale of the individual, James arrived at two interrelated explanations of how the mind can fit the environment without being directly molded by it.

One was that "accidental out-births of spontaneous variation in … the excessively instable human brain" spawn new ideas and new ways of drawing relationships between things.[42] Many of these inventions "perish through their worthlessness,"[43] but some help us notice and pull things together intelligibly. The environment reinforces the latter ideas, but this "is the cause of their *preservation*, not that of their production."[44] James's second explanation was that the environment supplies sensory variations, which are reinforced or deemphasized depending on our interests. Thus, during a cocktail party, we do not register every perceptible phenomenon. Instead, our attention narrows, focusing on what interests us and has emotional pull. Necker forms are similar in that focusing attention can flip a plane to front or back or make the figure appear two-dimensional. In most cases, such focusing occurs automatically, and the point is that attention must be narrowed to extract anything coherent. James further suggested that selective interests or attention shape how we rationally put things together.[45] The Necker illustration conveys something like this on a perceptual level.

Aside from the emphasis on multiple cycles of operation, James's account reiterates the nonpassive sides of adaptation, an implication that applies to pragmatic theories of mind. It also characterizes Gestalt and phenomenological outlooks, along with more recent Gibsonian and 4E views, all of which will become critical in this book. Stephen Jay Gould nicely illustrates the active and—in a sense—embodied side of Darwinism that James picked up on.[46] Gould points out that evolution is sometimes driven by both the presence of variation and the actions of organisms. Thus the appearance of a new food only alters the evolution of bill shape if birds have an ability to eat it and an interest in doing so: when they act upon this, the added nutrition allows those better suited to the task to propagate more. James made roughly the same point when joking that successive generations of dogs raised in an art gallery would not evolve an appreciation of painting.[47] They would not because they would be uninterested in the aesthetics of painting in the first place, and hence would not be affected by it.[48] James adapted this reasoning on an ontogenetic level, maintaining that interests dictate what environmental aspects we notice and therefore what features affect us within the span of our own lifetimes.

By modeling a Darwinian account of mind, and especially by emphasizing independent cycles of operation, James combined the empiricist claim that the world structures the mind with the rationalist claim that the mind imposes form on the world.[49] In this reconciliation, and by insisting that factors independent of our experience limit cognition and perception and actively shape how the world appears, James mirrored what Kant had done.[50] He recognized this, claiming in broad strokes to defend "the account which the apriorists give,"[51] that interests are "the real *a priori* … in cognition,"[52] and that "interests form a true spontaneity and justify the refusal of *a priori* schools to admit that mind was pure, passive receptivity."[53] However, these quotations also highlight a break from conventional Kantianism—namely, that James replaced the logical *a priori* with valuative mechanisms that nonetheless serve comparable functions by limiting cognition and experience.

This insight, as we will especially argue in chapters 4 and 5, has important but underappreciated ramifications for contemporary work on affective bases of rationality and perception. A missing link in both contemporary and classic literature—to be

expanded on later—is the inadequate appreciation of conceptual, experiential, and neurobiological overlap between interests and emotions.[54] Insofar as interests connect to emotion and bodily feelings, James's account also marks a departure from "in the head" approaches to mind. Dewey and Mead would widen this fracture (while retaining Kantian elements) by arguing that possibilities of bodily action limit possibilities of experience.

EXPERIMENTALISM AND PRAGMATISM

The term "scientist" as a designation for those investigating material nature is a recent neologism, coined by William Whewell at the prompting of Samuel Coleridge in the 1830s.[55] Before that, "science," from the Latin *scientia* for "knowledge," meant any corpus of "systematic and orderly thinking about a determinate subject-matter."[56] Over time, it came to mean systematic thinking directed towards a particular end—namely, acquiring knowledge about physical nature. This usually implies physical engagement with investigative targets, whether in laboratories or through telescopes, though exceptions exist.

Although classical pragmatists kept apace of scientific developments and the ones we deal with might be counted as theoretical psychologists, only Peirce and James were scientists in the sense described above. In addition to and because of his training, James joined Louis Agassiz—a scientific celebrity at that time—on an expedition to Brazil. The purpose of Agassiz's expedition was ideological: to discredit evolution, and James derided this agenda.[57] One of James's jobs on this venture was sifting through biological samples, something he found tedious. Ironically, James was never keen on hands-on work, even while extolling practice. Later, he would eagerly hand his psychology laboratory over to Hugo Münsterberg, despite taking pride in having established one of the first in the world. But while never enthusiastic about practical scientific work, James nonetheless had considerable knowledge of it and experience doing it, especially by the standards of his day, and this impacted his views on mind and epistemology.

The scientific achievements of Peirce, who studied chemistry at Lawrence Scientific School at the same time as James, were unequivocally impressive, and this even by today's standards. The United States Coast and Geodetic Survey employed him for over thirty years. During this time he refined the use of pendulums to detect small variations in Earth's gravity. He spent about three years as an assistant at Harvard University's astronomical observatory investigating the shape of the Milky Way and measuring the brightness of stars. He pioneered the expression of the meter as a number of light wavelengths at a determined frequency. A keenly rigorous mind, Peirce also made important contributions to statistics, logic, topology, and algebra, advancing the intellectual tools with which scientists have conducted and communicated analyses.

It therefore comes as no surprise that a great deal of pragmatism and its methods are grounded in science. Peirce's pragmatic definition of the notion of meaning is a case in point.[58] It holds that thought-distinctions are never "so fine as to consist in anything but a possible difference of practice" and that our concept "of anything *is* our idea of its sensible effects."[59] To ascertain the meaning of a concept, therefore, we need only ponder "what effects, which might conceivably have practical bearings, we might conceive the object of our conception to have."[60] Understood thus, a hard object might be conceptualized as one that has the possible effect of scratching other substances. This is known as Peirce's pragmatic maxim, and though it presents a method of getting clear about ideas, it bears the unmistakable imprint of experimental science, where we come to know things by systematically messing around and observing the consequences. Likewise, it gets close to the scientific procedure of operationalizing. Peirce's maxim forms a central thread in pragmatic ideas about knowledge and mind.

Though Peirce's work from the late 1870s is generally extolled as the beginnings of

American pragmatism, it did not achieve widespread notice until James began delivering and publishing popular lectures a few decades later. James's variant of pragmatism irritated Peirce, especially insofar as it emphasized the role of individual interests and, hence, personal affectivity in reasoning. However, James retained Peirce's core idea, and his version of pragmatism unequivocally bore the mark of experimental science. As James put it, quoting the future Nobel Laureate chemist Wilhelm Ostwald, "I am accustomed to put questions to my classes in this way: In what respects would the world be different if this alternative or that were true? If I can find nothing that would become different, then the alternative has no sense."[61] In other words, James explained that if rival views have the same consequences, then they mean practically the same thing; and practical meaning, according to James, is the only kind. James elaborated the point with another example from Ostwald:

> Chemists have long wrangled over the inner constitution of certain bodies called "tautomerous." Their properties seemed equally consistent with the notion that an instable hydrogen atom oscillates inside of them, or that they are instable mixtures of two bodies. Controversy raged; but never was decided. "It would never have begun," says Ostwald, "if the combatants had asked themselves what particular experimental fact could have been made different by one or the other view being correct."[62]

Summing up and repeating Peirce's position, James observed that many disputes evaporate when you trace out the concrete consequences of either side. There can be no abstract distinctions that do not express themselves "in concrete fact and in conduct consequent upon that fact, imposed on somebody, somehow, somewhere and somewhen."[63] The lesson James took from Ostwald, quoting him once again, is that "realities influence our practice … and that influence is their meaning for us."[64]

Like other pragmatists, James added what most scientists at least tacitly understand: that we influence realities, and so come to know them better. This view is inherent in experimental methods, which again open the world to us by jostling it in systematic ways, and is also part and parcel of James's model of cognition and Kant's before him.[65] In passages exhibiting nascent 4E views, James described "belief" as the "mental state or function of cognising reality,"[66] and "cognition" as an intermediary stage in "what in its totality is a motor phenomenon."[67] He meant that cognition, when confronted by some thing or event, is more concerned with the question of "What is to be done?" than the question of "What is that?"—or as Merleau-Ponty would later say: "Consciousness is in the first place not a matter of 'I think' but of 'I can.' "[68] James further said: "Cognition … is incomplete until discharged in act."[69]

James, then, associated belief with action, arguing that "the test of belief is willingness to act,"[70] and that "there is some believing tendency wherever there is willingness to act at all."[71] He meant not only that action measures strength of belief, but also that belief functions to facilitate action. When wavering between contradictory options, unsure what to believe, one hesitates to act, especially if acting carries weighty consequences. With strong belief, however, there arrives "an idea which is inwardly stable, and fills the mind solidly to the exclusion of contradictory ideas. When this is the case, [actions] are apt to follow."[72] On the grounds that beliefs enable and guide action, James proposed that the truth of a belief "is not a stagnant property," but something that happens through "a process of valid-*ation*,"[73] or, in other words, valid-*action*. Belief in atomic particles, for example, has led to scientifically fruitful theorizing and experimentation. Hence, it has led scientists to act in ways benefiting their field. So long as the belief continues to reliably cultivate beneficial or "valid" actions, scientists are apt to continue trusting it.

Based on the intimate connection between action and belief, James further speculated that people, by willing themselves to action, can will themselves into a state of belief.[74] He did not mean, however, that this occurs on a primarily psychological level,

since, for him, actions complete beliefs. Furthermore, people cannot capriciously believe whatever they want, for they cannot act however they want.[75] They cannot because the world supplies resistance, as Dewey, Mead and Peirce also said at various times. Most will accordingly find it impossible to act on the belief that they can walk on the Sea of Galilee; maddening to act on the belief that traveling south will get them from Florida to New York; and mortifying to act on the belief that Queen Elizabeth II led the Cuban Revolution. In sum, beliefs are not invariably correct, as many are not even tested and are held merely by virtue of nothing contradictory interfering,[76] but this is not the point. The point, rather, is that the world—including everything from the physical world to the world of already existing beliefs—checks certain actions, and therewith certain beliefs. It also generates evidence affirming or repudiating beliefs, as when putting scientific hypotheses to the test, or when risking small actions with someone we like romantically and discovering whether our feelings are returned.

Dewey, along with Mead, advanced roughly the same view, albeit in a more bodily and less cognitivistic fashion and in ways that squarely anticipated Merleau-Pontyian, Gibsonian, and 4E outlooks. They did this while incorporating Kantian elements, which some readers may take to be completely at odds with pragmatic positions; yet pragmatism, in fact, explicitly draws inspiration from Kant.[77] "Perception," as Dewey suggested in a mix of rationalist and empiricist language, "is an act of the going-out of energy in order to receive."[78] He held the same idea of cognition, as will later be seen. Thus, to adapt illustrations from Mead and Merleau-Ponty that resonate with Dewey,[79] we perceive by reaching out with our hands, exploring, and receiving the form of things. In so doing, we come to realize physical properties such as the glassy smoothness and roundness of a bottle. In this case (and we will later show it applies generally to other modalities such as vision), perception is active; that is, perception is literally an activity. It involves directing our bodies into the world. Bodily structures are perspectives or even biases of sorts,[80] albeit in nonpejorative senses, and robust perception necessitates adaption, just as getting to know people requires adjusting initial preconceptions of them, but without which we would have no place to start. So it is similarly with our hands: we normally do not keep them rigidly flat, and doing so would impoverish experience. Instead, our hands and fingers adjust to the form and texture of the bottle while nonetheless setting limits ahead of time on what can be experienced, and the doings and responses consequently undergone are integrated into the particular encounter.

Dewey's account arose in his ongoing efforts to circumnavigate debates between rationalists and empiricists.[81] Put crudely, these debates were about whether the mind structures the world or whether the reverse holds, and Dewey effected a reconciliation plainly within the Kantian trajectory. Against rationalists, Dewey argued that ways of cognizing worlds follow from ways of inhabiting them, which is to say, from habits.[82] To a significant extent, therefore, habits precede thoughts, a position defended by Peirce, James, and Mead as well. "Ideas … are not spontaneously generated. There is no immaculate conception," wrote Dewey. "Reason pure of all influence from prior habit is a fiction."[83] But so too, for him, were the "pure sensations" of empiricists, for they "are alike affected by habits."[84] According to Dewey, empiricists

> who attack the notion of thought pure from the influence of experience, usually identify experience with sensations impressed upon an empty mind. They therefore replace the theory of unmixed thoughts with that of pure unmixed sensations as the stuff of all conceptions, purposes and beliefs. But distinct and independent sensory qualities, far from being original elements, are the products of a highly skilled analysis.… To be able to single out a definitive sensory element in any field is evidence of a high degree of previous training, that is, of well-formed habits. A moderate amount of observation of a child will suffice to reveal that even such gross discriminations as black, white, red, green, are the result of some years of active dealings with things in the course of which habits

have been set up. It is not such a simple matter to have a clear-cut sensation. The latter is a sign of training, skill, habit.[85]

In sum, Dewey chided rationalists for not being empiricists—that is, for not recognizing the priority of experience. Yet this is, strangely, also why he assailed empiricists. "Our ideas," he wrote, "truly depend on experience, but so do our sensations. And the experience upon which they both depend is the operation of habits."[86]

While critical of both rationalism and empiricism, Dewey sympathized somewhat more with the rationalistic view that the world conforms to the structure of mind; that it is because of this that the world is an object of possible knowledge; and that it is by virtue of sharing the same structure that minds come to have similar experiences of the world, making it an object of shared knowledge. However, rationalists proposed that the world conforms to the structure of mind either because the mind imposes rational structure on the world or because the world is an expression of the rational mind of God. Dewey accounted for the conformity in a much less esoteric way: "The world is subject-matter for knowledge, because the mind"—or what Dewey sometimes called the "body-mind"—"has developed *in* that world."[87] Even though this sounds like British empiricism, Dewey went on to explain that the body-mind itself participates in and contributes to the patterns of acting, interrelating, and habits that make the structure of worlds. As Dewey said elsewhere, "habits"—and therewith the self or body-mind—"incorporate an environment within themselves," and in this sense conform to it. Habits also bring the environment into conformity with themselves ("they are adjustments *of* the environment, not merely to it"[88]), much like Kant's Copernican Revolution. It is to be expected, therefore, that the "body-mind … will … find some of its structures to be concordant and congenial with nature, and some phases of nature with itself."[89]

Here, bodily structure and things encountered limit actions and hence experience, supplying an analogue to the Kantian *a priori*.[90] Although not conventionally logical, the limits can be nearly as unyielding. Thus while we can roll beer bottles between our palms, the same action and, hence, experience is impossible with cinder blocks. Coherence-bringing activity, moreover, is typically subtler than gross movements of reaching and handling. As Dewey observed, experience is organized—prior to intervention from internal, mental mechanisms—by "adaptive courses of action, habits, active functions, connections of doing and undergoing" and "sensori-motor co-ordinations."[91] He reasoned that this meant even a presumably non-conscious organism such as an amoeba had preconditions of experience. It has them because of its bodily organization and the structures of things it encounters, along with activity-shaping organic demands. This combination ensures enactment of systematic patterns of doing and undergoing that form bases for experience, a point that more recent commentators also invoke unicellular life to illustrate.[92]

Dewey was arguably the most historically oriented of the original pragmatists (though Peirce's knowledge was also vast), and he identified his embodied position with ancient Greek views.[93] His account of embodiment also highlights links between ancient thought and James's concept of experience, though he did not state this and James was likely unaware. Dewey wrote that "sensation and perception," according to ancient Greek accounts, supply experience with "pertinent materials, but [do] not themselves constitute it." Experience arises with the addition of "retention … and when a common factor in the multitude of felt and perceived cases detache[s] itself so as to become available in judgment and exertion."[94] Here, Dewey summarized Aristotle, who, in his *Posterior Analytics*, observed that animals have a "discriminative capacity which is called sense-perception." Aristotle explained that "the sense-perception comes to persist" in memory, and when "such persistence is frequently repeated," there "develops a power of systematizing" and integrating individual memories: "So out of sense-perception comes to be what we call memory, and out of frequently repeated memories of the same thing develops experience."[95] This Greek account resonates with the pragmatic assertion that

experience is not sensation, as well as with James's argument that experience is instead what is left over after our concerns have chiseled it into coherent form.

While mostly accepting what James said, Dewey added that experiential shaping also occurs through bodily engagement, where activities of a certain form engender similarly structured experiences. This occurs when fingers coordinate around the contours of a bottle so that rhythms of interaction integrate into an experience. It happens globally and socially, such as when activities and hence experiences cohere around children or spouses, a point conveyed in Dewey's concept of experience as culture.[96] Dewey's account fits ancient etymologies. "Experience" derives "from the Greek …'*empiria*' (ἐμπειρία), and the Latin word '*experiential*,' or '*experimentum*.'" *Experiri* means "try, to put to the test."[97] *Empeiros* means being experienced or practiced in an activity, based on *peira*—trial or attempt. For the Greeks, wrote Dewey, experience "signified a store of practical wisdom, a fund of insights useful in conducting the affairs of life."[98] Thus, in mounting his enactive view, Dewey remarked that "the key to the matter" is curiously found in the ancient Greek notion that "experience was itself a product of experience."[99] In other words, having experience means being experienced. Recognizing that Plato and Aristotle distinguished experience or *empeiria* from art or *tekhnē*,[100] Dewey switched from a past-tense historical narrative to a present-tense voice in his summative conclusion—"experience is equivalent to art,"[101] with "art" understood more in the practical than fine art sense, though Dewey did not separate the two. So conceived, "experience is exemplified in the discrimination and skill of the good carpenter, pilot, physician, captain-at-arms."[102] In Dewey's scheme, then, experience is a mode of skilled coping, again precisely the position of contemporary enactivists, especially O'Regan and Noë.[103]

Ancient distinctions between experience and art are worth just a little more elaboration, since they bear on Dewey's position. In *Metaphysics*, Aristotle articulated the difference with an example from medicine.[104] He explained that one may have observed occasions when patients suffering an ailment improved after receiving a specific treatment, and thus know, as a matter of experience, that a good result was realized in these cases. Art comes about when a universal judgment is abstracted from many experiences. Notice here that experience implies some skill. Art implies higher skill. This aligns with Dewey's and more recent enactive accounts of experience. Notice, moreover, that the English words "experience" and "expert" share the same Latin root, *experiri*. Expertise implies skill, and the Greek adjective *empeiros* can connote those having skill and expertise, while *empeiria* means experience. The point is that for Dewey and some ancients, experience implies skilled coping, which is consonant with enactivism.[105]

At the same time, root words of "empirical" have sometimes been used to denote quack physicians. Plato's *Laws* helps resolve this apparent inconsistency. There, he described slave physicians "who gain their professional knowledge by watching their masters and obeying their directions in an empirical fashion, not in the scientific way."[106] They thereby acquire habitual routines, as opposed to reasoned knowledge. Routines may give them a knack and skill for treating patients, and thus the appearance of knowledge of medical arts. Yet as Plato's *Gorgias* reiterates, "routine" or "knack" is "no art,"[107] for by itself it supplies "no principle in virtue of which it offers what it does, nor [can it] explain the nature thereof, and consequently is unable to point to the cause of each thing."[108] Thus, as Dewey explained, "empirical" in this ancient Greek sense "does not mean 'connected with experiment,' but rather crude and unrational."[109] Consequently, empirical knowledge meant that which was "accumulated by a multitude of past instances without intelligent insight into the principles of any of them. To say that medicine was empirical meant that it was not scientific"[110]—science, again, understood in the older sense that connotes systematic and orderly bodies of knowledge. Empirical medicine would here be enslavement to "a mode of practice based upon accumulated observations of diseases and of remedies used more or less at random."[111] By contrast,