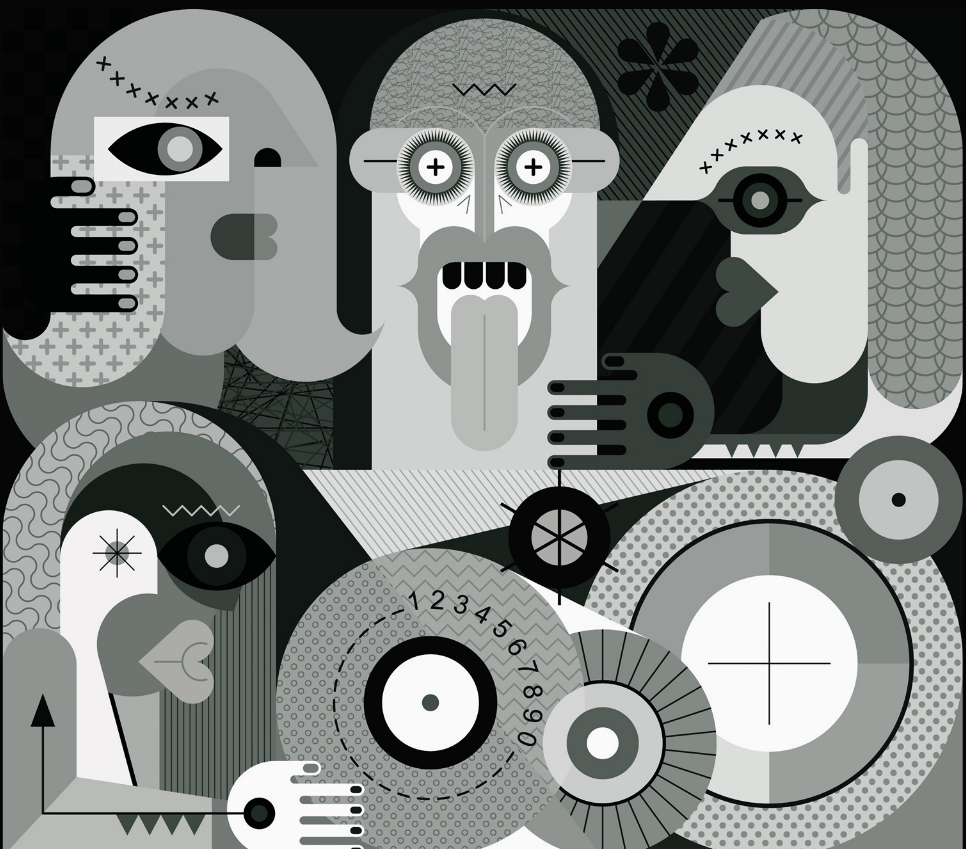
People Are STRANGE

Material Engagement and the Creation of Self-Consciousness



Lambros Malafouris

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In memory of Colin Renfrew

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Acknowledgments

I have been wanting to write this book for many years. It has been long in the making. It is the result of prolonged interest in and work on the becoming of human consciousness and selfhood from the point of view of material culture. The first steps were taken more than fifteen years ago through my participation in the European Platform for Life Sciences, Mind Sciences, and the Humanities funded by the Volkswagen Stiftung. Most of my initial work on the question of self-consciousness—what it is and what it means to have one—took place then. I was lucky to be a member of two research groups, working with colleagues from various disciplines. This experience helped me to develop a deeper critical understanding of how neuroscience, psychology, and philosophy approach the different dimensions of bodily self-experience. It also cemented my conviction on the value of radical cross-disciplinary research. I have been undisciplined ever since. I benefited hugely from exchanging ideas with Manos Tsakiris, Dorothée Legrand, Matthis Synofzik, Bigna Lenggenhager, Nicole David, Simone Schütz-Bosbach, Philipp Huebl, Jennifer Windt, and Katerina Fotopoulou (from the "The Body-Project: Interdisciplinary Investigations on Bodily Experiences"), and Jan Slaby, Suparna Choudhury, Thorsten Galert, Jan-Christoph Heilinger, Ahmed A. Karim, Felicitas Krämer, Saskia K. Nagel, and Stephan Schleim (from the "Neuroscience in Context: Critical Perspectives, Neuroethics, and Anthropology"). I am especially grateful to Manos and Katerina.

The main idea of this book first came to life in the form of a series of papers focusing on the notions of metaplasticity, tectonoetic awareness, and the extended self that I presented at The Sapient Mind: Archaeology Meets Neuroscience conference that I co-organized with Colin Renfrew and Chris Frith in 2007 at the University of Cambridge and the Human Nature and

Its Alterability conference I co-organized with Jan-Christoph Heilinger and Saskia Nagel at the Berlin-Brandenburg Academy of Sciences and Humanities in 2009. During that time and in the years that followed, my main priority has been the development of material engagement theory (MET). After the publication of *How Things Shape the Mind* in 2013, I returned to the issue of self-becoming. My intellectual ambition has been to reclaim the question of self-consciousness from certain assumptions that hold it captive. I wanted to rethink the major processes and forces that bind humans to oneself from a material engagement perspective—that is, by taking seriously our material environment.

Many of the ideas in the book took shape during that period. Still, the book took many more years of growing before acquiring its final shape, given the sheer mass of material that deserved to be considered, even though this book uses only a fraction of the literature I consulted. The inordinate length of this book also meant that many of these ideas have been rehearsed at different conferences and venues. I thank audiences for their questions and reactions, particularly those at the Torque Symposium (Foundation for Art and Creative Technology, Liverpool, 2014) organized by Sam Skinner; the History and Material Culture workshop (Bard Graduate Center, New York, 2014) organized by Ivan Gaskell and Sarah Carter; the Psychopathologies of Cognitive Capitalism conference (Goldsmiths, 2014) organized by Mark Fisher and Warren Neidich; the Instituting Minds conference (the Institute of Philosophy, University of London, 2014) organized by Zuzanna Rucinska, Shaun Gallagher, Dan Hutto, and John Elias; Civilisation, the Infrastructure and the City conference (University College London, 2014) organized by Kåre Poulsgaard and Frederik Weissenborn; the Embodiment in Evolution and Culture conference (Heidelberg, 2014) organized by Thomas Fuchs, Grit Schwarzkopf, Christian Tewes, and Gregor Etzelmüller; the Future Matters: The Imminent Reality of Multi-Materiality conference (Architectural Association, London, 2015) organized by Theo Spyropoulos and Roberto Bottazzi; the Embodied Cognition, Art and Affordances workshop (University of Amsterdam, 2015) organized by Julian Kiverstein and Erik Rietveld; the CogNovo seminar (Plymouth, 2015) organized by Jacqui Knight; the Social and Cognitive Dimensions of Technological Change conference (Fyssen Foundation, Paris, 2015) organized by Carl Knappett; the Temporary Knowledge lecture series (Universität der Künste, Berlin, 2016) organized by Marcel Finke, Ina Driemel, and Ekaterina Tewes; the Extended Mind and Artifacts

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In writing this book, I have drawn on my own work, including parts of articles, chapters, and lectures I have given. In all cases, I have changed and elaborated them in the process of writing this book. Chapter 2 is a revised and updated version of the 2019 paper Malafouris, L. (2019). Mind and material engagement. *Phenomenology and the Cognitive Sciences*, 18 (1): 1–17. Sections in chapter 10 draw from Malafouris, L. (2021). Making hands and tools: Steps to a process archaeology of mind. *World Archaeology*, 53 (1), 38–55. A précis of the book has recently been published as Malafouris, L. (2024). People are STRANGE: Towards a philosophical archaeology of self. *Phenomenology and Cognitive Science*. https://doi.org/10.1007/s11097-024-10002-1.

1 Selfbound and STRANGE: Introduction and Précis

> In vain we force the living into this or that one of our moulds.
> All the moulds crack. They are too narrow, above all too rigid,
> for what we try to put into them.
> —Henri-Louis Bergson, 1998 (1911), p. x

1.1 Binding Force

Consciousness is the inalienable force that binds mind with matter. It can be defined in many ways and expressed in various forms.[1] This book focuses on the form of consciousness that constitutes the foundation of human cognitive life: self-consciousness or awareness of self—that is, awareness of experiencing and of being the experiencer. Self-consciousness is an inseparable part of what is to be human. Yet, the emergence and making of this capacity—that is, self-becoming—presents a remarkable oddity that raises the hardest of puzzles along the evolutionary continuum of sentient matter (from the Latin *sententia* for "feeling"). To explain what is odd or so remarkable about that is, in essence, what this book is about. The short answer is: all and nothing.

In the basic sense of experience or responsiveness, consciousness is potentially a feature of all living things.[2] All organisms, as the biologist and philosopher Francisco Varela reminds us, "are fundamentally a process of constitution of an identity."[3] Such basic forms of distinction and identity formation can be found at multiple scales, expressed through energetic exchanges and interactions between systems or between organisms and their environment. We can take the immune system as a representative example. The function of the immune system is based on its ability to identify itself, distinguishing between the biochemistry of one's own tissues and those of

the invading other (e.g., pathogens). Failure to show immunogenic self-recognition leads to autoimmune reactions, causing the immune system to attack parts of the person's own body (such as the cartilage in joints in the case of rheumatoid arthritis).[4] Many more examples can be used to illustrate how various bundles of micro- and macro-identities are formed and maintained over time (see chapter 3). Experience and minimal self-recognition begin with the simplest life-forms. For instance, according to biopsychism, sentience is a feature of all organisms, including vertebrates, insects, and plants.[5] This continuum can be extended to include artificial configurations of organized matter (e.g., quantum systems). Panpsychism would go as far as to see consciousness (*psyche*) as immanent in all (*pan*) material reality.[6]

These are, of course, hotly debated issues that depend on how one understands the boundary conditions as well as variation and continuity in mind and life. The fact remains, nonetheless, that some of those sentient processes of identity formation, for reasons that are not well understood, give rise to a special variety of phenomenal consciousness that goes beyond the mere capacity for experiencing the world and becomes explicitly conscious of itself—that is, a capacity for self-knowledge and self-observation, or what we call self-consciousness.

Human beings provide the undisputable manifestation of this remarkable evolutionary complication (or anomaly). This book seeks to explore how this anomaly that defines the cognitive life of our species has come about and what it actually entails. Where should we start? Here is a simple but crucial observation. For humans, existence—their own existence as well as existence of others and the world—is not a matter of fact but a matter of concern. Humans, in other words, are conscious participant observers of their own being-ness. Moreover, their being-ness, to borrow the words of the anthropologist Marshall Sahlins, "is not confined to singular persons."[7] We don't see that in other varieties of self-organized sentient matter—at least, not in the same "self-designating"[8] way. No other form of *autopoiesis* (from the Greek *auto* for "self" and *poiesis* for "creation" or "production")[9] instantiates a similar self-knowing or autonoetic (from the Greek *auto* for "self" and *noêsis* for "intelligence")[10] mode of becoming.

To explain: whereas for most organisms perceptual, sensory, and motor events simply happen—they are immersed in experience (sometimes also learn from it) but they do not reflect about it—human subjectivity involves memory and reflective awareness that such events are happening to them

or because of them. Humans not only feel "what it is like to be" in their environment but also own the experience of experiencing.[11] This ownership of action and experience is intimately connected with the possibility of agency and moral responsibility. Humans relate and attend to their changing worlds and phenomenal states in a self-designating way that involves ethical, social, affective, and epistemic dimensions. An earthworm or a goldfish, like any other life-form, is certainly conscious of its environment—in the sense of being able to monitor and respond to its changing features. It reacts and attends to a variety of things in the world in its own intelligent ways. Yet, this basic affective responsiveness and reactivity does not necessarily presuppose knowledge or awareness of self. Unlike humans, other animals don't seem capable, or interested, in making self-experience the object of their sustained habitual attention—perhaps they don't need to. Nor do they present any evidence of conscience (moral commitment to the rightness and wrongness of their actions). There are exceptions, as empirical studies using mirror self-recognition tasks indicate in the case of many animals (in particular chimpanzees and dolphins).[12] Nonetheless, successful mirror self-recognition does not imply and should not be confused with self-consciousness in the sense of concerned observation of one's own existence (see discussion in chapter 3). Although there is certainly something that it feels like or it is like to be that animal, only humans explicitly own and actively seek to alter, to know, and to understand that experience—that is, their pre-reflective phenomenal what-it-is-likeness.

Why is that, and what does it mean?

1.2 A Selfbound Lifeworld

One of the main arguments of this book is that human beings enact a self-bound lifeworld. The term *lifeworld* is used in the sense of Jacob Von Uexküll's *umwelt* ("surrounding world")—also known as environment or milieu(x)—to describe the specific experiential world that an organism has as a consequence of its embodiment.[13] I coin the term *selfbound* and the verb *self-bounding* (which I fully define and discuss below and in chapter 8) to gesture at the peculiarity of human umwelt to become attached, owned, assembled, or else *bound* to a lived situated body, giving rise to what we call the self or person. Definitions vary, and I should clarify that, in this book, the terms *self* and *person* are used interchangeably to denote what is broadly referred to by, among others, the

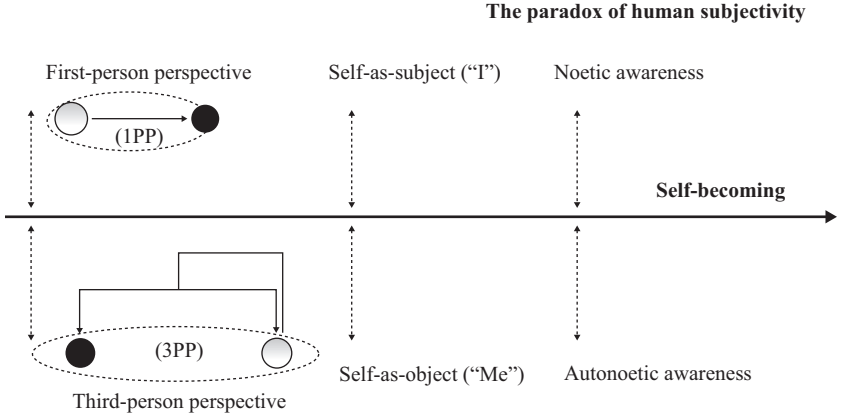

Figure 1.1
The paradox of human subjectivity. Human self-consciousness can be seen as a paradox in that it denotes a state of being at the same time subjectively aware and objectively part of the world. Human self or person is both the subject of perception and action ("I") and the object of perception and attention ("me"). Noetic awareness will refer to the basic subjective sense of oneself as acting in and on the environment at a time according to one's first-person perspective (1PP). Autonoetic awareness will refer to the objective sense of oneself as a unique individual persisting over time able not only to interact with objects and others according to one's 1PP but also to reflect on one's perspective, also from a third-person perspective (3PP).

phenomenologist Edmund Husserl as the paradox of human subjectivity[14]—that is, the ability of experiencing the world as a subject and at the same time thinking about one's own experience as an object (figure 1.1). For instance, experiencing the reading of this sentence and at the same time knowing that it is you who is reading it and being able to reflect on that experience. This paradoxical dual capacity to experience and to reflect about one's own self is an oddity that both unites and sets humans apart from other modes of conscious existence. In this book, I will be asking what exactly differentiates and unites human and nonhuman varieties of self.

Obviously, disagreements abound. The question of self-consciousness—what it is and what it means to have one—raises many challenges. The intellectual ambition of this book is to meet some of those challenges by reclaiming the question from certain assumptions that hold it captive. My aim is to rethink the major processes and forces that bind humans to oneself from a material engagement perspective—that is, by taking seriously our

material environment. The theoretical upshot of this book is, rather than conceiving of self-consciousness as internal and ontologically distinct from the material world, to approach it as a continuous process (i.e., self-becoming) entangled and fundamentally codependent with it. The basic thesis that I want to put forward is that self-experience is enacted beyond the skin boundary, dynamically binding to/unbinding from the material world. This way, I hope to make some progress on understanding what kind of observation self-consciousness is, what types of self-knowledge exist, and who (or what) is self-conscious.

To accomplish that, my approach is grounded in material engagement theory (MET) set out in *How Things Shape the Mind*[15] (I discuss the main postulates at length in chapter 3). The distinctive feature of MET is that it posits materiality as constitutive of human cognitive life. MET provides a different description of the mereology (the relations between parts and whole) and the boundaries (where self begins and ends) of human consciousness. For MET, individuation is not confined to the boundaries of the individual. Somatic and extrasomatic elements (neural and extra-neural) are now assembled by means of enactive in/dividuation (I explain that process below and in chapters 7 and 9). Excluding any of these elements leaves us, at best, with a distorted picture of the phenomenon of self-becoming that we are trying to understand. This fusion of elements and perspectives is critical in examining the constitution of self-consciousness because it changes the properties and dynamics of a system that now cannot be reduced to the properties of its isolated components. Rather, it emerges in the form of a heterogeneous hylonoetic field (from the Greek *hylē* for "matter" and *noêsis* for "intelligence"). Inside this hylonoetic field, to borrow Gregory Bateson's famous moto, "*the mental characteristics of the system are immanent, not in some part, but in the system as a whole*" (emphasis in the original).[16]

1.3 Undisciplined

These are issues that cannot be effectively pursued from the perspective of any single discipline. No discipline can take ownership of human consciousness as an object of study. In fact, the study of human consciousness can hardly be characterized as interdisciplinary. Too many foundational disciplinary assumptions about the meaning and the boundaries of human subjectivity need radical rethinking—if not unthinking—before we can distinguish

what parts of this puzzle we need to solve and to dissolve. I do not mean to say that the philosopher focusing on phenomenal consciousness, the archaeologist seeking the material signs of consciousness, the anthropologist looking at the local varieties of consciousness, and the biologist or the neuroscientist focusing on the biochemical and neural processes relating to human consciousness are not capable of producing valuable knowledge. The problem I am trying to underline here is not merely ontological (pertaining to the nature of human subjectivity) or epistemological (pertaining to the scale of analysis, the nature of evidence, or the constraints of the experimental procedures we use in order *to know* human subjectivity). Rather, it is an onto-epistemological problem—denoting "the study of practices of knowing in being"[17]—pertaining to underlying assumptions, perspectival interpretations, and analytical boundaries of human self-becoming. I shall be seeking to illustrate that an onto-epistemological unification of self cannot be achieved by adding isolated neural, bodily, and material aspects of self or by reducing the one to the other or, lastly, by focusing on one at the expense of the others. Instead, it can be achieved by attempting to discern the connections between these different aspects of self as they interact across the skin barrier and the scales of time.

To explain: *disciplined* approaches (across the range of sciences and humanities) tend to divide and conquer, reducing human life and consciousness to a series of natural or cultural components that can be studied independently of each other and at different levels of analysis (see chapter 3). The different component parts of our bifurcated nature can be seen as sometimes continuous (as when we speak of evolution or consciousness in human and nonhuman animals), sometimes discontinuous (as when we distinguish between the mind, the body, and the material world). Still, the main underlying assumption is that by adding or reassembling the different component parts, we can understand the phenomenon as a whole.[18] These divides, like most divides, may seem to offer convenient analytical tools for epistemological purposes, but they rarely work for ontological ones. They do not work because what they separate, for the sake of analysis or disciplinary purity, ends up being ontologically inoperable: brain without body, body without action, action without context, context without things, things without history, history without evolution, and so forth.

By contrast, approaches of the kind I call *undisciplined* dwell in the middle—or at least they try their best to do so. The middle refers to the

shared in-between and irreducible biosocial space of material engagement. This in-between space has the advantage of placing people and things (brains and actions, bodies and interactions) on the same ontological footing. I will be arguing in this book that however much we might try (as disciplined external observers) to keep a clear distinction between subject and object or inside and outside, it is actually their fold in the middle space of material engagement that gives us the best perspectival viewpoint to look at the problem of self. I call that perspectival viewpoint the *situated person perspective* (SPP), and I will discuss it in considerable detail later on in this book (chapter 9). For now, I should also explain that the characterization of my approach as undisciplined does not carry the meaning of disorderly, unruly, or unsystematic. An undisciplined approach is not one that is lacking method or epistemic rigor. On the contrary, undisciplinarity signals the commitment to develop disruptive and radically cross-disciplinary analytical tools that can be used to grapple with questions and phenomena that remain invisible, peripheral, or distorted. To be undisciplined is to adopt a conceptual frame that draws attention to, and critiques, oppressive disciplinary boundaries and practices of discrimination, allowing us to reimagine the knowledge and the identities they reproduce.

Resisting established forms and forces of academic disciplining does not mean that you abandon or escape the discursive tensions between theory and practice. What it means is that, free of the need to retain foundational disciplinary assumptions untouched, you regain the reflexivity needed for putting those tensions into the service of creativity and for avoiding pathways that lock us into specific ways of doing things. Path dependency is, to some extent, unavoidable and useful. Building on established traditions and practices is the path of least resistance, which is also productive. Undisciplinarity is not an obligation to avoid established pathways or to object disciplinarity. Instead, it is a strategic choice that allows new (undisciplined) opportunities for detached observation—that is, observation with no obligation to follow established disciplinary hierarchies, legacies, and ontological orientations about what is possible, what to be working toward, and how. Being undisciplined does not imply or lead to epistemic purity. On the contrary, to be undisciplined means opening to multiple kinds of epistemic contamination by methodologically juxtaposing heterogeneous forms of observation (detached and participatory, concerned and unconcerned), putting different perspectives in conversation. As I discuss in the following sections, the

undisciplined material engagement approach adopted in this book is a way of "doing" cognitive archaeology contaminated with the impurities of materiality (materiality encompasses both the tangible aspects of things—their texture, weight, and presence—and their role in human experience). It signifies a new direction to the study of human consciousness that opens up to various practices of self-observation and modes of self-experience that I hope will allow us to discover blind spots at the intersections of established epistemic structures, questions, and forms of knowledge. This kind of epistemic trespassing has its own challenges, especially in terms of how disciplinary borders are renegotiated and their responsibilities redefined.

1.4 Process Oriented and Non-anthropocentric

Starting from these broad premises, this book attempts to develop an undisciplined approach to the study of self that is process oriented and non-anthropocentric in its outlook. As I explained, I call my approach undisciplined, not because it is free and independent of constraints but, on the contrary, because it is profoundly dependent and impure. It depends on our ontological and epistemic anxieties about what kind of phenomenon, natural or artificial, people are and thus on what kind of processes, biological or sociocultural, can be brought to account for how we come to be what we are. It also relates to our preconceptions about the minds and the bodies we have because it is through the excitation, movement, transformation, and distribution of the subtle energies of those bodies that human beings become instantiated as selves and their presence can be felt or leave a distinctive material trace in the world.

In particular, by *process oriented*, I denote the ontological commitment to the primacy of becoming over being: one can only understand what it is to be human by understanding the modes of human becoming. Or, to borrow Alfred North Whitehead's original credo, "*how* an actual entity *becomes* constitutes *what* that actual entity *is*."[19] In the context of our analysis of self, adopting such a process ontology (prioritizing becoming over being) does not simply mean a shift of focus from objects (e.g., the "me" where self is the object of knowledge) to the processes that create, or the subjects that experience those objects as selves. What it means is essentially the deeper recognition that what we see or experience as an object is actually a process (i.e., self-*becoming*). The usual subject–object divide is now collapsing, giving way to the possibility of

Whitehead's *superject*—that is, a fusion of subject and object in experience.[20] The notion of superject radically extends and redefines the domain of subjectivity, shifting attention away from personal experience—the first-person perspective (1PP)—and toward the suprapersonal view of experience—what I call the *situated person perspective*. Understandably for many phenomenologists working in the tradition of Merleau-Ponty and Heidegger, the proposed shift and differentiation between the 1PP and the SPP may seem unnecessary. If, following Merleau-Ponty, we insist that embodiment and environmental embedding are essential to having self-experience, it follows that any conception of the 1PP is inherently situated. The body situates the subject in the world: "Inside and outside are inseparable. The world is wholly inside and I am wholly outside myself."[21] Still, this old phenomenological insight about the embodiment of self-experience is largely forgotten in many contemporary uses of first-person subjectivity in cognitive science, which often present us with a distorted picture and an impoverished neuro-centric meaning of embodiment that implicitly reiterates many of the divisions (e.g., the inner and outer) that Merleau-Ponty has been arguing against. I emphasize the concept of the SPP because it explicitly collapses those divisions and allows us to reconceptualize the material environment as a bridge for reuniting the first-, second-, and third-personal dimension of human subjectivity (a point to which I return later in this introduction and discuss more fully in chapter 9). For now, I will merely note that, from the SPP, the distinctions between inside and outside are less the mutually exclusive opposition that the terms might imply than two perspective points for looking at the multiplicity of the same boundary phenomenon. Approaching the problem of self as a perspectival problem essentially brings about two questions of interest: one about the nature of human situatedness (see below and chapter 9) and the second about the nature of human becoming (see below and chapter 4). Contrary to what, in the modern imagination, is taken for granted, from a process ontology perspective, human beings (species and person) were never stable enough to be defined as essences (genetic or metaphysical). No essential minimal system, state, or object—be it inside the brain, the body, or any other aspect of the human organism—is stable enough to be singled out and identified as a core universal self. Rather, humans remain in a constant state of transformation (evolutionary and developmental). The mode of being we call human is best described as unfinished and in-between, always prehuman and post-human—that is, a *becoming* (see discussion below and in chapters 4

and 5). Yet, out of this continuous flow, exchange, and recycling of energies and action potentials, a sense of self emerges. This self-consciousness is often defined as capacity to become the object of one's own reflection and recollection. But from a process perspective, it is better described using the example of a drawing—referring both to the process of its creation (e.g., the creative gesture of the painter) and to the final created product (the drawing on paper). To see self-consciousness as a drawing involves the deep realization that both senses of drawing—the drawing of the line and the line drawn—are ontologically intertwined. Self, like drawing, is an identity in difference, at any time passive and active, noun and a verb, subject and object (Whitehead's superject). Adopting a process-oriented approach to the study of self essentially means shifting attention to the modes of self-becoming.

The meaning of the term *non-anthropocentric* is less complex. As I explain better in chapters 2 and 3, contrary to some trends in post-humanist thought, I am not using this term to signify a move away from humans. On the contrary, I use it as part of my method for deeper, but decentralized, reflection into the conditions and possibilities of human becoming. My method is not anti-humanist or post-human; it can be better described as pre-human or pro-human. The main assumption is that the human condition is in a permanent state of incompleteness. Anthropoiesis[22] is ongoing, a human becoming. *Anthropos* remains at the center of attention but is ceased from being perceived as the center of experience and the world. Humans occupy their own place in the continuum of sentient matter, but they are by no a priori means privileged with any superior qualities. Our best means of understanding what it is to be human, or what is distinctive about humans, is by decentering and extending the study of human subjectivity to include: (a) the totality of its material environment, (b) the full spectrum of the spatiotemporal structure of consciousness (i.e., personal, peripersonal, extrapersonal, intrapersonal, and suprapersonal), and (c) the varieties of human becoming (ranging from less-than-human, more-than-human, and other-than human). I discuss and explain those terms below and more fully in the relevant chapters 3, 8, and 9.

In the remainder of this introduction, I will try to illustrate exactly what those theoretical and methodological commitments entail for the study of human consciousness. I want to articulate what questions the proposed concepts help us to answer and the analytical work that they do. The aim is to provide the necessary conceptual foundation and vocabulary for the

articulation and subsequent rethinking of the problem of self from the perspective of cognitive archaeology.

1.5 Toward an Archaeology of Consciousness

I am aware that in the mind of most readers, archaeology cannot be held responsible—capable, even—for answering the question of self-consciousness. After all, I suggested, this is not a project that can be pursued from the perspective of any single discipline or ontology, let alone an archaeological one. So, I would like to offer some clarifications about the scope and meaning of contemporary archaeology of mind.

Cognitive archaeology is broadly defined as the study of past ways of thinking using available material remains (figure 1.2).[23] This rapidly developing field of research brings together a variety of theoretical angles, methods, and research agendas (evolutionary, anthropological, experimental, affective, and semiotic). What unites cognitive archaeology as a research program and gives it a distinctive position in contemporary cognitive sciences is the focus on the cognitive and experiential dimensions of material culture. The approach I adopt in this book is rooted in this tradition, underlining the value of archaeological method as a comparative ontology concerned with studying the ecology of human becoming through the examination of material signs and their transformations. Specifically, the cognitive archaeology that I advocate signifies a new way of thinking about the relationship between mind and matter—what I call *process archaeology of mind*.[24] The two main characteristics that differentiate process archaeology are that it (a) emphasizes the active role of things in human cognitive life and (b) sees thought processes as hylonoetic fields—that is, mindscapes extending into the extra-organismic environment (see chapter 2; figure 1.3).

To explain: most modern people (modern here refers to ontological predicament not anatomy) would share a strong Cartesian intuition—which is actually the acquired habit of their modern predicament—that mind and matter are ontologically distinct. The brain inside people's heads is probably the only place where mind and matter actually meet in one form or another. The individual's head is also the place that most people would recognize as the center of phenomenal consciousness—that is, the location of the "I" that does the thinking. Process archaeology, and the theory of material

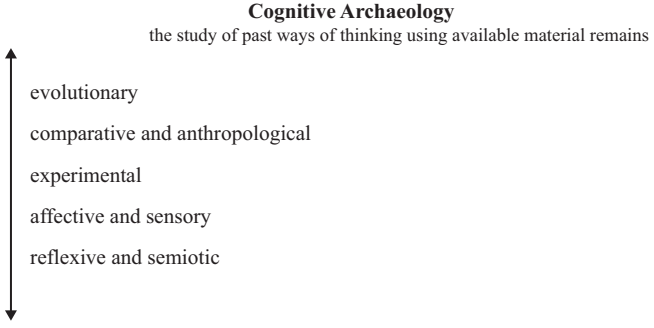

Figure 1.2
Cognitive archaeology. The field of cognitive archaeology can be broadly divided into five major and related specializations: (a) evolutionary cognitive archaeology is the study of the biosocial origins and evolution of human intelligence; (b) comparative and anthropological cognitive archaeology is primarily focusing on the classical question about the unity and diversity of the human mind; (c) experimental cognitive archaeology combines participant ethnoarchaeological observation, actualistic studies, and the so-called *chaîne opératoire* methodologies, trying to reconstruct the particular skills involved in the making of artifacts developed by different cultural groups and to explore their cognitive dimensions; (d) affective and sensory cognitive archaeology focuses on the emotional dimensions of human experience, the affective aspects of material culture, as well as the cultural significance of the senses and their important role in human cognitive and social life; and (e) reflexive and semiotic cognitive archaeology essentially refers to the critical study and deconstruction of archaeological concepts and categories as well as of the processes of signification by which meaning is constructed. Those thematic divisions are not absolute. On the contrary, they work better as an integrative project. It would be a mistake to assume that there can be a single perspective that offers the best view on every single aspect of human cognitive life.

engagement that is based upon, invites us to unthink this common assumption, stretching the notions of mind and human consciousness beyond their familiar and comfortable limits. A radical continuity between mentality and materiality, persons and things is proposed. I use the term *thinging* to express the ways in which things at once surround us and become part of our minds (brains and bodies). Thinging articulates the process of thinking and feeling with or through rather than simply about things—things not in the narrow sense of material objects but rather in the active sense of material signs, forms, environments, and techniques.[25] As I explain more fully in chapter 2, the notion of thinging help us to reconceptualize thinking as a multisensory mode of material engagement.

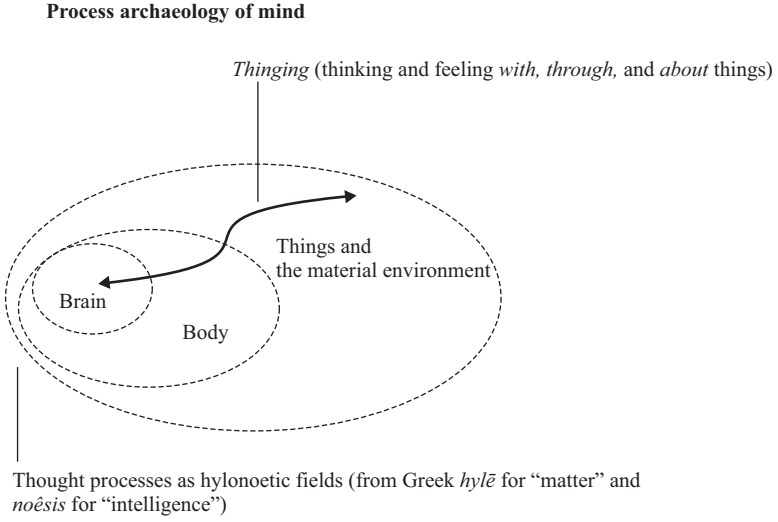

Figure 1.3
Process archaeology of mind.

What that essentially implies is that thinking is no longer a passive act of representation (thinking of and about)—a process by which the brain represents things (creating and processing mental images or substitutes for them) inside our heads. Instead, thinking is enactive and participatory (thinking with and through) or else an ecology of mind—a process of active exploration by which the brain and the body engage with things in the world. The process archaeology of mind retains its identity as a deep time approach to the study of the macro-history and evolution of human thinking. However, it is explicitly concerned with how human thought processes become constituted, transformed, and reproduced in different situations and configurations of brain–body–material environment in the course of human becoming.

In this book, the issue of self-consciousness will guide our explorations in the conditions and possibilities of human becoming. Of course, understood as an internal subjectivity, selfhood is not the kind of process that can be easily extrapolated from the archaeological record. But as I will show in the following chapters, this does not have to be the case. Apparently, cognitive archaeology lacks any ready-made methodological substitute for the brain-imaging techniques or the classical experimental mirror self-recognition tasks widely used in developmental and comparative studies.[26] From an archaeological perspective, we have no direct way of detecting different types of consciousness

or testing for self-identification. What cognitive archaeology does have, nonetheless, is access to a rich material record and a well-developed ability to use and interpret that record to produce sophisticated accounts for the study of long-term cognitive and socio-material transformations. The study of human engagement with the material world is widely recognized as one of archaeology's distinctive contributions to the questions of human becoming and of what it means to be human. The intention of this book is to take advantage of this unique archaeological preoccupation with the changing relationships or entanglements between humans and things and to use it to conjure a new way of studying the emergence of self-knowledge not only in the past but also in the present. The material remains of the past (past present and present past) may lack the equivalent of first-person pronouns such as "I" or "me" through which, as it is customarily assumed, humans claim ownership of their bodies and agency over their actions as self-conscious agents. Still, material things have a great deal to say about self-experience if approached in their own peculiar semiotic idiom of enactive signification.

The notions of enactive sign and enactive signification have been coined in the context of MET in order to describe and to account for the semiotic (meaning-making) dimensions of things, gestures, and, in general, material signs (to be contrasted, for instance, with linguistic signs). Enactive signification denotes the process by which the material sign emerges as a sign and acquires semiotic force (indexical, iconic, or symbolic). It answers both the questions of how material signs become meaningful and about how humans make sense and create meaning of their material environment. As recognized by post-humanist theories and material culture studies, the semiotic dimensions of materiality (known also as material semiosis) differ from those observed in the case of language, which define the ways most people think about issues of meaning. The key difference would be that material signs embody not a communicative logic but rather an expressive one. This can be contrasted to the denotative logic of linguistic signs that operate primarily on the basis of representation. For material semiosis, meaning is the product not of representation but rather of a fusion in action between what is often perceived as separate material and conceptual domains. Material signs are enactive signs because they "do not stand for reality; they bring forth reality."[27] Enactive signs are expressive signs that actively create meaning rather than merely represent preconceived meanings created elsewhere. What that means is that the meaning of the sign does not exist independently of the

sign itself. Instead, the meaning becomes realized (expressed) through the material sign. The materiality of the sign matters.

As I will show in chapter 10 using the examples of toolmaking and early bodily ornamentation, simple material things, their associated bodily skills, and social practices can offer new perspectival points to understand important questions about the meaning of agency and body ownership, or about the different ways by which the basic feeling of one's own bodily presence in the world can be transformed to objectified self-knowledge. Archaeology's natural preoccupation with the changing forms and mingling of mind and matter can provide new insights and make a valuable contribution to many contemporary debates that tend to overlook or misrepresent the ways in which human consciousness is bound up not just with the body but also with the material world and its synchronic or diachronic transformations (forms and flows).

This is what I mean by proposing an archaeology of human consciousness. The term denotes the unique perspective archaeology brings in the study of the human cognitive ecologies or entanglements of mind and matter. Such an approach requires a stretching of the archaeological imagination and vocabulary. To practice cognitive archaeology is to think across disciplinary boundaries in a radical sense. By radical, I mean the critical ability to expose and modify hidden assumptions, often very conveniently taken for granted. Indeed, the task of cognitive archaeology is not simply to supply new answers to existing questions but also to critically interrogate their scope and origin in order to refine the significance of the inquiry. This rethinking of the foundational questions and problems comes with a parallel unthinking of the meaning of concepts such as *mind*, *sentience*, *self*, and *consciousness*.

There is an overabundance of conceptual distinctions and technical terms associated with self-awareness in philosophy and the cognitive sciences. I retain and use certain established and familiar concepts to provide a necessary anchoring, but I will also be introducing new terms to highlight neglected aspects of self-experience. My selection of terms, like anything else about this book, aims to balance analytical accuracy with anthropological and archaeological sensitivity to the material conditions of human becoming. What I hope to achieve is the conceptual freedom and perspectivity of an undisciplined approach while retaining cross-disciplinary intelligibility and avoiding conceptual equivocations. In summary, I will be adopting and drawing on philosophical distinctions seen through the lens of material

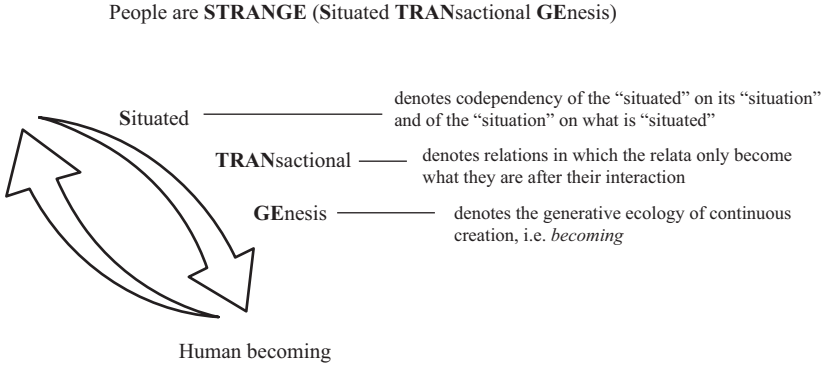

Figure 1.4
People are STRANGE (Situated TRANsactional GEnesis).

engagement theory and set against anthropological concepts of dividuality and partibility (see discussion below and in chapters 7 and 8). I am seeking to establish links with the neuroscience of self, cautious to avoid neuro-centric formulations of the problem of self or attempts to eliminate it. Last, where possible, I move beyond classifications grounded in ordinary experiences of normal subjects and see how they come apart in several pathological cases, drawing on literature from psychiatry.

In the remaining sections, I offer a précis of the book's main thesis—that is, that people are STRANGE. I use the acronym STRANGE to describe the process of Situated TRANsactional GEnesis by which self-becoming is realized (figure 1.4). Below, I explain what each of these terms means and also introduce the notions of self-bounding, suprapersonal space, enactive in/dividuation, and the situated person perspective that I use to support the main thesis. The major postulates that underpin those concepts and their links are explored in full in the relevant chapters (especially chapters 7–9). Here, I only offer a summary of what the main arguments entail to give the reader a sense of direction.

1.6 On Human STRANGEness

As mentioned, STRANGE stands for Situated TRANsactional GEnesis, which is the process that I will use to characterize human becoming. What does this mean? I turn now to explain the meaning of those terms.

1.6.1 Situated

Situated denotes human embeddedness and dependency to specific material environments (found or made). The meaning of the term *material environment* is relational. More than a general description for the spatial surroundings or context of human action, it denotes that part of the world that becomes a part of us, just as we are a part of it. Not every part of an organism's surrounding space is also part of its material environment. To borrow an example from *The Dialectical Biologist* written by the ecologist Richard Levins and the biologist Richard Lewontin: "The bark of trees is part of the woodpecker's environment, but the stones at the base of the tree, even though physically present, are not."[28] With humans, the meaning of situatedness is far more complicated, given their creative ability to transform their environments and their relations with them. Situatedness is not a mere positioning of a living occurrence within a sociohistorical context. It should not be seen as a framing according to a possible set of spatiotemporal coordinates either. Situatedness designates something deeper: the co-constitution of the situated and the situation (figure 1.5). This meaning of situatedness carries important ontological and epistemological implications. From an ontological point of view, it denotes the necessary unity between organism and environment. From an epistemological point of view, it denotes the unity between observing and the observed. Here, I am following John Dewey's conceptualization of situation as constituted by the organism-environment.[29] This conceptualization essentially implies two things: first, that the situation includes the experiencing subject, which includes the situation; second, that because of that, the situation (material environment) should not be conflated with the broader physical environment. Human situatedness is a mixture of biological, sociomaterial, and experiential conditions. As Dewey observes, "In actual experience, there is never any such isolated singular object or event; an object or event is always a special part, phase, or aspect, of an environing experienced world—a situation."[30] In short, a situated entity is one that depends on its mode of becoming—that is, the stabilizing, transforming, or expanding forces that characterize its situation. As a simple rule of thumb, I would suggest that all situated entities or phenomena are actually processes, even if they may seem stable or object-like from a given temporal or analytical scale. When we speak of situatedness to denote the experience of an organism *in* an environment, we should be thinking not of an environment "out there"

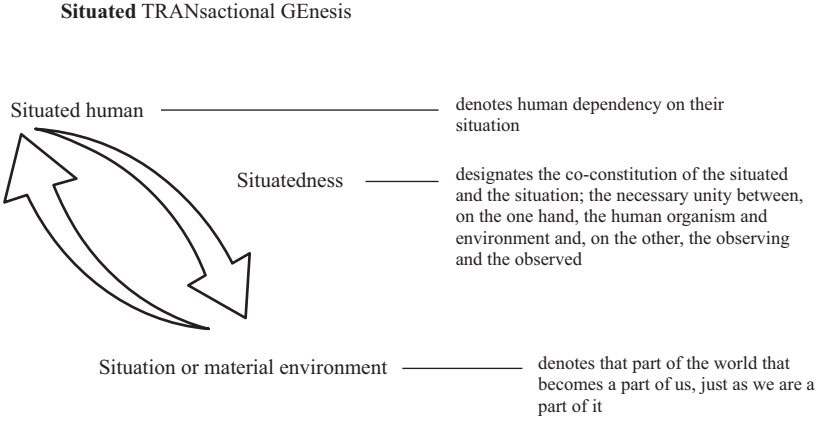

Figure 1.5
Situated TRANsactional GEnesis. Situatedness designates the co-constitution of the situated and the situation. From an ontological point of view, it denotes the necessary unity between organism and environment. From an epistemological point of view, it denotes the unity between observing and the observed. Humans are situated because what they are depends on their mode of becoming—that is, they are entangled with the stabilizing, transforming, or expanding forces that characterize their situation.

surrounding an individual body or person but rather of a hylonoetic field where brains, bodies, and things are entangled.

To illustrate that, we could use the example of the potter and clay. As discussed more fully in chapter 9, where the meaning of situatedness and the situated person perspective will be exemplified, when we describe the potter as situated, we do not refer solely or primarily to the physical positioning of potter's body in space. No doubt, the potter's body is occupying a certain portion of space and exists in time, but this is not what the notion of situatedness primarily refers to: we need to understand the potter's becoming with and through clay. The potter's body is situated in clay (entangled with the affordances of this material) through its engagement with the craft of ceramics (enskilment). The person we identify as a potter is inseparable from the environment we identify as clay. The potter is in clay as the clay is in the potter. The meaning of *in* here refers to the withness and throughness of the potter's thinging. Compare that with what we describe when we say that the water is in the glass, and you get a very different meaning. The water may be inside the glass but is not situated; the water is contained in the glass

but does not interact with it.[31] Other animals, such as the woodpecker mentioned above, may be equally situated in their environments (also able to transform them), but they do not invent or develop crafts and communities of practice, nor do they acquire skills and technics of the body in the attentive manner that humans do. All animals are situated, but only humans creatively transform and transact with their situation as concerned participant observers (more on that below)—which brings us to the second constituent of human STRANGEness.

1.6.2 Transactional

Transactional describes the type of interaction that is distinctive to being situated in an environment. Specifically, a transactional interaction is one where the interacting entities or processes only become what they are after their interaction. That is, their actual meaning and boundaries (what they exclude and what they include) do not predate their entanglement. The terms *transaction* and *transactional* were originally developed by John Dewey and Arthur Bentley in their *Knowing and the Known* published in 1949.[32] They differentiate three major types of "interaction" (figure 1.6): (a) the unidirectional sense of interaction as self-action (wherein subjects act on objects); (b) the mechanistic bidirectional sense of interaction (wherein predefined subjects and

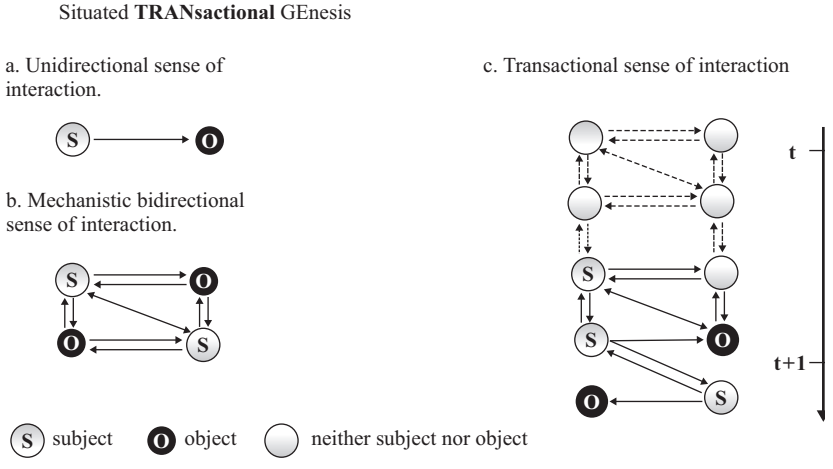

Figure 1.6
Situated **TRANsactional** GEnesis: three major types of "interaction."

objects are acting on one another); and (c) the process-based transactional view of interaction (wherein subjects and objects are the emerging products of their interaction).

In the latter case, the common way of thinking about interaction as composed of separable elements acting on one another gives way to a relational transactional vision of interaction as an entangled relation. This entanglement characterizes the unity and inseparability between humans and their environment, or else the mutuality of human becoming.

The above meanings of interaction are not exclusive but rather perspectival. They depend on the boundaries and on the scale of observation (micro, meso, or macro). For instance, take again the example of the potter's interaction with clay. At the microscale, one may describe it as a unidirectional relationship, where the potter causes the hand to move and to shape the clay—the direction here is from mind to the world. At the mesoscale, the same action could be described as a bidirectional relationship, where the hand of the potter interacts with the clay—the potter directs but also receives direction from the clay. Finally, at the macroscale, it is clear that the directionality of the interaction between the potter and the clay is lost—potter, wheel, vase, and clay are co-constituted. In the latter case, the product of the interaction between potter and clay is not just the form of the vase but also the self of the potter—thus, the transaction.

Transactional relations resemble gift exchanges; they are characterized by uncertainty, anticipation, reciprocity, inalienability, and incompleteness. I see them as the primary characteristic of human becoming. If we accept these gift-like qualities of human becoming, then we probably need to consider the possibility that there is no such thing as a free, boundless person. Potter and clay are entangled, the products of their interaction. The person (brain and body) we call a potter can never exist apart from the environment we call clay; the environment we call clay is what it is only in conjunction with the particular potter that realizes the affordances that it has. The relatedness (mutuality of being) between potter and clay is, in turn, firmly situated inside the local traditions and techniques of pottery making.

This transactional logic also explains what I mean when I say that humans are thingers or refer to the process of thinking as thinging. There is no directionality from humans to things or from mind to matter. We think with and through things only because things think through and with us (using human

muscles and brains). Thinking is a joint transactional accomplishment of the fusion of people and things. The fusion I talk about can be experienced and observed at different levels and temporal scales—from the way the hand of the craftsperson captures form and imagines for real[33] to the way the folds of a betel bag hold stories and memories for the Kodi of Sumba (Indonesia)[34] to the way a modern aircraft cockpit, seen as a distributed cognitive system, "remembers its speeds" for successful approach and landing.[35] In all these examples, the usual divisions between brains, bodies, and things collapse.

Think, to use another example of thinging, of music making. Focusing on the production of a single note at a given point in time, we may perceive the engagement between the musician's skilled body and the musicking affordances of the instrument as a basic interaction—see figure 1.6(b). However, what allows kinetic melodies[36] (bodily or instrumental) to emerge and turn sound into music is best described from a transactional perspective—see figure 1.6(c). The resistance of the instrument opens up to the performer a new field of situational affordances that will allow the exploration, discovery, and realization of their mutual capacities for joint action. Transacting with the instrument, the musician is not just producing music but also extending the boundaries and possibilities of self-expression.[37] This shared engagement in musical performance constitutes an evolving hylonoetic field (material environment) that comprises various actants (actor entities, human and nonhuman, that do things).[38] Musicians, instruments, scores, and audiences participate equally (but not in the same manner) in the making of music and creative self-expression. People and things are jointly appropriated and educated to sustain or discover their affordances. That applies to all aspects or levels of self, minimal or pre-reflective and narrative or reflective. I will explain those distinctions in chapter 6. Suffice it here to point out that pre-reflective thinking (sentience, bodily consciousness, and affect) are primarily modes of thinking through and with things. Reflective thinking (self-awareness, memory, and imagination) are primarily modes of thinking with and about things. As an example of the former, think of how a tool can extend the boundaries of peripersonal space (space within the range of the body; see chapters 8 and 10). As an example of the latter, one could cite Janet Hoskins's ethnography among the Kodi of the Eastern Indonesian island of Sumba, which I mentioned before, showing the intimate links between object biographies and people's life histories.[39]

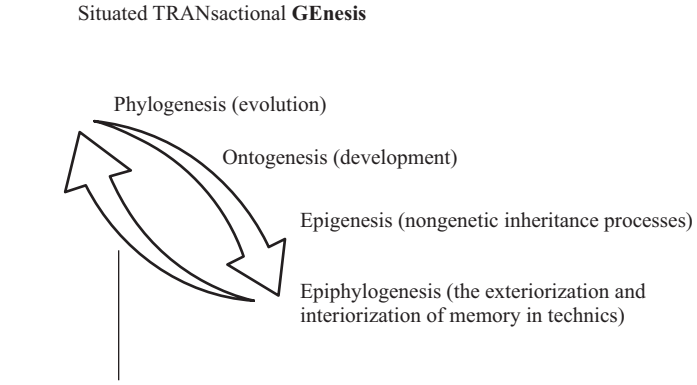

Figure 1.7
Situated TRANsactional **GEnesis**. The term *genesis* denotes the generative ecology of continuous becoming by means of creative material engagement (creative thinging). Creative thinging refers to humans' ability to transform their environments and their relations with them. This process of perpetual self-making and transformation (inseparably evolutionary and ontogenetic) is enacted by means of situated transactive becoming (or else enactive in/dividuation). Four major paths of macro- and micro-anthropogenesis (human becoming) are distinguished as possibilities of self-becoming: (a) phylogenesis (evolution), (b) ontogenesis (development), (c) epigenesis (nongenetic inheritance processes), and (d) epiphylogenesis (the exteriorization of memory in technics and interiorization of these memories through technical practice).[40]

1.6.3 Genesis

Genesis is the final characteristic of this relational domain of human STRANGEness. It denotes, specifically, the generative ecology of continuous creation (i.e., becoming). More specifically, it refers to the perpetual generation and transformation of human self (i.e., self-becoming) or anthropogenesis. This process of anthropogenesis dynamically combines phylogenesis (evolution), ontogenesis (development), and epigenesis (nongenetic inheritance processes). Nonetheless, it is enacted by means of situated action, trans-action, and technics (i.e., enactive in/dividuation; figure 1.7).

Relevant in this connection is the concept of epiphylogenesis,[41] introduced by the French philosopher of technics and technology, Bernard Stiegler, in order to distinguish technical evolution from biological evolution (phylogenesis). Stiegler's theory of anthropotechnical evolution is also based on the assumption that what makes humans human (species and person) is

constituted by technics, and it cannot be understood without them—that is, without understanding the material conditions of human becoming.

I must explain that, in this book, the meaning of human becoming should not be confused with the term *becoming human*, which is broadly used (in archaeology and other fields) in connection to the evolutionary process by which we came to be the kind of species we are—that is, *Homo sapiens* between a hundred thousand and three hundred thousand years ago. The process I refer to as human becoming means something different: it denotes the process of ongoing transformation (inseparably evolutionary and ontogenetic) that characterizes the human beings as indeterminate and incomplete. Humans did not become; humans are becoming. As I discuss more fully in chapter 4, the proposed terminological shift from becoming human to human becoming signifies an important difference. On the one hand, it signifies a major shift from the neo-Darwinian ideals about human evolution toward a more enactivist version of the extended evolutionary synthesis (EES). On the other hand, this radical inversion from becoming human to human becoming alters the terms of the inquiry on human origins, allowing us to see humans not as an evolved species but rather as an exploratory, constructive, and open-ended process (process in the strong ontological sense of ongoing change).

A simple way to explain the basic distinction between becoming human and human becoming is to draw an analogy inspired again by my anthropological study of pottery making. Imagine the formation of a vase out of clay. The conventional use and meaning of the term becoming human would be akin to the moment when the vase comes out of the kiln. The underlying assumption here is that once a predetermined stage of human evolution has been achieved, all members of our species possess and inherit a set of capacities that may (or may not) become realized (with some variation) in different cultural settings. This human potential is genetically fixed (pre-given or innate), and nothing that human organism does or experiences in its life is capable of changing it. It is this deeply entrenched vision (fallacious in my opinion) of the evolution of *Homo sapiens* that one could easily associate with the fixative nature of firing on clay. The firing of pottery is analogous to the irreversible evolutionary changes brought about in the past during the speciation phase. As with the heat hardening the clay, making it impossible to return to its previous plastic state, so with natural selection the human form is now given, it can no longer change. You could, nonetheless, experiment

with new decoration motifs on the exterior resembling the seemingly inexhaustible richness and diversity of cultural forms. It is the latter phase that most people will identify with "cultural evolution."[42] The main form of the vase (like the core identity of our species) is fixed. Still, you are flexible to play with surface treatment.[43]

In contrast to this separatist identification of human beings as the heritable fixed biological core dressed up in a variable colorful cultural surface, the process of human becoming that I advocate in this book means something different. It refers to an open and ongoing coevolutionary entanglement of people, materials, and things rather than to a genetic setup or an evolutionary stage. Human becoming is never finished; it is always ongoing. This meaning of human becoming is better expressed with a different image from an earlier event in the process of making—specifically, that of the still plastic and incomplete vase at the pre-fired stage, not entirely formless but still plastic and open to change (figure 1.8). This meteoric moment of plasticity and uncertainty provides the grounding metaphor for my perspective on human becoming. Humans, I argue, are a species incomplete, or else always about to become. Human nature is to be completed, which also explains

Figure 1.8
Human becoming.

our remarkable metaplastic qualities and prosthetic abilities (see discussion below and in chapters 4 and 5).

This simple analogy of pottery making helps us to rethink the meaning of human becoming by escaping the ontological splitting between nature and culture (see chapter 2). There is no moment in the history of our species where human nature was suddenly engineered by natural selection or that biology gave way to culture.[44] What we call *culture* is not a separate added layer of complexity but instead a compound of material forces and energies that mingle and assemble, allowing us to become what we are.[45]

We are used to thinking of our sapient minds as the apex of human evolution. But this vision of modern human cognition as complete, superior, and fixed, adapted to past environments that no longer exist, is unhelpful if not entirely wrong. I propose a different reading of the meaning of human evolution that sees the human mind instead as an unfinished project, potentially in a permanent state of ongoing evolution.

Humans are creative organisms of a relational kind and prosthetic disposition, constantly changing their material environments and opening up new paths of development (macro- and micro-genesis) and possibilities of self-becoming. More than the products of separate evolutionary and developmental processes (e.g., natural selection and enculturation), humans become at their intersection by means of creative material engagement (creative thinging). The notion of creative thinging designates specifically the discovery of new modes of enactive signification through attentive engagement with things and form-generating materials.[46] Creative thinging both sets and expands the limits of human consciousness. It constrains what is possible in a given situation while it opens up new exploratory possibilities for material imagination.[47] There is also the drawing of distinctions and connections between self and other, the construction of difference and similarity. Through the process of creative material engagement, we transform the ways we touch and are being touched by others and the world. Our cores and peripheries, our insides and outsides, the very boundaries of the self: it all changes. How exactly that happens will be explicated in the following chapters (especially chapters 4 and 8). Here, it is enough to clarify that the underlying rationale is based on the principle of metaplasticity. As I will explain in chapter 5, metaplasticity is a term used both in neuroscience and in the context of MET to denote essentially the plasticity of plasticity. However, it carries different meanings and implications in each field. Whereas in

neuroscience metaplasticity is primarily concerned with the internal dynamics of the brain, focusing on how neural systems adapt their responsiveness based on past experiences, MET broadens the concept to include the material environment, seeing metaplasticity as a property of the extended cognitive system, which includes the brain, the body, and material culture.

In particular, neuroscience considers metaplasticity at the microlevel, concentrating on the cellular and molecular processes that regulate synaptic changes. It is concerned with how individual neurons and synapses are modulated over short timescales in response to immediate experiences. It follows that the focus in neuroscience is on the biological mechanisms within the brain that allow it to fine-tune its learning processes to new information and experiences. MET, on the other hand, looks at metaplasticity on a meso- and macroscale, considering long-term evolutionary and situated (context-dependent) developmental processes. It emphasizes the dynamic, reciprocal relationship between humans and their material environments, where skills and cultural practices can lead to structural and functional changes in the course of ontogeny and over generations. Metaplasticity in no longer about internal brain processes and their adaptation. Rather, it refers to the middle space of activity where brains, bodies, and the material environment jointly and interactively create the conditions for their adaptation. MET posits that cognitive processes are deeply embedded in and shaped by embodied material interactions. Instead of viewing artifacts as passive objects or mere extensions of the mind, MET emphasizes that artifacts actively participate in human thinking. This perspective challenges traditional neuro-centric views of metaplasticity that separate mind and environment, proposing instead that the plasticity of plasticity that truly matters and defines human becoming is systemic and emerges from the dynamic interplay between humans and their material surroundings. It follows that MET's version of metaplasticity is thoroughly relational. It no longer refers to the higher-order modulation of synaptic plasticity inside the brain in response to experience (based on previous neural activity). Rather, it involves the continuous shaping and reshaping of both the brain and material culture through reciprocal interactions. The main idea is that neural and extra-neural plastic changes occur in tandem, influencing each other in profound ways. It basically states that the plasticity of the human mind is entangled with the plasticity of the things that we make. The notion of metaplasticity represents the culmination of that insight about

the dynamic and relational nature of human becoming, embodying MET's shift from a substance-based to a process-oriented ontology.

Think of the potter and clay from our previous example. The plasticity of clay offers a basic diachronic example of such a metaplastic process of creative material engagement that incorporates two inseparable modes of becoming: first, the transformation of clay into an environment (pottery), and second, the transformation of a human body into a potter (a body capable of making pots). This process of creative and situated co-constitution is what all modes of human becoming have in common. Now, what differentiates human modes of becoming from the becoming of other organisms is the ability of the former to creatively transform their environments and their relationship with them. To explain, I return to Levins and Lewontin's example of the woodpecker from the previous section. The main difference in the case of human becoming is the following: although it is highly unlikely that the stone will ever become environment for the woodpecker, early on in human deep time history, stones (and many other materials) did become an inseparable component of the human condition. As we will discuss in chapter 10, we have made the stone part of our minds and bodies—that is, our material environment. Human engagement with stone created not only new tools—in the functional sense of bodily extensions and "extrasomatic means of adaptation"[48]—but also a novel domain of creative thinging, offering new possibilities for self-observation and self-identification through skilled action and social interaction. The edge of stone was never just for cutting meat—we have been using that edge to change the affordances of the world, redirecting the flows of energy and matter. Feeding and thinging are forever united in this perpetual exchange of matter and energy that we call human becoming.

Of course, the fact that the woodpecker's environment may not include the stone doesn't mean that woodpeckers are not able to actively change themselves or their environment with their activity (what is known as *niche construction*[49]; see discussion in chapter 4). Still, the range of possible niche-modifying interactions the woodpecker can have with its environment will be probably restricted to perturbation (change one or more factors in its environment) and relocation (exposure to different environmental factors by movement). More importantly, the woodpecker will never make stone, or any other external material (external here denotes materials outside of its environment), part of its environment. Similar constraints in the use of

external materials and limits in the range and complexity of techniques characterize the ways most nonhuman animals modify their niches. Whether we think of crows' usage of raw materials for making hooked stick tools or of beavers building dams, there seem to be obvious limitations in the range and variation of materials and techniques. This situation can be contrasted with what seems to be the norm in the case of humans beings. There, an almost unlimited variety of external materials (discovered or created) and technics of improvisation constantly become, in different forms and historical manifestations, inseparable parts of the human niche. In fact, as I argue in chapter 4, human evolution is creative evolution: humans become through their creative engagement with the material world.

Although all animals are situated and capable of minimal thinging (prereflective thinking with and through things), only humans habitually destabilize established circulations and exchanges of energy and matter, adding creativity into the mixture. With humans, thinging becomes creative thinging. The world opens up to humans in ways and manners that far exceed the affordances (action possibilities) of other animals. The unity of the organism and the environment is the common foundation that connects human and nonhuman forms of material engagement. This complementarity of the animal (human and nonhuman) and the environment is also what the concept of affordances, as coined by psychologist James J. Gibson, meant to express. However, in all its varied permutations that span multiple timescales, the meaning of this unity and of its relational structure takes on a new significance in the case of humans. What gives creative thinging this special place in human becoming is not just that it transforms the ability to change the world but also that it changes the meaning of adaptation from a merely responsive process to one that is primarily attentive. The evolutionary equilibrium between the actual and the potential is destabilized. Hylomorphism gives way to hylonoetics. Any attempt to understand self-consciousness must begin with, and take into account, the profound plasticity and creative and prosthetic abilities of our species.

1.7 Human Self-Bounding

I suggested that our attempt to understand the conditions and possibilities of self-becoming must start with the recognition of our species' intimate relationship with the things and material forms that we make. Humans create

things, and things, in turn, create us. This fundamental co-constitution of people and their material environments is widely recognized. Still, the exact processes by which humans and things are entangled are not well understood. In this section, I introduce the notion of self-bounding (which will be treated separately and more thoroughly in chapter 8) and explain how it can help us to explore the implications of this ongoing entanglement of people and things for human becoming.

The basic proposal that I want to put forward is that humans display a selfbound mode of becoming. As I briefly mentioned at the start, with the term *selfbound* (and the verb *self-bounding*), I am gesturing at the process by which human ways of being are assembled, owned, or else bound to form what we call self or person. A major characteristic of this self-bounding is that it is suprapersonal—that is, it extends above and beyond the skin boundary dynamically engaging with the material world. Self-bounding is not associated with any single prespecified location or sensory modality. It should not be confused with an internal bodily or brain property. Self-bounding rarely stops at the skin or is confined to a singular body. On the contrary, it allows for enactive exploratory self-making by blurring and continually remaking the boundaries between brains, bodies, and things. It produces difference while retaining a decentralized identity grounded in the history of material entanglements that makes it up. I call this process *enactive in/dividuation* (see chapter 7). Self-bounding is more of an ongoing realignment and attunement of organized matter than a separation of what is inside from what is outside a body or person. This does not mean that the realignments are always adaptive or that humans are boundless creatures—although for certain conditions and purposes, they may well be. What it means is that boundaries can be both open and closed, porous and rigid. More importantly, it means that self-boundaries are about connectivity and interaction as much as they are about containment and separation.

This shift of attention on boundary making that comes with self-bounding allows connections with issues of extended and distributed cognition. As I will show in the following chapters, self-bounding is closely related with cognitive extensiveness. My argument is that if the human mind is unbound, extending beyond skin and skull, it is because human consciousness is self-bound. Specifically, I will argue that it is the bounding of consciousness that allows the unbounding of human thought and imagination. Self-bounding is the precondition for a borderless mind. Selfbound is thought-unbound: it

provides the material anchoring and self-grounding needed for the extension and distribution of human intelligence.

Self-bounding, finally, is a process of boundary making (and unmaking). It denotes the process by which the degree of independence from, and relatedness to, the surrounding world is maintained or negotiated through discovering and reconfiguring one's boundaries. Those boundaries are not fixed. As long as the immediate environmental circumstances are changing, the boundaries of self will change as well. Consequently, what we take as internal or external cannot be fixed either. Sometimes, it makes good sense to think of the physical body as defining one's boundaries. Other times, it makes better sense to extend those boundaries into the world, as when we incorporate tools and learn new skills. Although, in one sense, self-boundaries can be expanded or contracted to include or exclude elements of the world, in another sense, they do not. This is not because they solidify but rather because their porosity means they can also be dissolved. The collapse of those boundaries—as, for instance, in the case of immersion in skillful creative activity or in the case of self-fragmentation in extreme psychosis—would result in the loss of self. By the same token, the objectification of boundaries, as when a judge wears her long black robe and strikes a gavel, will intensify the self–other distinction.

The role that the body plays in the above process is crucial. The bounding I am speaking of is inseparably linked with a situated body. However, as I explain in chapter 9, the term *situated body* denotes more than a body (or sometimes less). Furthermore, self-bounding should not be confused with the quality of mineness; it is not merely an expression of body ownership—the feeling that hands and feet or some other part belong to me and are my body. This is for two reasons: first, self-bounding is related not just to ownership (binding to) but also to dispossession (unbinding from). Second, what is owned in self-bounding is not just a body but all kinds of attachments, from personal objects and tools to memories, skills, narratives, and ideas. Self-bounding denotes the various ways by which a situated body discovers and enacts what is to become its object of reflection. And yet, what feels like or is described as an object is actually a process of enactive creative exploration and sensorimotor material engagement. Importantly, so far as spatiotemporal self-location and ownership is concerned, the body's material environment is ontologically on a par with other body parts. We are not just conscious of, we are also becoming conscious with material things, using their situational

affordances for action as well as their affective and mnemonic qualities as resources for reconfiguring the agent–world boundary[50]—a point to which I shall return in chapters 8 and 9.

1.8 The Trouble with Human Consciousness

It follows from our discussion so far that the question of the becoming of self-consciousness with which this book is centrally concerned can be seen both as an evolutionary anomaly and as a paradox. Self-consciousness can be seen as an evolutionary anomaly because whereas natural selection is unidirectional and blind (in that it lacks foresight in the production of variation), self-becoming is bidirectional and sighted (in that it is attentive to, anticipatory of, but also an active creative participant in the production of variation; see chapter 4). Self-becoming can be seen as a paradox (what Edmund Husserl described as the "paradox of human subjectivity") in that it denotes a dual state of consciousness, being at the same time subjectively aware and objectively part of the world. As I mentioned at the start of this chapter (see figure 1.1), this dual capacity of "being a subject for the world and at the same time being an object in the world"[51]—or, to use William James's formulation,[52] of being simultaneously the subject (the "I") and object (the "me") of experience—is an oddity that both unites and differentiates human self-becoming from other modes of conscious existence. Taken together, paradox and anomaly are what make human consciousness such a hard problem. The suggestion I advance in this book is that this is not a problem that needs solving but instead one that needs dissolving. I also suggest that human consciousness may be an anomaly along the continuum of sentient matter but might not be a paradox after all.

In particular, three persistent misconceptions about (a) self-location, (b) the subject–object division, and (c) the nature of self-boundaries are causing confusion and reiterate our perception of human subjectivity as a paradox. I briefly explore each one in turn.

1.8.1 Internalism About Self-Location

A major obstacle and source of confusion in the study of self-consciousness is the common misrepresentation of it as something internal and separated from the material world when, in fact, it is an experience profoundly embodied and fundamentally codependent with it. This misconception is partly

the product of history, specifically of our modern (largely Western) representational disposition and partly due to the peculiarity of the human body to be experienced from the inside, unlike other material objects, which we can only experience from the outside. I will say more on the subject–object duality of human experience below.

What needs to be emphasized here is that this internalist misconception is an old one. It is also the reason why so many great thinkers, from David Hume to Friedrich Nietzsche and from Ludwig Wittgenstein to Daniel Dennett and Thomas Nagel, each in their own way,[53] are either pessimists about solving this puzzle of "how anything in the world can have a subjective point of view"[54] or have denied, to some extent, the reality of self. The self that they wish to eliminate is an internalized essence, an object, or an abstraction.

Finding ourselves was never easy, as the famous excerpt from David Hume's *Treatise* reminds us:

> For my part when I enter most intimately into what I call myself, I always stumble on some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never catch myself at any time without a perception and can never observe anything but the perception.[55]

One could accuse Hume's method of introspection as looking for the self in the wrong way or in the wrong place, but even with our most recent sophisticated experimental entrapments and neuroimaging techniques, there is no guarantee of success. The puzzle of self-consciousness will not simply go away by translating it into the language of mental or neural representations, asking about how consciousness can arise in the brain. For instance, functional neuroimaging, although successful at highlighting how many different areas and circuits are engaged when recognizing oneself, has failed to provide a unifying neural signature of self-awareness and self-recognition. In fact, the message from neuroscience is that there are no self-specific networks in the brain. Instead, there is wide cerebral network (labeled *E-network*) of self-relatedness.[56] One may argue, then, that the most pragmatic way to interpret the neural dynamics of self-related activity is to admit that self-becoming has no predetermined location, direction, beginning, or end. I suggest, and will explicate in the following chapters, that the processes through which self comes into being combine growth and making. This continuity between growth and making, or nature and culture, has proven especially hard for modern thought to accept. The double bind here is between the largely Cartesian intuition of a universal phenomenal presence (the "I") and

the situated and transactional basis from which it develops. The trouble with human consciousness is how you reconcile the relational and extensive character of self with its localized subjective features. The paradox of human subjectivity emerges because although self is incomplete and "still being made" (i.e., a process of becoming), we insist on perceiving it as potentially object-like and complete. For instance, as an evolutionary stage—the by-product of anatomically modern humans sometime between a hundred thousand and three hundred thousand years ago—or an ontogenetic (developmental) achievement—around year two.[57]

In contrast to this object-based view of self, the emphasis of this book is on constant change—that is, becoming essentially implies that a person is constituted as a person in and through the process of self-transformation, not in the states that either preceded or followed the transformation. To illustrate that, I will borrow the example of a caterpillar transformed into a butterfly from the developmental psychologist Philippe Rochat:

> The caterpillar and the butterfly are clearly individuated entities if, and only if, the process of metamorphosis is not factored in. In reality, they are individuated entities yet of the same transforming creature. The identity of this creature is thus neither to be found in the caterpillar nor in the butterfly, but in *both*. The identity is in their transformation or metamorphosis, the passage from one entity to the other. In other words, it is *in between*.[58]

1.8.2 The Subject–Object Division

I turn now to the second major misconception of the paradox of human subjectivity. It relates to a particular (representational) way we have learned to think about subject–object relations. As a consequence of this representational conceptual habit, we mistake the subject–object relation for a dualism. We see a division where, in reality, there is a union or fusion of consciousness. The roots of this misconception can be found in the internalist fallacy about self-location I mentioned before. The misconception of the subject–object division also affects the meaning of boundary making I will be discussing next.

Self-consciousness is not an all-or-nothing phenomenon. Rather, it has various aspects and gradations. We should think of it as a continuum, where oppositions such as "subject" and "object" or "individuality" and "dividuality" exist not as absolute distinctions but rather as the possible ends of a spectrum. I should explain that the notion of dividuality refers to the classical

anthropological division between dividual and individual personhood[59] (see chapters 7 and 8). The division was introduced to explain the differences between the relationally constituted Melanesian person, who may be divided and distributed among objects circulating through exchange, and the self-animated and self-enclosed Western autonomous individual. Self-becoming, seen as a real ontogenetic process, occupies a shifting position along this spectrum that is always a mixture of dividuation and individuation. Individuality is not natural or identical with subjectivity. Rather, it is one of many possible subjective states that emphasizes individualistic modes of self-bounding. Dividuality, on the other hand, signifies the prevalence of relational and distributed modes of self-bounding over individualistic ones. However, the two states, dividuality and individuality, coexist as dialectical and not antithetical moments in self-becoming. This coexistence I call the process of *enactive in/dividuation* (see chapter 8). Moreover, sometimes, self-becoming leads to what is often described as being no one or a loss of self. But the fragmentation or loss of self-consciousness (due to pathology or creativity) is just another expression or dimension of self-bounding. Self-bounding is about past selves, present selves, actual selves, possible selves, or absent selves. If we see the paradox of human subjectivity in terms of a subject–object dualism rather than a spectrum of possibilities for self-realization, it is because of our modern predilection to bifurcate nature into experiencing subjects and experienced objects and of our use of those clean categories to describe (unsuccessfully) a cognitive life that is messy and leaky—which brings us to the issue of boundaries.

1.8.3 The Meaning of Boundaries

The last misconception of self-consciousness relates to the meaning of self-boundaries and of boundary making. The concept of boundary is central at various levels in the emergence of living organisms. The notion of autopoiesis, as developed by the biologists Humberto Maturana and Francisco Varela,[60] is grounded in the existence of such boundaries in the form of operational closure able to distinguish a living system within the environment and to maintain that autopoietic system by continually re-creating the boundary between itself and everything else. Autopoietic systems are described as operationally closed because their functioning is based on internal rules and processes that determine how those organisms maintain their identity. This doesn't mean that organisms are isolated from the environment. Still,

the implication is that the organism's interactions with its surroundings are mediated through its internal organization and operational logic (in a manner analogous to how a cell maintains itself through biochemical reactions that occur within its membrane). In the case of self-organizing systems (e.g., a cell), the boundary becomes the source of the system's autonomy in relation to its environment. One way to think of boundaries, then, is as the place in which the organism negotiates its autonomy within a specific environment, preserving its operational integrity (autonomy).[61] But although having a self is to possess a boundary, the problem with organismic boundaries is that sometimes they wrongly imply a rigid division between an interiority and an exteriority. Within the enactivist paradigm, the classical autopoietic view has been evolving into a more dynamic conception of human autonomy that emphasizes the codetermination between perception and action.[62] A major insight that comes from enactive theory is that perception isn't passive; it is tied to the potential for movement and action. In the case of humans, this happens through both sensorimotor structural coupling and participatory linguistic interactions.[63] This vision better reflects the evolving embodied and permeable boundaries of human self-becoming.

Think of the human body. What exactly do we mean when we talk of bodily boundaries? The skin is probably what comes to mind first. But what about the eyes or the ear drum? Even if we accept the skin as the most prominent visible outer surface of the human body, what kind of surface or boundary is it? Is it permeable or fixed? Is it a limit or a medium of interaction? In one sense, the skin can be a physical boundary of a sort. In another sense, the skin is permeable or semipermeable. Is the Māori skin a boundary in the same way that the skin of the people of New Ireland[64] is a boundary? What about those cases, well attested in the ethnographic record, where the skin as the medium of personal decoration turns the individual body into an active sociopolitical medium? Terence Turner's famous paper "The Social Skin," exploring the practices of bodily alteration and adornment (e.g., lip piercing) of the Kayapo in Amazonia,[65] provides a good example of such a case—despite its emphasis on symbolic representation at the expense of embodiment. So, what part of the self is the skin? Which part of the skin (interior or exterior surface) touches ourselves? Answering those questions is important, should we want to understand what self is.

Selves need to have boundaries, but at the same time, they need to ensure traffic across them. The simplest example of that can be found in basic forms

of social interactions and participatory sensemaking.[66] These interactions are always situated, mediated, and constituted by a given material environment. Think, for instance, of the mutuality of self-production in gift exchange through an unending round of reciprocity.[67] Skilled material practices also involve a similar reciprocity and situational attunement between maker and material.[68] More radical examples can also be found beyond humans. The anthropologist Eduardo Kohn describes the Amazonian forest as an "ecology of selves." Self-becoming in such a context depends on the ability to "recognize the soul-stuff of the other souled selves that inhabit the cosmos."[69] To lose this ability leads to soul blindness—that is, the condition in which the person becomes incapable of recognizing the subjectivity of other beings (human or nonhuman). There is nothing mystical about this condition that Kohn explains using semiotic theory. Moreover, this condition can be compared to the so-called disenchantment of the world characteristic of modernity and its emphasis on the atomistic buffered individual.[70] The vision of self-becoming as enactive in/dividuation by means of self-bounding that I propose in this book allows and explains this "traffic of souls"[71] across self-boundaries, well attested in the anthropology of personhood (chapters 8 and 9). This is possible because the proposed vision departs from the orthodox autopoietic paradigm and its emphasis on autonomy. A more ecological version of relational autonomy is instead embraced: one that prioritizes the fluidity of creative material engagement over organizational fixity and operational closure. Obviously, such a decentralized conceptualization changes the geography, ontology, and meaning of personal space. Self-becoming is locationally uncommitted. As I fully explore in chapters 8 and 9, when it comes to self-experience, interiors and exteriors are relevant distinctions. Our boundaries are shifting (expanding, shrinking, or collapsing) in response to our intra-actions and the affordances of our changing material environments. This brings us to our last major postulates and the notions of suprapersonal space and the situated person perspective.

1.9 Self-Consciousness Is Extensive and Perspectival

In the previous sections, I have been gesturing toward a process ontology of self that binds together temporal extension (continuity of the self in time) and spatial extension (continuity across the divisions of space). Those spatial divisions are personal space (occupied by the body), peripersonal space (within

the range of the body), and extrapersonal space (out of the range of the body). The meaning of this spatiotemporal binding should be underlined. A common way of thinking about the temporality and spatiality of self is, first, to see both of them as discrete multiplicities made of distinct experiences and then to use the spatial experience to map the temporal structure of consciousness. By contrast, thinking along the lines of material engagement and enactive in/dividuation, both aspects (spatial and temporal) are co-constituted. Self-becoming, as a dynamical flow, is characterized by the mutual penetration and interconnection of one spatiotemporal state to another. Self-location is not internal or external but rather peripheral and in-between; it depends on local modes of engagement with the material world. Our common modern predilection to locate all agency on the side of humans and treat things as passive objects of consciousness gives way to an extended intra-agential system of exchange. This extended intra-agential system crisscrosses traditional spatiotemporal boundaries of personal, peripersonal, and extrapersonal space. In their place, a new suprapersonal liminal space of betweenness or in-betweenness emerges to accommodate the permeable boundaries and transactional dynamics of the self (figure 1.9 and figure 1.10).

It is here that the familiar preconceptual 1PP, proposed by phenomenologists, reveals its true form as the situated person perspective (SPP). Self is not the subject of experience (from a 1PP) or the object of reflection (from a 3PP). Rather, it is subject and object—superject. As mentioned, Whitehead coined the term *superject* (feeling and being felt) to denote a relational conception of subjectivity as the currents of material consciousness that operate on different levels and scales of self-specification or becoming. Material consciousness here has the durational sense, familiar from Bergson—that is, it is both memory of the past in the present and anticipation of the future. I should explain that although terms such as *subject* or *experience* are retained in Whitehead's process ontology, they have a very different meaning from that in ordinary use. Whitehead proposed that subject and object are relative terms in the unity of an actual occasion: "The occasion as subject has a "concern' for the object. And the 'concern' at once places the object as a component in the experience of the subject, with an affective tone drawn from this object and directed towards it."[72] The superject denotes the perspectival spatiotemporal binding of experience from a SPP. I argue that the usual analytical distinctions of self-experience from a 1PP, a 2PP, or a 3PP in reality can only be enacted from a SPP. Within the hylonoetic field of material engagement,

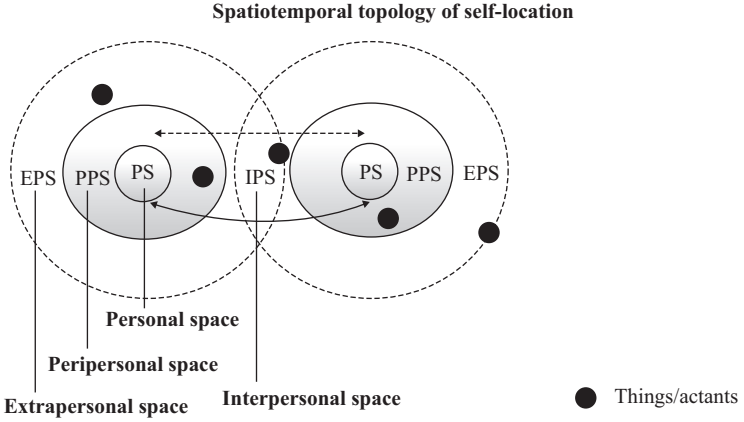

Figure 1.9
Spatiotemporal topology of self-location. A common and simple way to map self-location (behavioral and neural) relevant to the space that surrounds the body is through the notions of (a) personal space (PS), which essentially denotes the body (the space occupied by the body itself); (b) peripersonal space (PPS), which denotes the near space that immediately surrounds the body (within the hand-reaching distance or the range of the body); (c) extrapersonal space (EPS), which refers to the space surrounding our bodies beyond the reach of our limbs (out of the range of the body); and (d) interpersonal space (IPS), which refers to the space of social interaction (personal, peripersonal, extrapersonal).

there is no fixed single position or privileged point of view from where "I" perceive the world. The spatiotemporal self-location (the experience of where "I" am in time and space) is transient and continuously shifting. Human self-experience is continuously generated through a mixture of subjective (1PP), intersubjective (2PP), or objective (3PP) encounters with others (humans and nonhumans). Importantly, whereas in the cases of 1PP, 2PP, and 3PP the meaning of perspective is directional (from subject to object or from subject to subject), in the case of the SPP, it is transactional and participatory. The SPP gives us the suprapersonal view of experience (figure 1.11).

This alters our conception not only of the "I" and the "me" but also of the "we." In particular, the social dimensions, or origins, of self-knowledge as something that arises from a dialogical process has long been recognized. Philippe Rochat, whose example of the caterpillar and the butterfly we discussed above, argues that to be self-aware is to have "others in mind." Self-knowledge is located "neither within the individual nor in the mind of

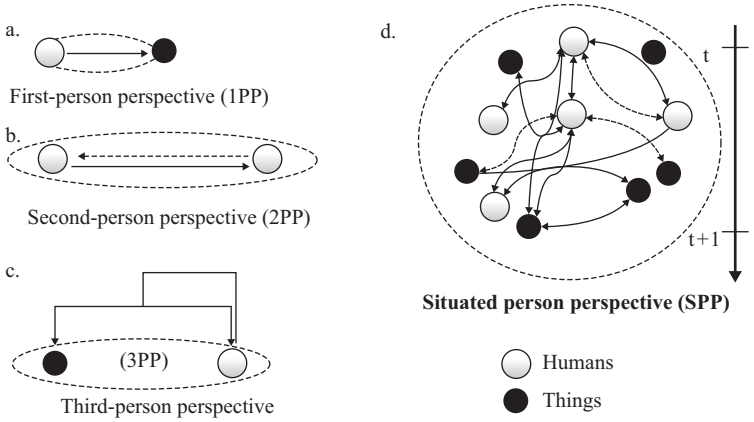

Figure 1.10

The situated person perspective (SPP). Human self-experience is often described by way of three distinctive perspectives: (a) the first-person perspective (1PP) refers to the egocentric inside point of view of the body-as-subject or *Leib* (i.e., the pre-reflective "I"); (b) the second-person perspective (2PP) refers to the intersubjective encounters with others (humans and nonhumans); (c) the third-person perspective (3PP) is the objective outside point of view of experiencing, denoting the body-as-object or *Körper* (i.e., the physical body that is observable both by myself and by others); and (d) the SPP denotes the plastic and distributed, rather than fixed, perspective from which self is experienced and constituted in the hylonoetic field of situated action through the invariant properties that the organism has discovered and assembled about itself (i.e., self-bounding).

others" but rather at their "*junction*."[73] To illustrate that, he uses the analogy of the pointing gesture. Self-consciousness, like a pointing gesture, exists "within neither one nor the other individual's private mind." Rather, it exists "at the interface of one individual's attention to a particular object in the environment and other individuals' attention to the same object." In other words, if a pointing gesture signifies and has meaning, it is because it is shared rather than "privately owned."[74] It is the same principle of mutuality and co-constitution that applies to self-consciousness.

Still, an important drawback persists and signifies an important difference with the meaning of social interaction advocated in this book. This drawback concerns the prevalent ontology and meaning of the social, which remains construed through the lens of a "we" that refers solely to relations among human individuals. Despite the significant impact that symmetrical models, such as actor–network theory (ANT),[75] had in exposing the blind spot of

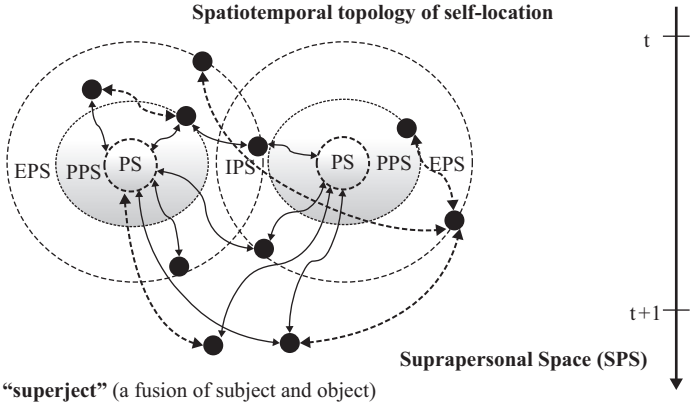

Figure 1.11
Suprapersonal space (SPS). SPS denotes the extended, intra-agential, transactional lived space that crisscrosses traditional spatiotemporal boundaries of personal, peripersonal, extrapersonal, and interpersonal space. This new suprapersonal middle experiential space of in-betweenness is introduced to accommodate the permeable boundaries and dynamics of the situated person or superject (a fusion of subject and object). The notion of superject extends and redefines the domain of subjectivity shifting attention away from personal experience (the 1PP) and toward the SPP.

technical mediation (where society and matter exchange properties), interpersonal forms of sociality continue to receive much more attention than mediated forms of participatory sensemaking. In short, interactions between humans are privileged over transactions between humans and things. Let me explain the implications of that in the context of our discussion.

Dialogic theories advocating the social origins of self claim that "when we think of ourselves, we always and inescapably have others in mind."[76] I agree that the "I" and the "me" are actually a "we." However, the "we" that I refer to is not the one we use merely to describe social phenomena of joint attention or collective intentionality between individuals.[77] The meaning of the "we" that I refer to should be understood in the participatory intra-agential sense that extends the meaning of social actors to nonhuman actants as well.[78] In short, the meaning that the term *we* and, by extension, the term *social* have in this book is not restricted to interactions between individual human actors but also includes interactions between people and things.[79] Those mundane material relations are more important than we often recognize—the sociologist Bruno Latour in his famous essay "Technology Is Society Made Durable"

describes them as "the missing masses" of our social universe.[80] The topology of that "we" is no longer constrained by a single location either within the individual (the subjective point of view or 1PP) or from outside—either from the location of the other, the 2PP, or the objective "view from nowhere."[81] As discussed, humans do not experience self or the world from the purity of the spatiotemporal positions afforded by the subject–object or nature–culture divides. Rather, they experience self and the word from a middle in-between position. This position is not fixed but rather movable, and it is thoroughly embodied in situated and mediated action. The point of view of subjectivity is no longer single, within/outside, or personal. Rather, it is multiple, in-between, and suprapersonal—that is, the SPP.

To recap, the difference that makes the difference can be explained as follows. Whereas in the case of the 1PP the meaning of perspective is directional—experiencing has either a mind-to-world or a world-to-mind direction of fit—from the SPP, the meaning of perspective is transactional and participatory—both mind and world are experiencing and experienced (subjects and objects). On this construal, classical divisions such as that between the dividual and individual person collapse. Instead of signifying antithetical poles in a dichotomy, dividuality and individuality now emerge as key ingredients of enactive in/dividuation along a continuum of self-consciousness. Our exact position on this continuum varies and depends. There is no single position or privileged point of view from where "I" perceive the world. Instead, the SPP signifies the ability of human consciousness to constantly integrate elements of dividuality and individuality by taking the perspective of self or the other, as well as by creating new technological and imaginary perspectives for experiencing the self and the world.

1.10 Patterns That Connect: A Note on Comparison and Selective Juxtaposition

The study of self-becoming that I attempt in this book combines perspectives from archaeology, anthropology, philosophy, and the cognitive sciences. My objective is to provide a new undisciplined approach to self-consciousness grounded in the principles of MET. This is also reflected in the choice of material and examples that span from early prehistory to the present.

For instance, throughout this book, I draw insights and examples from the study of stone toolmaking and pottery making. The study of stone tools

allows us to explore long-term issues of human becoming. The study of pottery making allows us to explore issues of embodied experience, skill, and technique. I am drawing on my ongoing ethnographic work with contemporary ceramicists over the past twenty years. I have found in the study of those crafts a natural laboratory for exploring the creative dimensions of self-becoming as well as a constant reminder of the immense varieties and plasticity of self-experience. Pottery making, like the making of stone tools or any other craft, will help ground our examination into the lifeworld of material possibilities that are usually neglected in conventional discourse about self. I also look at more recent experiential domains such as the study of digital materiality and the infosphere (see chapter 11).[82] This will allow us to explore recent transformations of self and to ground our discussion into a more familiar contemporary experiential terrain.

Even if somewhat arbitrary, the chosen examples offer specific windows to the process of self-bounding, which is dynamical, ongoing, and subject to situational constraints. Although I believe that these three characteristic domains of material engagement (pottery making, stone toolmaking, and digital materiality) provide pertinent analytical units for the study of the issues at hand, they should not be seen as having any special epistemological significance. Other examples and modes of engagement could also be used to explore the main thesis of this book, perhaps highlighting additional dimensions. Nevertheless, the chosen examples have certain diachronic qualities that render them especially fertile for the questions at hand. My choices also have a comparative logic. All the decisions about what is present, or excluded, emanates from my central conviction about the significance of relational analogy and comparison. I do not mean that what is left out is not important or relevant. On the contrary, I mean that the examples presented are inevitably the product of selection among possible comparable events, and they should not be seen as representing the phenomenon as a whole in some objective or inclusive sense.

All perspectives are partial and incomplete viewpoints of the single reality of human becoming. This is also reflected in the structure of the chapters. The book seeks to avoid the usual linear narrative, where events are presented in an unfolding predetermined sequence from past to present. The ordering of the chapters and their thematic contents are carefully curated and grounded in different disciplinary perspectives. Each chapter describes self from a specific viewpoint, but it also aims to guide and facilitate the reception of the

argument presented in the book as a whole. Moreover, there is no underlying geographical or chronological logic. We learn from the past about the present as we learn about the past from the present. The conceptual mapping works both ways. The thematic structuring of the book reflects this central objective to disrupt the idea of a progressive historical narrative. Instead, in retrospect, it resembles the kind of assembling one usually expects from an anthropological exhibition that operates on the principle of estrangement and selective juxtaposition. When the curator selects and arranges objects within the context of an exhibition, the choices she makes often forces both the curator and the viewer to consider those objects in new ways. For instance, during the Assembling Bodies exhibition at the University of Cambridge Museum of Archaeology and Anthropology, the unconventional positioning of Malangan funerary effigies from New Ireland, Papua New Guinea (see also note 70) alongside Watson and Crick's Double Helix model of DNA allowed the generation of new ideas surrounding the processes that make up the human body.[83] The value of juxtaposition lies precisely in the capacity to reveal novel connections among familiar objects (similarities and differences) that generate unexpected meanings and understandings. By juxtaposing and highlighting aspects of self that rarely meet and are rarely discussed together, challenging conventional preconceptions, and blurring the boundaries between them, the chapters allow us to bring into focus new undisciplined ideas and relations regarding human becoming.

I use the terms *human* and *human becoming* to refer both to the species (the evolved physical body) and the person (the lived situated body). Human becoming is a transformation not simply of anatomy or behavior but also of consciousness (i.e., self-becoming). Traditionally, these aspects of humanness are kept separate (at least analytically). Human speciation is expressed through stories of origins: grand evolutionary narratives about how we came to be the kind of species we are (i.e., *Homo sapiens*). The emergence of human self, on the other hand, is expressed through short-term developmental life histories, autobiographical self-narratives about individuals, acting and interacting, in specific social and historical situations. In this book, I try to put the two stories together. I do not mean that I put one story after the other as if they represent a unidirectional progressive sequence, starting with the minimal bodily self (the product of evolution) and finishing with the narrative conceptual self (the product of culture). I do not imply any sort of evolutionary continuity in the linear sequential sense of advancement in discrete steps.

Rather, I try to integrate the two stories, and their timescales, and search for their multiple points of intersection. The reason I attempt such a mingling of the conventional categories of nature and culture is because I want to unite threads, present in both stories, that are usually kept apart and are thought of as separate (also studied by different disciplines). The aim is not to provide an interdisciplinary synthetic overview but rather to collapse disciplinary boundaries moving beyond nature and culture. The central concern is to provide a structure that helps us to challenge established categorizations and ways of thinking, allowing space for the emergence of unpredictable and unexpected patterns contributing to the generation of new connections and ideas. This way, I hope that a new kind of story will emerge—a story not of the linear kind with a clear beginning and ending, narrating how we came to be human, but rather a story akin to what in the philosophy of Gilles Deleuze and Félix Guattari[84] is described through the concepts of *assemblage* and *rhizome* (see chapter 5): a juxtaposition of connective patterns about what it is to be human that makes up a possible story of how humans become. This is a story about human life in the middle, the territory of enactive in/dividuation. The main protagonists of this story are not just people but also the things that become inextricably bound up in the lives of people. The setting of the story is the lived suprapersonal space of material engagement. At the center of my story lies the foundational question of what it means to be human. The way to answer that is by focusing on the modes of human becoming.

I Principles of Self-Becoming

2 Outline of a Theory of Material Engagement

Material engagement theory, which forms the conceptual foundation of this book, is rooted in cognitive archaeology and anthropology but relates and draws insights from many adjacent fields of research in phenomenology and embodied cognitive sciences. In *How Things Shape the Mind*,[1] I offer a detail exposition of the major working hypotheses and the vision of mind that it embodies. Here, I present an overview of MET's vision and discuss its application to the study of mind and matter.

2.1 Walk the Line

Let's begin with a simple task. Take a pen and paper. Draw a line. The sketch of any form will do. Just leave a trace. Make a mark. What constitutes an adequate description of—and how do we account for the process by which skills, hands, instruments, and materials intersect to create a trail of—ink on the paper's surface? Our most habitual actions (psychical or physical) are experienced and become constituted where brain, body, and culture conflate. Yet, finding adequate ways to describe this conflation, even in the simple case of line making, poses a great challenge.[2] Where do we start delineating the boundaries of the marks our moving hand leaves on a surface? What kind of mental processes and forms of representation can account for the origins and endings of the simple line we have drawn? Consider three common ways to describe the line. The first way is to think of it as an action: the drawing of a line. The second way is to think of it as an object: a line drawn on paper. The third way is to think of the line as a sign: the index of our moving hand or perhaps the trace of a creative gesture. Ontologically speaking, those three ways of seeing the line are inseparable. Each one of those ways

supports, informs, constrains, causes, and complements the other. To grasp their unity is to attend the cognitive life of the line. Attentiveness to the cognitive life of the line will allow us to see sentience in the trail of ink. Yet, more often than not, we seem to resist this realization. The preferred analytical convention is to break the line's cognitive life into pieces: first by separating ourselves from the line and then by seeing the line as the external product of a sentient internal process. As modern human observers, we have learned to see the line where the movement stops and the drawing ends. We have also developed the conviction that some preformulated idea or mental representation of a line inside our head precedes and causes the materialization of the line in the outside world. The anthropologist Tim Ingold refers to this representational tendency as *inversion*. The logic of inversion, characteristic of modernity, manifests as an attempt to reconfigure the relational matrix of the world in which we live into a series of internal representational schemata of which our actions are but an outward expression: "Through inversion, beings originally open to the world are closed in upon themselves, sealed by an outer boundary or shell that protects their inner constitution from the traffic of interactions with their surroundings."[3] Most of our troubles with the nature and evolution of human cognition and self-knowledge stem from this representational logic of inversion that sets up the artificial opposition between mind and matter.

2.2 What If the Mind Has No A Priori Location?

Setting the boundaries of the human mind was never easy; specifying the conditions under which a process falls on the inside or outside of those boundaries even more so. As I said, the conventional way of dealing with this problem, marking the mental and delineating those boundaries, has been to divide the world a priori in two parts: a mental part and a physical part. The mental part is the sentient part that thinks about the other physical part that is lacking this precious ability. In one sense, the mental part deals with what is absent (representing, remembering, imagining) and the physical part with what is present (in the ways we touch the world and the world is touching us). For instance, the line in our example belongs to the physical part as the end product of a human intention that originates in the mental part. Perhaps this bifurcation of the world works well within the metaphysical confines of a representational space where lines and material forms have no real life and

where the physicality of traces does not matter. Yet, this separatist logic fails in most real-life situations where our ways of thinking, making, and doing are inseparably linked as part of an evolving material ecology.

Cognitive archaeology—which, as discussed in chapter 1, is the field that examines the macro-history of human thinking: how it becomes constituted, transformed, and reproduced in different contexts and configurations of brain–body–material environment in the course of human becoming—offers plenty of evidence to support this basic claim against the separation of thinking inside the head and acting inside the world. Perhaps this claim is less obvious for other disciplines that do not afford a deep time perspective and lack any particular expertise or familiarity with the causal efficacy of material culture in human cognitive life. I should make it clear then that not just the size of our brains and the shape of our bodies but also our ways of thinking and socializing are rooted in those elementary gestures of enactive material signification. Line making is just one simple example of that process of creative thinging. From the earliest lithic ecologies (chapter 10) to the latest digital ontologies (chapter 11), this process is at the heart of human becoming and evolution. Humans think by constructing material signs and memory traces. They do all that primarily by using their bodies (especially their hands). This is not to say that the signs we make or the lines we draw merely represent or reflect intelligence. The reflected intelligence is not hidden away in some separate mental realm inside the skull. The moving hand and its material traces do not just externalize the internal workings of a mind. Instead, intelligence is enacted through them; it proceeds along lines and material signs of one kind or another. For instance, the making of a stone tool is not the product of thinking. Instead, it is a way of thinking (see chapter 10). When we look at a stone tool we don't simply see the externalization of form, skill, or memory. Rather, we observe how the affordances of stone make it possible for human bodies to learn and to remember skills, to sense causality, or to enact intentions. In short, within a lithic ecology, stone tools bring forth and constrain the organism's possibilities for action, self-experience, and imagination. In that sense, the process of thinking is effectively turned inside out. Our forms of bodily extension and material engagement are not simply external markers of a distinctive human mental architecture. Rather, they actively and meaningfully participate in the process we call *mind*.

This basic idea of a mind not limited by the skin has a long ancestry in various intellectual traditions. We are mistaken, the early pragmatist and

semiotician Charles Sanders Peirce reminds us, "to conceive of the psychical and the physical aspects of matter as two aspects absolutely distinct. Viewing a thing from the outside, considering its relation of action and reaction with other things, it appears as matter. Viewing it from the inside, looking at its immediate character as feeling, it appears as consciousness."[4] Another central notion, I already mentioned, proposed by the pragmatist philosopher John Dewey, is that of *situatedness* (see also chapter 9), referring to the necessary unity between knowing and the known or organism and environment.[5] This basic idea of the unity and relatedness of the organism and its environment has a long presence in various intellectual traditions seeking to avoid divisions between that which is known and that which knows. Indeed, from Alfred North Whitehead's process philosophy of becoming[6] to Henri Louis Bergson's idea of creative evolution[7] to the phenomenology of Merleau-Ponty[8] to the more recent work in ecological psychology of James Gibson[9] and Gregory Bateson,[10] critiques of the oppressive modernist alienation of the mind from the material world have been gathering momentum throughout the twentieth century. One may also add here the influential work of Deleuze and Guattari's *rhizomes*,[11] Latour's *actants*,[12] and Karen Barad's *agential realism*.[13] Today, the debate over how best to sidestep the need to bifurcate nature and avoid the classical divisions between mind and matter or subject and object continues more intensely than ever, with new theoretical and empirical work on enactive, distributed, embodied, and extended cognition.[14]

So, what sort of a thing is this that we call *mind* in the archaeology of mind? Our immediate intuition is probably to point at the head. MET invites us to rethink this common assumption, stretching the notion of mind beyond familiar boundaries and comfortable limits. A radical continuity between cognition and material culture is proposed. Mind and world form a necessary unity. As Shaun Gallagher observes,

> We are *in-the-world* in a way that is not reducible to occupying an objective position in the geography of surrounding space, and at the same time the world is irreducible to an abstraction of itself represented in one's brain. We, as minded beings, are definitively "out there," dynamically coupled to artifacts, tools, technologies, social practices and institutions that extend our cognitive processes.[15]

One major methodological implication of this continuity is that the organism's worldly engagements, and acts of making, become the new analytical unit for studying cognitive becoming.

What, then, if in trying to answer the fundamental questions about the nature of human intelligence, we start from the assumption that the mind has no a priori location or place of origin?

2.3 Where Brain, Body, and Culture Conflate

Let me rephrase those questions, returning to the example we started this article with: What if the lines we leave behind in drawing, like the paths we lay down in walking, are marking the mental? Imagine we were to redescribe the process of line making by focusing on the moment when the pen stops but is still touching the paper's surface. It seems that for that single moment, all three aspects of form making (i.e., the line as gesture, the line as object, and the line as a trace) coexist. They are no longer seen as separate. Instead, they can be seen as a transformative, constitutive intertwining of neural, bodily, and material resources. What, then, if we try to create a theory of human intelligence, taking this enactive cohabitation of marks and traces (both neural and extra-neural) as the point of initiation?

Accepting that human thought processes are better described as *hylonoetic fields*—mindscapes constituted by bodily practices, material environments and artifacts—places us in a position to restate the problem of the interaction between cognition and material culture. Not only the lines we draw on paper but also our imaginary lines—those that connect our past with our present and possible future and allow us to become the self-conscious beings we are—exist in the middle space where brain, body, and culture conflate, never entirely mental in the internal sense and never just material in the external sense, neither mind in the cognitivist sense nor matter in the materialist sense.

Human cognitive life, as we also discussed in chapter 1, is enacted in this middle space of material engagement (figure 2.1). The challenge for us is how best to describe this conflation and understand how it comes to matter in different historical contexts. I describe material engagement as a *conflation* because I see brain, body, and culture as analytical abstractions that can only exist through their mutual engagement in ontogenetic becoming (enactive in/dividuation). We are often misled to think that brain, body, and culture are real entities that can somehow exist independently (i.e., they can exist before their actual fusion in human life). We also tend to think that what

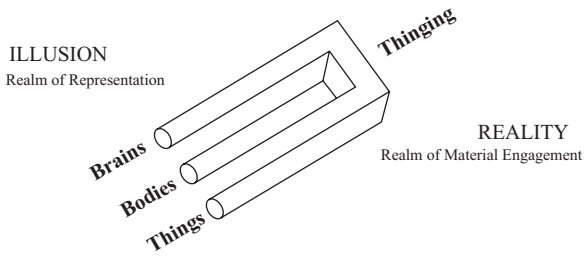

Figure 2.1
Material engagement and the fallacy of misplaced concreteness: where brain, body, and culture conflate.

we call *thinking* is the kind of mental activity that happens inside the brain as a result of its interaction through the body with world and culture. This is the confusion that I try to highlight when I use the term *conflation*. These are examples of what Whitehead calls *the fallacy of misplaced concreteness*—that is, the error of mistaking abstract conceptual representations for concrete reality.[16]

Material engagement theory sets out a possible pathway to approach this middle in-between space where brain, body, and culture conflate. The material engagement approach is committed to observing and describing cognitive life as we find it, enacted inside the world (past and present). Based on that commitment, the material engagement approach comprises perspectives and epistemic constraints that allow us to take seriously the materiality of mind-stuff. Three major working hypotheses neatly summarize what material engagement theory stands for (figure 2.2):

1. The first is the general *hypothesis of the extended mind*.[17] This basically states that many processes that we tend to classify as cognitive or mental, and prefer to localize inside the head, are better described as distributed processes extending beyond the individual and incorporating aspects of the socio-material environment. MET is committed to a view of thinking as a dynamical process that is enacted and situated. The internalist representational ontology gives way to a cognitive ecology[18] that comprises a variety of heterogeneous mental resources and skills spanning the boundaries of the individual brain and body. The organism's worldly engagements (organism–environmental transactions) and acts of making become the new analytical unit for the study of human cognitive becoming. In other words, mind is not limited by the skin.

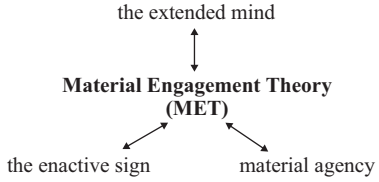

Figure 2.2
Material engagement theory: major hypotheses.

2. The second is the *hypothesis of enactive material signification*.[19] This states, as we briefly discussed in chapter 1, that the meaning of things is the product not of symbolic representation but rather of enaction. What that means is that things do not merely represent or reflect meaning that is hidden away in some separate mental realm. Instead, the meaning of things is enacted through social action and material engagement. Moreover, meaning making is the act not of externalization or representation but instead of *participation*. We do not impose meaning on a meaningless material world. Rather, we meaningfully engage with it. Enactive signs are things not in the static sense of material objects but rather in the active sense of thinging (see chapter 1 and also below). That is, they operate as material anchors for meaning-making activity that is not in the organism, the environment, or a thing. Enactive signification denotes the process by which material signs bring forth meaningful experiences rather than representing or transposing meanings as signifiers of a signified.
3. Third is the *hypothesis of material agency*.[20] The argument here is that what we call *agency* is not a human property but rather the relational and emergent product of situated activity. There is no way that human and material agency can be disentangled. Humans and objects work together to produce agency. So, the question we should be asking is not "What is an agent?" but "When is an agent?" What an entity is in itself does not really matter. Instead, what does matter is what it becomes and where it stands inside a community of action and material engagement.[21]

Drawing on those three working hypotheses, I want to stress three closely related insights that come with material engagement theory and which provide the conceptual underpinning that guides the archaeology of consciousness advocated in this book.

2.4 On Boundaries and Mind-Stuff

One important characteristic of the material engagement approach that follows naturally from our previous discussion lies in its conviction that in order to study the cognitive life of any species, we need to understand the lines, forms, and material traces left or made in the course of its becoming.[22] That is, we need to follow the variety of mind-stuff as they fold and unfold, entangle and disentangle, in different temporal and spatial scales of a species's phylogeny or ontogeny. With mind-stuff, I refer to the dynamic ensembles, flows, and configurations of matter and energy by which sentient creatures become organized and relate to their surrounding environment and to each other. We should not forget that what we try to articulate when we use the terms *mind* or *self* can be better described as verbs. There is no such universal thing as the mind or the self. Rather, there is a variety of human ways of thinking and self-bounding enacted by specific bodies in specific situations. These are situated processes that exist in a state of perpetual movement, constituted by the continuous production, exchange, recycling, and reorganization of mind-stuff and material signs. This applies to every sentient organism but is especially true in the case of humans, given the profound plasticity and immense variety of the material forms that we make. As we discussed, we have a plastic mind, inextricably intertwined with the plasticity of culture (see also chapter 5).

Material engagement theory takes this metaplastic recursive relationship between brains, bodies, and things as the main analytical unit for the study of human thought processes. Contrary to methodological individualism—that is, the view that anything mental must refer to and is explained by processes internal to the individual—the study of metaplasticity demands an action-centered methodology especially adapted for handling the complexities of human becoming in a variety of socio-material settings and across the scales of time. As the anthropologist Edwin Hutchins points out, "The proper unit of analysis for cognition should not be set a priori, but should be responsive to the nature of the phenomena under study."[23]

Perhaps, sometimes, for specific questions and phenomena under investigation, the right boundaries must be closed and narrow. Cognitive neuroscience, to give one example, operates on that assumption, focusing on the study of so-called neural representations and their complex networks of activation and deactivation inside the skull. Methodologically speaking, this

closure makes good sense if you're just interested in the human brain and what flows therein, which now can be measured by means of blood oxygen level–dependent (BOLD) functional magnetic resonance imaging. But the substitutional logic of such an approach embodies a neuro-centric attitude that can mislead us to think that all that really matters when studying the mind is understanding the nature, formation, and processing of internal mental representations (that operate as substitutes for the real world). This threatens to turn human cognitive life into a lifeless abstraction. On the contrary, human cognitive life extends beyond skin and skull. As a result, it is important, when we decide exactly how and where to set the boundaries of the cognitive phenomena we seek to investigate, not to "cut lines of interaction in ways that leave key aspects of the phenomena unexplained or unexplainable."[24]

Obviously, my previous remark does not mean to question the neural bases of human thinking and feeling or the immense contribution that a contextualized critical neuroscience can make in delineating how the varieties of human thought and consciousness are supported and mediated by the brain. I do, nonetheless, seek to underline that from the vantage point of a process archaeology of mind, one can hardly find any convincing reason—besides convention—why the process we call *mind* should be restricted to neural or representational events occurring inside an individual's brain. Specifically, for MET, as with many other enactive and distributed approaches to the study of mind, there can be no a priori separation with respect to the boundaries of skin and skull. The skin does not necessarily act as a barrier between the mind and the material world. Rather, we should see the mental world as immanent in the relations and transformations that allow human beings to reach out and to engage their surrounding environments. Edwin Hutchins, inspired by Gregory Bateson,[25] uses the term *cognitive ecology*[26] to describe this kind of relatedness.

Of course, the role of the brain as an assemblage of neural activation and deactivation patterns remains central. However, the centrality of the brain lies not in its ability to constitute mentality by internalizing and representing the world but rather in the ability of the brain to connect, to attend, to respond, to attune, and to relate to the world using its extraordinary plasticity and sensitivity. In other words, brain operations are inseparable from the rest of the body and its surrounding relevant environment. Importantly, there is no central executive. No single part of this dynamical system is

responsible for central processing. What is often described or seen as central processing is, in fact, an attribution of agency. The patterns of neural activation that one may observe and associate with a specific pathway of world-engaging action do not represent that pathway but rather simply correspond with it. This correspondence can take a variety of forms (affective, semiotic, social, or aesthetic), but it can never emerge in the absence of some minimal material engagement. The basic process described here is similar to what Shaun Gallagher and Micah Allen call "ongoing predictive engagement (PE)—a dynamical adjustment in which the brain, *as part of and along with the larger organism*, actively responds in ways that allow for the right kind of ongoing attunement with the environment—an environment that is physical but also social and cultural'(emphasis in the original)."[27] Predictive engagement derives from Karl Friston's free energy principle,[28] which, similar to autopoietic enactivism, defines biological cognitive systems by their tendency to resist entropy.[29] MET puts special emphasis in trying to understand specific instances of these biosocial relations, their material constitution, and their transformations in human becoming. This brings us to the cognitive life of things and the notion of thinging.

2.5 Thinking as Thinging

I said before that mind-stuff does not have fixed locations or set properties. They equally pertain to brains, bodies, and things. A neural activation pattern, a movement of the hand, a line produced on a piece of white paper—they are all mind-stuff. This, of course, does not mean that mind-stuff does not also differ. However, it is their coming together in lived time and space that matters so far as material engagement is concerned. This ontological gathering—the coming together of specific mind-stuff—I call *thinging* (recall the discussion in chapter 1). To explain: thinking is usually understood as something we do *about* things in the absence of things. On the contrary, thinging denotes the kind of thinking we do primarily *with* and *through* things. For the material engagement approach, *withness* and *throughness* takes precedence over *aboutness*.

We should be reminded here that in the context of MET, the term *things* is used not in the narrow sense of material objects but rather in the broadest sense of material forms, socio-material assemblages, and techniques. It refers to the materiality of individual artifacts as much as it refers to the

materiality of space and the environment. Importantly, things are active and process like (both forms and flows). I have coined the term *thinging* to articulate and draw attention to the specific varieties of cognitive life instantiated in actual occasions of thinking and feeling with, through, and about things. The notion of thinging signifies the mentioned continuity between mind and matter. In other words, I use the term *things* to signify energetic compounds of form and matter, and the term *thinging* to signify flow—the ongoing movement and transformation of mind-stuff. Thinging should not be understood as a psychological process of internalization or representation by which things become the object of consciousness. Rather, thinging should be seen itself as an act of consciousness. The philosopher Martin Heidegger, in his famous essay "Das Ding" (The Thing),[30] uses the same term (i.e., thinging) to express how things "gather" space and time, tying together their material constituents. The meaning of the term *thinging* in the context of MET retains this original sense of "gathering," but it also diverges from the Heideggerian phenomenological path in many respects. The process of material engagement that produces our thinging essentially refers to a process of becoming with and through the world, leaning toward Alfred North Whitehead's notion of *prehension*[31] (see below) and John Dewey's transactional sense of situation (see discussion in chapters 1 and 9).[32]

With the notion of thinging, the focus falls on process ontologies and ecologies rather than on static decontextualized objects, tools, or other material structures. The analytical value of the notion of thinging, then, lies in helping us to understand not what things are (as entities) but instead how things come to be (as "events")—that is, how things come to possess ontological specificity or multiplicity in the course of their life history. Thinking is not the cause of our thinging. Rather, the two are inseparable: thinking is thinging. There are not two separate processes, one realized on the inside and the other on the outside, but rather a single process of cognitive becoming. This description of thinging opens up new possibilities for exploring what minds and things are and how they relate and connect to each other. In other words, thinging, on the one hand, frees thinking from a cognitivist view of what mind consists of and, on the other, frees things from a narrowly modernist definition of what matter consists of.

Things have a cognitive life not because of what they represent, or of how they can be represented, but for what they *do*. Things are present in the process of mind. For instance, things play an important part in the

integration and coordination of processes that operate on radically different timescales (e.g., neural, bodily, cultural, and evolutionary; see discussion in chapter 5). Through their physical persistence, they help us to move across the scales of time and to integrate temporal phenomena that operate at different experiential levels. Things also work best over the long term, accumulating memory, biographies, and life histories through joint participation in cultural practices in ways that often escape the temporal limits and rhythms of individual experience.

Things become the non-biological stuff of mind on a par with other biological stuff such as bodies and neurons. However, the parity I am talking about here, although related, is not the same as the parity found at the heart of extended mind theorists.[33] In the case of MET, the starting point is not the mind as we know it from the inside but rather a relational or extensive mind in the middle: where brain, body, and culture conflate. Thinking *about* presupposes the thinking *with* and *through* (both evolutionary and developmentally). This I call *primacy of material engagement*.

2.6 Thinking *with* and Through Clay

We started this chapter by drawing a line. I have used this minimal creative gesture as a means to rethink the boundaries of the mind from a material engagement perspective. I now turn to a different example of creative action: ceramics and the craft of pottery making. The morphogenetic plasticity of clay offers a paradigm case for the hylonoetic field. Pottery making can be used to exemplify the entanglement of mind and matter, allowing us to ask questions about what the clay and the human hand can do when acting together in partnership. How do they relate and connect to each other? What do they affect? What do they become? What do they bring forth?

Close participant observation of the potter's hand allows us to attend the transactional logic of active touch and creative gesture.[34] This will help us to make some progress with our questions about how are things related to thinking and what kinds of marks are marking the mental? For specific examples, I draw on my comparative anthropological and ethnographic study of pottery making in Greece.[35]

Look at the image of the ceramic vase that is being formed by the hands of the potter on the wheel in figure 2.3. Try to visualize, to the extent that the image and previous experience allows, the flow between the hand of the

Figure 2.3
Pottery making as a process of thinging.

potter and the affordances of clay on their way to produce form. The image depicts what Whitehead would call a *processual event* in the making and life history of this material form. The plastic form on its way to the kiln exists somewhere in-between the states of matter and form. As we discussed in chapter 1, it preserves enough stability to be identified as a specific form. Still, it retains its plastic nature, which means that it is open to further change and transformation.

Where does the thinking of the potter end and the forming of clay begin? What is the boundary that separates pure mind-stuff from the nonmental physical stuff? Different, perhaps more general, versions of those questions have been raised in different fields of activity. Still, when trying to answer them from the inside perspective of a participant observer, they lose their meaning. The reason for this is simple: These questions, although deeply sedimented in modern thought, nonetheless rest on certain implicit assumptions about the nature and boundaries of human intelligence that are fundamentally untenable at the level of mediated action. As we discussed, traditionally, the received view of the human mind has been that of an internal

brain-bound device operating primarily by constructing and manipulating internal representations of the outside world. This so-called cognitivist view of mind has been challenged and is changing, but it remains the norm still. Yet, cognitivism is certainly falsified by what we observe when we actually study pottery making, where clearly throwing and thinking are inseparable (see also chapter 9). It is simply wrong to assume that, in the case of the potter, there is a natural demarcation line for separating pure mind-stuff from the clay and all the other inanimate material-stuff that surround his body. Instead, what we see is a process that is profoundly embodied, situated, and assembled from a variety of non-localizable mental resources and skills, spanning the boundaries of the individual brain and body.

Let's take a closer look at the process to see what is really at stake here. Consider the following questions: What makes possible the growth of material form out of clay? What kind of bodily processes and mental recourses are involved? The usual answer would be something along the following lines: We start with the potter's intention to produce a specific form. Then, the intention is translated into a sequence of relevant motor commands. The motor commands will, in turn, generate a sequence of proprioceptive, tactile, and visual events. Eventually, the form of the vase will emerge as a consequence of those events. Notice in this traditional representational account not only the directionality of the process from mind to matter but also the total disregard of the material properties and affordances of the media involved. What, then, if one is to take seriously the materiality of mind-stuff? For instance, the effects and affects that they have on the temporal structure of the potter's experience.

Look again at figure 2.3. One simple way to describe this image is as if it is depicting a series of sequential events that can be seen, and talked about, as isolated occurrences, each happening one after the other, occupying a moment in time. But in reality, what may seem in the image to be a causal sequence of linear events is rather a dynamic nonlinear continuous process. Importantly, inside this process, each of the depicted events far from being static or isolated is extending in time, encompassing retentions from previous states in the past and protentions from the future. There is temporal as well spatial continuity that unites those events. However, phenomenologically speaking, those processual events are not identical: one cannot represent or substitute the other, although they all may stand, in some respect, for the creative process as a whole. Moreover, those single events, although

continuous, do not add up to a single linear process. Rather, they are non-linearly related. Relatedness, as an active process, is prior and dominant over beingness, as a passive state.

Even within the narrow temporal limits of this snapshot, every component of the process (biological or non-biological) is continuously influencing the other's action potential. Nothing of what we see and observe here, from the perspective of either a participant observer (the anthropologist) or the observed participant (the potter), supports or can be accounted for by means of the usual analytical divides of subject–object, mind–matter, nature–culture, and so forth. Instead, what we see and experience is a mode of becoming (see discussion in chapter 4). That is, we see a flow of energies within and between varieties of materials. This is how energies are being transformed into agencies. What we call an *agent* refers to a momentary gathering or anchoring of several perspectival qualities that varies with time and cannot be in a fixed state a priori.[36] The potter's skill lies precisely in discovering the right balance of agency for each specific stage in the process of form making. The creation of a new form on the wheel brings about a reworking of the potter's imagination and ways of seeing, as well as a new understanding of the agentive capacities and vitality of clay.

As a consequence of that, it can be argued that the form we see emerging in the picture is not the result of human intentionality. Rather, material form is folded into the mental by means of prehension. I borrow the term *prehension* from A. N. Whitehead[37] to describe the affective binding power of hand making by which all the different microscopic or macroscopic occasions or events remember and influence one another but also select what aspects of past events will become the ingredients in shaping the future events and thus the actual realization of form. In that sense, prehension describes the temporal binding and the material consciousness immanent not just in the potter's brain/body but also in the ongoing creative engagement of biological and non-biological materials, energies, and surroundings. Prehension, in other words, is a metaphysical partnership of heterogeneous elements with emerging experiential content—that is, a feeling of and for clay.[38] I use the expression *feeling of and for clay* to designate the phenomenological depth and vitality of this creative tension between the potter's absorption in and submission to the material and the parallel active exploration and improvisation with the material. This feeling of and for clay comprises not only what the plastic form of the vase that we see emerging in figure 2.3 remembers

or forgets about the previous moments during the process of its becoming but also what it anticipates about its future as a potential object—namely, a vase. The form is a memory of these interactions. How can we understand in a new way the growth of this specific form out of clay? From what we have just described, it seems that prehension operating through the hand of the potter must be responsible for the act of making. However, the potter's intentionality is not inscribed on the clay. Rather, it largely derives from and is partly made of clay. The form we see emerging in the picture is not the result of human intentionality. Rather, material form is folded into the mental by means of prehension. That is to say, the form of the vase enfolds in its constitution the totality of the forces, energies, memories, skills, and relations of which it is the momentary outcome. It is as if the potter's intentions inhabit the clay, and the affordances of clay bring forth the potter's intentions. When I say that material form is folded into the mental by means of prehension, I describe this mutual responsiveness and inseparability of mind and matter during the course of this creative transaction of the potter with the clay. It is as if the potter's intentions inhabit the clay and the affordances of clay bring forth the potter's intentions.

Our example of pottery making helps us to rethink the creative tension of form and flow in a way that escapes the old ontological splitting between matter and mind. The mind is not imposed or opposed to matter. Rather, mind and matter merge together in the activities and experience of the situated bodies that carry forward the process of thinking. What we see is not mind or matter, nature or culture. Instead, it is a way of thinking and feeling with and through the soft clay. The long division of internal and external components is no longer necessary. Action is not in the brain, nor is it the brain that guides and produces action by telling our bodies when and how to move. Instead, the brain, like the rest of the body, is the instrument of action, albeit an instrument especially attuned to the complexities of the human lifeworld and the pre-reflective structure of experience. This is not to say that complex neural activations patterns, often associated with specific brain areas, are not an important and identifiable part of bodily movement and its rhythmic coordination. Rather, it means that those neural activations and action potentials have no priority over the sensorial dimensions, bodily movement, and prostheses that make a specific form of bodily action possible in a given lived space.[39]

One may protest that the handling of clay, even in sculptural ceramics, is not sufficiently representational to count as a paradigmatic example of human thought processes such as memory, imagination, and creativity. However, I argue that the throwing of a pot on the wheel gathers, in a single continuous act of material transformation, all the basic processes that phenomenology and cognitive science take as their object of study.

There is no deficiency of higher intelligence in pottery making. Quite the contrary, pottery making, like the rest of human arts and crafts, bring forth, enact, and re-create precisely the form of intelligence that drives human cognitive evolution. It is not the movement of clay that is lacking creative consciousness, memory, or imagination. Rather, it is us, modern detached observers that often lack the ability or the appropriate participatory methodologies to follow that movement and to understand the cognitive life it entails.

2.7 Conclusions

Phenomenology and the cognitive sciences have long reached an agreement that mental events do not occur in a vacuum or some a priori metaphysical space. They are better described as components of our lived experience, the skills and capacities of our bodies. New embodied and enactive frameworks are pushing this idea even further, changing the way we think about the mind.[40] Still, radical or not, those frameworks remain largely undecided about how exactly to delimit those living occurrences of mentality from their surrounding material environment and how best to understand their material bases.[41] For MET, the question of what things are and the question of what minds are inseparable. The main contribution of MET is precisely to change the way we think about the relation between cognition, affect, and materiality or else the co-constitution of people and things. We are used to thinking about things as inert and passive. MET sees things as dynamic, perturbatory, mediational means whose presence has the potential of altering the relationships between humans and their environments. New artifacts create novel relations and understandings of the world. New materialities bring about new modes of acting and thinking.

In that sense, MET diverts from any ontology that prioritizes subjective experience over situated action. The human capacities of agency, memory,

and imagination are seen as distributed material processes extending beyond the individual. Those capacities are no longer seen to exist only in the interiority of the human brain. An ecology of mind thus emerges: one in which notions of material agency, material imagination, or material memory gain new meaning and ontological significance. Perhaps the term *material* may seem unnecessary. What would the meaning of *immateriality* be in this context? Yet, materiality matters because it refers to more than mere matter. It refers to the constitutive intertwining of mind with matter.

As discussed, a distinctive feature of MET lies in its conviction that minds and things are continuous and inter-definable processes rather than isolated and independent entities. Such a position has serious ontological and epistemological consequences that demand a thorough rethink of how we make sense of human intelligence and human becoming. The drawing of a line, the making of a stone tool, or the forming of a clay vase provide new perspectival points for approaching the enactive and material bases of human thought and selfhood. MET offers the conceptual means that allow those elementary practices and their transformations to enfold into the very process of human becoming. As a consequence of that, our conventional understanding of human nature must change—which brings us to the fundamental anthropological question that will occupy the focus of our discussion in the next chapter: What does it mean to be human?

3 *Anthropos*: Beyond Nature and Culture

> We are at ease only in the discontinuous, in the immobile, in the dead. The intellect is characterised by a natural inability to comprehend life.
> —Henri-Louis Bergson, 1998 [1911], p. 165

3.1 On Human Nature

What makes us human? The question remains open. It is a difficult question, as enticing as it is unsettling. But it is not empty. Nor should we think of it as a white canvas. Quite the contrary, the canvas's surface is full, filled with bundles of lines and swirls of drip paint. Although no permanent or clean forms are discernible, the search for them is never ending. New lines are repeatedly drawn on top of earlier ones that are never fully erased. The result is a composite of marks, a palimpsest.[1] These are the marks of humanity. The signs of the mode of being we call *human*.

Human marks come in great variety of materials, forms, and technics. Yet, their real significance is barely perceptible from a single perspective or point in time. Their making demands attentive and skillful engagement. The same applies for their identification and apprehension; they too demand concerned observation and relational comparison of traces. Rendering those marks visible—understanding what they are and what they do—has been a great challenge, especially for cognitive archaeology. No ordinary graph can depict the overlapping temporalities and agencies embodied at the cutting edge of a stone tool. No single epistemic apparatus can fully understand the varieties of affective, technical, creative, and social intelligence enacted in the making of such an edge, or delineate the remapping of peripersonal space that the use

of this edge makes possible (see chapters 7 and 9). New skills, possibilities, and responsibilities will emerge and be part of human becoming.

To make things worse, there has been little agreement on what, if any, the fundamental aspects of human becoming might be, as well as on the kinds of explanations and the types of evidence that could possibly account for those fundamental aspects we seek to understand. Moreover, it remains unclear what exactly it is that we allude, hope, or aim for when we speak of a *human nature*.[2] What does it mean to ask "What is human nature?" or "What makes us human?" Are these questions that can be answered simply by pointing at "a particular subdivision of the primate order" (i.e., *Homo sapiens*)[3] or by a list of unique biological traits and anatomical features (e.g., our opposable thumbs, bipedalism, the size of our brains, or the unique form of our larynx)? Or is there more to it than a mere question of genetic variation, genealogical proximity, and biological classification? Archaeologists and anthropologists often insist that there is. They claim that there is more than one way of being human, and they turn on the cultural and behavioral aspects of human *beinghood*. They look for answers in human creative practices, rituals, and narratives rather than in the possible genes associated with them. Importantly, they have also discovered that despite the existence of strong links between genes and culture, there seems to be nothing inherently "natural" about those links. Walking is probably the favorite anthropological example in this context (more on that in chapter 4). The links between *FOXP2* and the capacity for speech and language[4] offers another example. No universal genetic or biological feature can stand for or explain the variety of human bodily techniques and self-narratives. How can we possibly differentiate or prioritize one feature over the other? Clearly, we cannot. There is no way we can strip away culture from a human body in order to study its biology.[5] Still, this is what we do every time we think of hands as separate from tools or of making as separate from thinking.

The notion itself (i.e., human nature) reiterates a conflicting message of identity in difference and of difference in identity. This conflict, at the heart of human becoming, is an ancient one, rooted in the old pre-Socratic antithesis of the one and the many and the related opposition between *phusis* and *nomos* (what we now call *nature* and *culture*). This propensity to think in parallel dichotomies has been a pervasive feature throughout the history of Western thought. This conflict has yet to be properly resolved. Perhaps it never

will be. It resists as much as it persists. Yet, perhaps ironically, our endeavors toward answering the question of what it means to be human must be sustained, even without the slightest promise or certainty of success. One thing we can be sure of is that we can no longer hope to resolve the issue by appealing to an essence (logical, metaphysical, cultural, or biological). Clearly, any essentialist conception of human nature must be rejected. The idea that a unitary species-specific essence exists that unites individual human beings (past, present, and future) must be abandoned. Essences work for entities that remain immutable and unchanged. Paradoxically, human nature is unlike anything of that kind.[6] Humans never stop, nor have they ever been stable or passive enough to be predefined as essences. Human nature cannot be fixed. Rather, it constantly becomes. Even when it appears stable, it gathers momentum. The mode of being we call *human* refuses to hold still. Moreover, as we change, the meaning of human nature changes with us. Its openness is its beauty. This constant transformation is also what kept the question of what it means to be human alive down the centuries. Think of it as a gift to human imagination. It compels the recipient to reciprocate.

Archaeology and anthropology, for their part, have been wrestling for too long with this question, trying to make sense of how our evolved human nature become differentiated into the cultural multiplicity we see today. Generally speaking, there have been two major ways in which the issue has been approached. One way has been to focus on differences, seeking to understand what makes humans unique—both from nonhumans and from one another.[7] The second way has been to focus on similarities, seeking to uncover the common traits (biological, cognitive, or behavioral) that humans share with other living things. The latter approach puts emphasis on continuities, the former on discontinuities.

Closely related and equally debated is the issue of enculturation and enskilment.[8] This relates to the role of culture in the origins of human diversity. The concept of culture—its use and meaning in the determination of what counts as human[9]—has been a central concern in all strands of anthropological research (biological, cognitive, sociocultural, and philosophical). Unfortunately, and despite numerous claims and evidence against it, the sterile opposition between nature (representing that part of our physical body we are born with) and culture (representing the different ways we learn, educate, dress, discipline, socialize, inscribe, feed, enhance, punish, mutilate, adorn,

or otherwise modify, transform, reconfigure, and supervene upon our biological body as given) is one that haunts all disciplines concerned with the study of what makes a human being a human.[10]

Still, the hard question, like anything that is interesting in human becoming, remains in the middle: How exactly can a unified human nature be reconciled with the pronounced diversity and malleability of human social and cognitive life? No single cultural attribute ever succeeded providing a behavioral signature of our species. Nor is there anything in our genome that provides biological signature, even less proof for us having any special status among other life-forms. Perhaps, then, we have been thinking about human nature in the wrong way. Is there another way? In this chapter, I propose that there is. The question "What is to be human?" must change from being about the nature of human beings into being about the modes of human becoming: we should be asking, "What mode of becoming are we?"

3.2 From Kinds of Being to Modes of Becoming

A good point of departure in trying to dissolve the problematic ontological split of nature and culture and the divisive epistemology that come with it is to admit, with anthropologist Philippe Descola, that these notions (i.e., nature and culture) denote nothing more than a particular modern way "of carving ontological domains in the texture of things."[11] Descola uses, instead, the term *worlding* to describe the stabilization or piecing together of ontological domains using available environmental affordances—features, qualities, and relations—actualized by humans in specific situations.[12] We should also recognize, this time following Tim Ingold, that human beings and their capacities "are not prefigured in any kind of specification, genetic or cultural."[13] As we will discuss in chapter 4 using the examples of walking and cello playing, skilled material practices and modes of engagement are no more the operations of an enculturated mind than they are evolved bodily capacities designed by natural selection. Humans and their skills are mutual developmental achievements. They are emergent properties of a situated body positioned within a field of hylonoetic relations (its material environment). Contrary to the deeply entrenched modern bifurcation of mind and matter, humans can be better described as "a continuum of human-prostheses inter-relations."[14] Instead of seeking a stable foundation

of essences or human traits upon which to juxtapose a natural and a cultural domain of existence, we must shift our focus to the middle space of situated material engagement. This is a lived space made of bio-psycho-socio-material processes[15] that are inseparably natural and cultural.

I emphasize those complex issues of our common humanity and variation because, on the one hand, they illustrate the conventional conceptual divisions upon which discourse on what it means to be human has been grounded and, on the other hand, they highlight two important premises about the human condition that provide the meta-theoretical foundation of this book. The first premise is that the mode(s) of being we call *human* are firmly situated *in between* the imposed notional frontiers of nature and culture. Humans are not mere creatures of either (i.e., of nature or culture). Human beings are both *species* beings and *self* beings. Humans are species beings as evolving animals belonging to a species. Humans are *self* beings as evolving persons (individuals or dividuals) belonging to specific historical and socio-material situation.[16] The second and related premise is that both descriptions of human beings (individuals of a species and persons) essentially represent different aspects of the same process (i.e., human becoming) and thus both are needed if we are to understand what it means to be human. Human beings, seen as a selfbound lifeworld, can no longer be merely described either as species (i.e., the natural product of biological evolution by means of natural selection) or as persons (i.e., the cultural construct of social interactions). The way we understand and pose our question about the nature of human beings has to be recast. We should replace notions of nature and culture with that of human becoming.

As we briefly pointed out in chapter 1 using the analogy of a clay vase, human becoming should not be confused for the evolutionary transition from nature to culture realized through a series of adaptive responses by which we came to be the kind of species we are between a hundred thousand and three hundred thousand years ago. Human becoming, instead, denotes a process of ongoing transformation. People are STRANGE, a situated transactional process realized at the intersection of nature and culture or, better, *beyond* nature and culture. Humans achieve this relational ontological standing primarily by means of creative material engagement. This will be fully exemplified in the next chapter. Here, I want to examine how those premises point out a possible way to reformulate and to better understand human consciousness.

3.3 Human Consciousness as a Remarkable Complication

As we already pointed out at the start of the book, from an evolutionary perspective, consciousness, in the most rudimentary sense of responsiveness to the world or ability to make local distinctions or discriminations about it, is something that potentially all animals and forms of organized living matter have.[17] One could think also of the various instances of individual recognition that occur when one organism identifies another according to its individually distinctive characteristics.[18] I mentioned briefly the immune system as a minimal form of self/nonself discrimination, and we can also refer to Peter Godfrey-Smith's example of an earthworm to illustrate how widespread the basic distinction between self and other can be.[19] In particular, an earthworm seems able to differentiate when its body is touched by "other"—a potential threat causing it to withdraw—from when its own body crawls forward, causing part of it to be touched—no reason to withdraw or "it could never move."[20] Similarly, many plants appear able to differentiate self from nonself neighbors, growing fewer and shorter roots in the presence of other roots of the same individual.[21] This fundamental process of identity formation, in the case of many animals, gives rise to a minimal form of consciousness: the lived experience or feel of what it is like to be that lifeform. "What is it like to be a bat?" the philosopher Thomas Nagel asks in his famous essay.[22]

However, and hence the complication I mentioned, the human variety of consciousness we call *self-consciousness* presents an interesting anomaly along this continuum of sentient lifeworlds. Although other forms of organized matter are immersed in experience without reflecting about it, with humans, experience becomes explicitly conscious of itself, the object of one's own attention or reflection—that is, it becomes self. For many other animals, there must be something that it feels like or it is like to be that animal, but only humans explicitly own or relate to that phenomenal experience in a self-specifying sense. Humans not only feel or experience "what it is like" to be in the world, they also remember, own, and actively seek to know, to change, and to understand their phenomenal consciousness.

Humans are STRANGE creatures for whom existence (being) is not a given but a problem. What I mean when I say that existence is a problem is that, for humans, self-experience is not just a matter of fact but also a matter of concern. Concern about self-experience brings about the realization of

its inevitable demise—thus, a double bind between the awareness of death and the need for living.[23] The human mode of being embodies knowledge and concern about death.[24] Nothing about human cognitive and social life makes sense except in the light of this peculiar fact of self-consciousness. As I pointed out in chapter 1, the basic premise that I think nicely draws out what lies at the heart of the matter is this: All humans are anthropologists by default, in that they are bound to be conscious participant observers of their own "beingness." To put it simply, humans don't simply exist. Rather, they have made existence—both their own existence and the existence of the world and others—the object of attention. I do not mean that in a separatist sense. Attention here does not imply or presuppose representational detachment and alienation from the world. On the contrary, it provides the necessary basis for our participation and concerned observational engagement with it. Mind and matter are bound together to form a suprapersonal perspectival identity or what I define as the situated person perspective (see chapter 9).

With humans, the immanent materiality common to all modes of existence acquires self-consciousness. Not only do humans act in, on, with, and through their material environment, but they also develop the sense of permanence and identity in time that allows for self-becoming. This entanglement of human becoming and self-consciousness is not an all-or-nothing phenomenon. Rather, it has various aspects. We should think of it as a continuum of consciousness. It is, by definition, also consciousness of and for the other—that is, social consciousness. Humans are aware that they live among and along with other sentient beings and agents, humans and nonhumans, in the world. Self-consciousness also leads humans to act altruistically, benefiting others at a personal cost.[25] Importantly, the "other" is not necessarily human. Other-than-human creatures and entities are equal parts of our social universe. Evidence from anthropology, as we shall see in chapter 7, shows that, in many societies, animals are believed to form communities like those of humans. Descola, to give one example, describes how the Achuar Indians of the Upper Amazon "treat plants and animals as persons endowed with a soul identical to the one they possess, thus opening the possibility of establishing social relations with them."[26] Similarly the Jivaros and the Tukanos, also from Amazonia, categorize humans, plants, and animals as "people" (*masa* in the Tukano languages) or as "persons" (*aents* in the Jivaro languages).[27] This attitude is by no means exceptional. On the contrary, it is a

common feature of many so-called animistic societies, ranging from Amazonia and the Indians of Subarctic Canada and the Inuit to the Siberian peoples as well as those in South-East Asia and Melanesia (for a more detailed discussion, see chapter 7). Indeed, it is not uncommon that many nonhuman animals will be treated as persons.

The skeptical reader will surely respond that the fact that the Achuar Indians speak or treat plants and animals as persons does not mean that they are. But as we shall see later in the book, the debate over the ontological status of nonhuman persons has advanced beyond the mere admission of cultural relativism. Suffice it to state for now that there exists a rich tradition in anthropology, ethology, and comparative animal studies focusing on the question of animal selfhood. The notion of the other-than-human-person[28] (see chapter 7) offers a characteristic example of the former anthropological tradition, whereas the mirror self-recognition test[29] in animals provides the central methodology of the latter tradition in comparative animal cognition. Unfortunately, and rather paradoxically, the two traditions have very little to share and are usually talking past each other. Of course, there are important differences in the exact nature and meaning of self-recognition implied—either in the context of animistic ontologies, which is the domain of anthropology, or in the context of naturalistic ontologies, as expressed, for instance, in the case of mirror self-recognition experiments in animal psychology. But these differences do not render their perspectives incompatible. Self-recognition in different animals has to be different because their action affordances, abilities for sensemaking, and environments are different. As Von Uexküll describes using the example of the spiderweb: "In the spider's Umwelt the web represents a meaning-utilizer of the meaning-carrier 'prey.'"[30] Different animals engage with the world differently through their particular *umwelt*. They also engage with the world differently because their bodies are different. Different bodies sense and move in different ways. Different movements and sensations provide different possibilities of action and interaction—think of the dance of a bee or the movement of an octopus.[31] Different actions and interactions produce different kinds of lived experience and intelligent life.

Specifying what exactly the meaning of the word *self* is in animal self-recognition remains a matter of debate within and between comparative cognition and anthropology.[32] The problems are more complex than either side has generally appreciated. They also depend on what exactly we mean

by *difference* here and what kind of metric system we use to measure brains, bodies, and selves. Maybe existing scales and metaphors are not a good way to express the issue at hand. As mentioned, the separatist logic that ascribes a special status to humans, discriminating against other forms of organized matter, must be rejected. However, I suggest that the growing—at least in some circles—attempt to homogenize and reject any distinction between the human and the nonhuman must be resisted. Talk of self-consciousness in other species remains heavily constrained by our anthropocentric bias toward animalizing humans and humanizing animals—what the neuroscientist Raymond Tallis calls the "fallacy of misplaced explicitness."[33] Such an uncritical and rather unqualified use of animal selves not only cancels the proposed symmetry between human and other-than-human-persons by turning it into a mere isomorphy but also fails to address the question that, in my view, matters the most: What does it mean to be human in a context where other-than-human organisms are recognized as persons?

The question of whether other animals and nonhuman entities should or should not be seen as selves is relational and situational. On the one hand, anthropological discourse on other-than-human-persons forcefully argues for a radical perspectival understanding of selfhood. On the other hand, as already discussed, we cannot deny that we have many cases where other animals have been shown to recognize themselves in mirrors or to demonstrate behaviors indicative of some aspects of self-identification. By the same token, discussion of consciousness in other animals should be careful not to exclude the possibility that self-consciousness may well emerge as part of that animal's becoming and evolution. We should not forget that, as recent developments in the study of comparative cognition suggest, only very minor differences in neural circuitry (often action based and practice led or induced) might be needed to generate major shifts in cognitive attributes. Moreover, the possibility of convergent or parallel evolution needs to be taken seriously.[34]

Many human and nonhuman attributes form a continuity and are thus comparable. It is because we can now see the profound similarities between humans and animals that we are allowed and able to think in a fresh way about their differences. That also implies that any assumptions about human preeminence must be rejected. Continuity and comparability provides what Gregory Bateson would call "necessary unity" or else a "pattern that connects."[35] Still, the ontological and, in some cases, also genealogical proximity

between humans and animals should not be confused with identity or be a reason for masking or negating their alterity. Otherness should not be feared or suppressed. Instead, it should be highlighted. Above all, it needs to be understood for what it is. Hiding from discussion of species-peculiar features is also a form of latent anthropocentrism that often leads us to ignore forms of intelligent behavior that come from organisms very different from ourselves. In particular, by depriving humans of their unique features, we also deprive nonhuman animals of their own forms of uniqueness, which may be radically different from the human ways and capacities we often take as the natural measure of intelligence.[36] Intelligence or mind is a species-specific term that cannot be defined a priori or ranked in relation to its proximity to humans. Octopuses, to give one example, despite having an evolutionary lineage radically distant from that of humans, with little social life and no evidence of tool-related behaviors, seem to have developed their own unique emotional intelligence, famously expressed by changing color.[37]

3.4 Understanding Human Uniqueness

The overarching working hypothesis of this book is that although all animals are intelligent and have basic consciousness—one may wish to extend that to include different variations of vital matter, ranging from the Greenlandic all-pervading environmental force of *sila*[38] to artificial intelligence (AI) or complex systems that exhibit life-like behavior—only humans are selfbound. The human variety of consciousness instantiates and enacts a self-designating ontology of becoming. Not only do humans, as attentive beings, have consciousness of their being in the world, they are also capable of changing the course of their becoming by means of creative material engagement. The human capacity for creativity adds another species-specific peculiarity to the study of self-becoming. The guiding idea is that humans display a self-bound mode of creative becoming. The following chapters will try to illustrate exactly what this difference entails. First and before going any further, I should discard a possible misunderstanding.

Understandably, recognizing the distinctiveness of human consciousness can easily be misinterpreted and subjected to criticisms as favoring human exceptionalism. The price for studying self-consciousness is risking being accused of adopting an anthropocentric view of sentience—one in which human subjectivity occupies a special place over and on top of all

other-than-human creatures. I want to clarify that such a re-centering of human consciousness is unnecessary and quite the opposite of what I am proposing in this book. The way I intend to reclaim the distinctiveness of human consciousness within the continuum of sentience is by following a decentralized non-anthropocentric approach.

It will become clearer as we progress in the book that the uniqueness I talk about denotes distinctiveness and difference and does not imply discontinuity or human exceptionalism—not, at least, in the usual forms of human superiority, metaphysical essentialism, or divine intervention. It does not necessarily imply any conventional form of continuity either—not, at least, in the classical Darwinian sense, where differences between species are only of degree and not kind—or privilege one kind of continuity over another. I think that questions about continuity or discontinuity are inherently imprecise and potentially misleading. They wrongly assume that we can readily determine that there is some general fundamental difference or similarity between humans and other entities (human or nonhuman). This presupposes that we have some clear criteria and sufficient evidence to determine when two types of entities or processes are sufficiently different or similar to be named respectively as being discontinuous or continuous. I suggest that everything in the world is both continuous and discontinuous relevant to some aspects (e.g., genealogical proximity). Moreover, this generalizing logic does not allow the possibility that two previously discontinuous types of entities might become continuous and vice versa.[39] A lot of research on human evolution these days, trying to conform to the ideals of neo-Darwinian theory, runs the risk of misrepresenting this tension between our evolutionary continuities and discontinuities. I cannot emphasize enough that in studying human and nonhuman consciousness, we must pay equal attention to both their specific differences and perceived similarities. Similarities can only emerge from differences and differences from similarities. Emphasizing the one over the other should be treated as a methodological decision. None of the two pathways should be seen in itself as more valuable or free from the usual anthropocentric biases and anthropomorphic constraints. Likewise, when it comes to understanding human becoming, the fact that we share almost 99 percent of our DNA with the common chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*) is as important and informative as the 1 percent of our difference.[40] It all depends on the exact nature of the question or issue we are trying to understand. There is no exact measure for continuity or diversity.

Are humans unique then? In this book, I propose that indeed they are, but I mean that not in the obsolete anthropocentric sense where humans stand opposite and over and above everything else in nature. Rather, humans are unique in the way that all organisms are unique—that is, in their species-specific ways of becoming and making sense of the world. The meaning of the term *non-anthropocentric* can also be easily misunderstood in this context. So, I would like to clarify that, in contrast to some trends in post-humanist thought, my use of this term does not signify a shift away from humans but, on the contrary, an even deeper reflection into the conditions and possibilities of human becoming. As I also mentioned in chapter 1, if I call my approach non-anthropocentric, it is because of my contention that for the question of human consciousness to retain center stage at the level of discourse, the ontological foundation, our analytical units as well as the ways we set out answering that question must be thoroughly decentralized. I adopt a non-anthropocentric approach not because I believe that *anthropos* should cease from being the center of attention, abandoned or give way to a new post-human state of becoming. Instead, I adopt a non-anthropocentric approach because of my conviction that decentering the human to its natural in-between state of becoming and incompleteness is our only means of understanding it.

Such an approach provides a secure foundation for identifying difference by reconceptualizing the unity and continuity of mind and matter as well as the different meanings of their interaction without implying any injustice to other nonhuman sentient beings. Making distinctions was never the problem. Ensuring that you adopt a framework that allows you both to construct and hold onto distinctions that are valuable and to discard those that distort the ontology of the phenomenon you seek to understand (i.e., *anthropos*)—that was always the major challenge. It remains so still.

In other words, I am using the term *human uniqueness* to designate primarily difference, otherness, or alterity. This difference should be understood in the active open sense of species embodiment and not in the passive closed sense of species membership. Humans are not different because they belong to a special kind of species (i.e., *Homo sapiens*). Rather, humans are different because of the way they become. Human becoming, as a process, has primacy over human being as a category.[41] The noted human capacity to specify ourselves does not signal a break from the self-organizing features of life but rather the emergence of a new creative and self-conscious form

of intelligence. The human habit[42] to know ourselves and the varieties of social skills and techniques that come with it should not be thought of as an invisible force that pulls us outside nature in order to throw us inside some elevated cultural plane of personhood. On the contrary, it firmly places us right in the middle: where brain, body, and culture conflate.

The ontological ambiguity of this middle ground (both mind and matter, nature and culture) should be perceived not negatively but positively. It gives us an epistemic advantage. It protects us from the misleading tidiness of definitional categories and false either-or dilemmas. Inside this lived space of mediated action and sentient matter, the tyranny of the opposition between nature and culture has no power. Nature and culture no longer oppose each other. Rather, they now fold to each other, giving way to the possibility of becoming by means of enactive in/dividuation. This evolving capacity for concerned observation and creative engagement places humans beyond and above the nature–culture divide. Human uniqueness signifies this possibility: the emergence of difference in human becoming.

4 How Humans Become

In the previous chapter, we explored the question of what it means to be human. What mode of being are we? I argued that humans, seen as selfbound creative lifeworlds, can no longer be described as the products of nature or culture. The old dichotomy between nature and culture must be replaced with a deeper concern for the conditions and possibilities of human becoming. We should not be asking what kind of being we are. Instead, we should be directing our attention to the modes of human becoming. My aim is this chapter is to further develop and clarify the meaning of human becoming and the process of creative thinging that lies at its heart.

4.1 Process and Evolution

Darwinian evolution made it clear that, biologically speaking, humans are simply a species among others, and that whatever distinctive or anomalous features humans may seem to enact and embody, we are, nonetheless, the outcome of a process of evolution. Of course, there are many ways to understand the meaning of the terms *process* and *evolution*.

One major assumption of this book is that humans do not simply evolve. Rather, they become. The use of the term *becoming* signifies an important shift in perspective from entities, types, and objects into processes, events, and actions. Becoming is always becoming *with* and *through*. It speaks of the human condition as world involving, material engaging, and relational (constitutively open). Becoming signifies a process ontology able to accommodate the different modes of being and forms of human participation.

This description of human becoming is not exactly the familiar picture of "descent with modification" by means of natural selection that we see

depicted in Darwin's classical works *The Origin of Species* and *The Descent of Man*.[1] For one thing, the role of humans in Darwinian selection is passive; adaptation is asymmetrical—humans, like any other organism, adapt to their environment, never the other way round. In contrast, human becoming is transactional. It brings forth the process of change by actively altering the "landscape of affordances."[2] Humans undergo situated ontogenetic histories leading creative, self-aware, and social lives. Notice also the use of the present tense: evolution is not of the past but rather ongoing.

Interestingly, the majority of researchers who subscribe to neo-Darwinism (sometimes also called the *Neo-Darwinian synthesis*) would claim that this evolutionary process that made us the kind of beings we are is long completed. Sometime between a hundred thousand and three hundred thousand years ago, our genetic organismic makeup was fixed and our elevated place in the apex of the evolutionary ladder secured—the exact timing and sequence depends on whether we are focusing on anatomical, cognitive, or behavioral modernity.[3] This huge evolutionary accomplishment allowed us to disperse and vary by means of culture, launching ourselves on the path of history. It also signified the moment when the split between nature and culture was born—haunting us to this day.

In this chapter, I make a case against this vision of humanity as complete and fixed and the concomitant neo-Darwinian ideals about the origins of human modernity (anatomical, behavioral, or cognitive) that it entails. The view that I defend is that if there is any true universal about human mind, it must be its openness to transformation and variation. The meaning of both terms should be understood in the strong process sense of ongoing change or becoming.

This is not to deny the existence of genetically guided structure or biological constraints. There is no form of life (human or nonhuman) that develops in a manner that is free from and unconstrained by past evolution. To argue for such freedom from the conditions of life would be to contradict the very idea of situatedness and the process ontology of becoming that constitute the conceptual foundation of this book. Clearly, human beings are all member of the species *Homo sapiens* based on their close genealogical connection and reproductive compatibility. However, it must be emphasized that those evolutionary and biological constraints determine and control very little—at least in the common sense and use of those terms. The job of those evolutionary and biological constraints is not to determine and control. Rather, their job is

to provide the conditions for a relational ecology of bodily action—capacity "to affect and be affected."[4] Even if it were the case that certain aspects of human behavior were under genetic control, these controlling genes have themselves been selected as a result of prior niche-constructed changes.[5]

A common fallacy when we think about human biology is to assume that form (organic or artificial) existed before the processes that give rise to it—that is, to think of the processes of growth and making as the transcription of a preexistent form coded in some abstract genetic or mental domain to the material domain of the physical world. However, genomic analyses have shown that only 1.2 percent of the genome is devoted to protein coding sequences (the most commonly invoked definition of genes). Most of the remaining sequences are employed in regulation—that is, in responding to and interacting with the immediate and distal environment. The original aspirations of genomics and the Human Genome Project for finding the whole organism in its DNA sequence gradually give way to a very different post-genomic vision of the genome "as a reactive system than as a collection of genes guiding and controlling the development and survival of the organism."[6] Genes are not important for what they code and determine. Their importance is, in fact, co-determined by the developmental pathways that they afford in real ontogenetic time.[7] Evelyn Fox Keller's musical analogy of the mRNA transcript adopted from her book *The Century of the Gene* nicely illustrates the heart of the issue: "The problem is not only that the music inscribed in the score does not exist until it is played, but that the players rewrite the score (the mRNA transcript) in their very execution of it."[8]

Within evolutionary biology, the new constructive paradigm of extended evolutionary synthesis[9] (EES) allows us to see development as a dynamical process free from the conventional directions and constraints of a genetic program "laid down in the blueprint of the DNA genotype as instructions or potentialities."[10] The traditional metaphors of "blueprint" and "program," as found in early formulations of the evolutionary synthesis,[11] gradually give way to the dynamical vocabulary of EES that allows us to see organisms as exploratory, constructive, and open-ended processes: "Organisms are not built from genetic 'instructions' alone, but rather self-assemble using a broad variety of inter-dependent resources. Even where there is a history of selection for plasticity, the constructive development perspective entails that prior selection underdetermines the phenotypic response to the environment."[12] This recognition—that the relationship between an organism and its relative

niche can be modified and that those alterations matter to the evolutionary process—also highlights the significance of variations in the material environment. Especially when seen from a material engagement theory perspective, our material surroundings not only influence our cognitive abilities and affective responses from the very beginning but also shape the form and the constitutive mechanisms of interaction—thus, the primacy of material engagement in human becoming.

None of the empirical phenomena people often describe under the headings of human biology and human culture—not even the most basic human actions and movements—make sense, or even exist, in isolation. Human becoming has always been inseparably linked with the developmental contingencies of action. No bodily activity—not even our basic capacity for bipedal locomotion—is immune to the situated dynamics of real-life ontogenetic development. As the anthropologist Marcel Mauss neatly pointed out in his famous essay on bodily techniques, there is no natural way to move our bodies.[13] But I suggest it would be equally wrong to think of bodily movement as an isolated culturally induced phenomenon. There is no natural or cultural way to move our bodies. I am not saying that there are no aspects of bodily movement that can be accounted for by means of biology or social learning. What I am arguing is that a moving or acting human body in real life enacts in a combinatory interactive fashion a variety of aspects or features that cannot be explained in isolation. Instead, we should think of the acting body as a relational developmental achievement of situated material engagement. In chapter 9, I offer a more detailed treatment of the meaning of situatedness and the situated body using insights from my anthropological work in pottery making. What I want to do here is to stay with the example of walking and contrast it with a more recent and less common skilled practice: cello playing.[14]

4.2 Reflections on Walking and Cello Playing

Walking is generally regarded as a species attribute: the natural product of the long evolved ability for bipedal locomotion. Cello playing, by contrast, is perceived as a cultural skill: something that people learn, especially if they belong to or are interested in the European musical tradition. So, what is it that we take as natural about walking? What is it that we take as cultural about cello playing?

As mentioned in the previous section, one of the first anthropologists who set out to answer the former question in a systematic manner suggested that actually there is no natural way of walking.[15] This simple observation that Marcel Mauss made in his famous essay on bodily techniques continues to challenge our understanding of the natural or cultural status of our basic bodily abilities. Humans are not born walking, and they do not all walk in the same way. For instance, in Japan, Mauss noted, people "walk from their knees," and in Europe, people tend to "walk from their hips" keeping the legs straight. How exactly, then, should we understand the relation between human varieties of walking and their basic capacity for bipedal locomotion? A common way to answer that question is to see bipedalism as an evolved universal capacity passed on to the human body by the genes, and the local varieties of walking styles as culturally acquired supplements to this universal capacity. But there is another way to describe this—that is, to see walking essentially as a skilled practice, incorporated into the human body within a specific material environment that includes caregivers and a variety of scaffolds.[16] Different environments and practices will afford different ways of walking. Different ways of walking will construct different bodies.

So, what is the difference with cello playing? Here is how Tim Ingold responds, drawing on his personal experience of learning how to play the cello:

> This, too, is a bodily skill, likewise established through practice. Of course I had a teacher, and we may say colloquially that my teacher passed on his skills to me. What he did not do, however, was *transmit* them to me, as advocates of the orthodox view would say, by *non-genetic means*. He did not send me abstract, decontextualised messages, encoded in symbolic media, specifying rules of play which I had then to execute in my performance. He would rather place my hands around the bow, and my fingers on the fingerboard, so that I could experience for myself the relation between the movement of my right arm and the vibrations of the strings, and between the muscular tensions in the left hand and the resulting intervals of pitch. My ability to play the cello was not transmitted to me any more than was my ability to walk. I grew into it.[17]

The vision of skilled practice emphasized in this passage is crucial for the argument of this chapter. Our ways of engaging with the cello and the processes that allows our minds and our bodies to do that skillfully are as much the product of practice and experience as they are biological facts. Playing the cello, as a bodily skill acquired through practical experience in an environment, "is every bit as 'biological' as walking on two feet."[18] Skills and

technics are not cultural additions to biological universals. Rather, they *are* themselves expressions of human life and difference.

The long-held independence of the cultural and biological bases of human life and variability upon which a host of dichotomies in archaeology and anthropology are based should be put in question. Human becoming is a shifting point of the intersection between development and evolution that is realized in specific situations through specific bodies as they engage with specific aspects of the material world. None of the usual abstractions (genetic or cultural) can account for this process. The genome can be conceptualized in many ways, but it cannot explain walking, just as it cannot explain any other skill or mode of becoming.

The source of the problem, as Tim Ingold points out, "is not the conflation of the cultural with the biological, but the reduction of the biological to the genetic."[19] Seen as part of human biology, our capacities to play the cello and to walk in the way we do have evolved and are evolving still. This does not mean, however, that "people from different backgrounds walk in different ways, or play different musical instruments, because of differences in their genetic make-up."[20] Nor does it make sense, Ingold continues, to suppose that these differences are due to culture that inscribes our biological bodies with intergenerationally transmitted skills.

From a material engagement perspective, the meaning of the term *body*, far from reductive and fixed, refers to the details of bodily implementation (neural and extra-neural action potentials), as those can be determined by the nature of local interactions, practices, and prostheses. As will be discussed in chapters 9 and 10, the skills needed to make a stone tool or a clay vase impose new biological and kinesthetic constraints on the human body (not just the hand). Similarly, the practices of planting and harvesting that arise with domestication, or of writing and typewriting that arise with literacy, create new biomechanical stresses and cognitive ecologies. From walking and seeing to reading, writing, and navigating the physical or digital world, skilled practices are active parts of human becoming—which is to say that humans are not "made" but rather "in the making."

4.3 Becoming Human Is Human Becoming

As I have already pointed out many times, the reason that I am explicitly contrasting notions of becoming human and human becoming is because I want

to emphasize an important change that the latter term (i.e., human becoming) brings in the meaning of the question of when and how we became human. Specifically, my suggestion is that the two notions—becoming human and human becoming—give us alternative ways of thinking about what it means to be human, which are based, respectively, on substance ontology (the former) and process ontology (the latter).

I start with the first term: *becoming human*. As I wrote at the start of the chapter, it is common practice to think of human origins as an evolutionary process—that is, to think of our species, like we do other species, as the product of evolution operating by means of natural selection and adaptation. It is also customary to think of human speciation, at least according to the "biological species concept" of Ernst Mayr,[21] as essentially a process of reproductive isolation. Evolution is what shaped and equipped us with a bipedal body, a relatively large brain, and a concomitant set of impressive social and cognitive abilities. How exactly did that happen? The simple way to answer that would be that evolution proceeds by natural selection of random mutations. That is to see variation under natural selection as the necessary and sufficient condition for explaining how human beings have evolved.

What does it mean to become human then? The orthodox way to tackle that question is to see humans as species beings defined in terms of anatomical modernity and evidenced in the archaeological record by means of fossils that are morphologically contiguous with contemporary humans.[22] Once that stable biological core is established, then the cognitive life and history of our species can begin to unfold, adding cultural variation as we spread across the globe from the place of our origin in Africa. In recent decades, the questions about the physical evolution of *Homo sapiens* and those concerning the evolution of "modern" human behavior have merged into the larger inquiry about the origins of "modern" humans. In particular, the current understanding of human origins is that of a gradual speciation event by which our archaic ancestors developed in Africa between three hundred thousand and thirty-five thousand years ago or between a hundred thousand and thirty-five thousand years ago—the actual window of this transition depends on whether it is morphological or behavioral and cognitive variation that is being prioritized.

The term *becoming human* is often used in this context to denote both the dynamism of the speciation process (the view of humanity as something evolved) and the stability of the product of that process (the view of

humanity as a distinctive and fixed evolutionary achievement/stage). These different but complementary aspects of human origins are centrally concerned with the human evolutionary process. Yet, they fail to capture the process ontology advocated in this book.

To explain this, in brief, I will point out two major problems associated with the conventional meaning of becoming human. The first problem is that in submitting to the Darwinian logic of selectionism, the term *becoming human* lost contact and eventually became disconnected from the situated nature and creative foundation of humanity. This alienation was needed if the evolving human organism was to fulfil its adaptive functions. However, it also resulted in a split between biology and culture. One part of our humanity, the evolved biological part, is treated as genetically fixed, prespecified, and inherited. Another part of our humanity, the cultural part, is treated as variable, constructed and socially transmitted/learned through a process of enculturation. Becoming human signifies that separation between nature and culture or evolution and history.

This brings us to the second major problem: Becoming human implicitly assumes there is a nonreversible trend toward modernity in *Homo sapiens*, leading from archaic premodern populations to modern ones. The notion of modernity is predicated on that assumption. Increasingly, researchers would see this trend as a gradual process of cumulative change rather than a saltational event that began abruptly or ended sharply. However, the emphasis on gradual long-term processes does not necessarily imply, and should not be conflated with, the durational understanding of time or the primacy of becoming, which are key features of process ontology. The problem of temporality that process archaeology is trying to underline does not relate primarily to the actual temporal length of the humanization process (shorter or longer). Rather, the problem is about the meaning of temporality in that process. Even if the time span of modern human origins is longer, it is predicated still on the same chronometric logic (before/after). Becoming human essentially refers to the process by which a before (archaic) stage of humanity turns into an after (modern) stage of humanity. Moreover, the process of becoming inevitably leads to the same end: the origins of modern humans. In one important and rather circular sense, then, modernity sets the preconditions of the human condition based on the inferred presence or absence of particular predefined traits. However, such a view of human origins embodies a developmental

vacuum: once modernity is reached humans no longer become. Paradoxically, becoming human presupposes the end of human becoming.

In other words, proponents of cognitive and behavioral modernity are willing to embrace change at one end—that is, the end that leads from nature to culture. At the other end—that is, the end that follows the state of modernity—no further shift is allowed. Once humans become modern, the process of transformation (genetic and extra-genetic inheritance) that allowed and drove human becoming stops. In other words, modernity deprives humanity from becoming. Evolved humans are now to persist in one stable and unifying state (i.e., human nature). Changes may still happen, but either they happen at a different level (i.e., the level we label *culture*) or they do not have the force or significance to change anything that really matters so far as human nature is concerned. Nature and culture, species and person are split. In order to bridge this gap between the organism and the person and to account for the evolutionary relationship between biology and culture, a new, albeit isomorphic, cultural inheritance process has been proposed, focusing on the transmission of cultural traits (i.e., culture evolution).[23] The evolutionary mechanisms remain the same—including invention (mutation), selection, and drift—but this time, the argument goes, it unfolds in a separate cultural realm.[24] On this construal, material culture and artifacts serve merely as proxy evidence of inheritance (and modification) of cultural traits. That is, the role of material culture can be seen, at best, as simply helping humans to realize the creative evolutionary potential of adapting the environment instead of oneself.[25]

There is some value in the latter claim, but notice the underlying assumption. Although it is agreed that humans are constantly changing, even during the course of their life histories, it is also accepted that their human biology remains largely unaltered. The changes we observe are not changes at the level of human nature. Rather, they are cultural changes that affect our individual behaviors, our social practices, and our history. In other words, the assumption is that although humans may change continuously, there is a stable underlying "essential" human nature that is immune to those changes. Those changes happen elsewhere. Once we reached that point in our evolutionary history where humans became humans, the meaning of human becoming became somewhat obsolete. Our core humanity now remains unaffected. As a result, those changes are not going to change what we are—that is, the kind

of beings we are. Instead, what is changing is how we behave and how we relate to each other.[26] To put it simply, now that our species has evolved in the familiar form that we all have, human beings are no longer becoming but merely unfolding out of preformed and predetermined innate properties. This is also why the process of becoming human stops once our species' achieves its anatomical, cognitive, and behavioral modernity. It stops in order to make possible the transition or elevation of humanity from a world confined within the bounds of nature and biological evolution into the world of culturally constructed meaning and historical transformation. Evolution stops to give place to culture and history. Herein also lies the problem and the key difference with the process ontology of human becoming: History and culture are not separate from evolution. It is pointless to think of some embodied processes such as speech or bipedal locomotion as the products of evolution and contrast them with more recent developments such as reading, writing, or cello playing as the products of history and culture.

Herein also lies the key difference with the process ontology of human becoming to which I will turn now. To put it simply, humans never stop, nor have they ever been stable enough to be predefined as essences "independently of the manifold historical and environmental circumstances in which they become."[27] In stark contrast to the process of becoming human, human becoming signifies something radically different. It refers to the human condition as an open process that can only be provisional or else continually coming into being. This is to see humans "not as species beings but as biosocial becomings."[28] The domains of nature and culture are not separate transitional points or steps toward becoming human. Instead, they form an evolving compound of material forces and energies that entangle or disentangle, allowing us to become. The process of becoming human never ends. Beginnings and endings are irrelevant; what matters is the process, the modes of human becoming. This also sidesteps the need to mark a point in time when hominins came to be modern humans—that is, humans like us living today. There is no value in separating humans into premodern, modern, or postmodern stages. We have never been modern—complete and fixed.

This radical inversion from becoming human to human becoming completely alters the terms of the inquiry on human origins. There is no becoming us; there is us becoming. "Us" is a predicate that help us to make sense of the process, to retain identity as a self-designating system; it cannot exist outside becoming. The classical question of human origins is not one of

accounting for when we become us (i.e., the completed species we know). Rather, it is about understanding the self-organizing dynamics and form-generating potentials of human becoming—that is, understanding the nature of malleability in a species that is perpetually changing and being changed by its environment and the material forms that it makes. Adopting this approach, we no longer have to posit a radical break between evolution and history or between biological and cultural evolution. Nor do we need to imagine a point of origin where the one rises up from the other. Whether we look at the stone ecologies of people living by hunting and gathering or at the digital ecologies of contemporary communities living by means of virtual connectivity, humans evolve by becoming what the forms they have made allows them to become. Naturally, there are many ways to be human—given the wealth of evolutionary, developmental, and historical dynamics and constraints crisscrossing brain, body, and world. Humanity is not genetically inherited. Rather, it needs to be realized anew in real life.

This also implies that the meaning of the traditional archaeological trait lists used as markers of human behavioral and cognitive modernity is also transformed. Take, for instance, mark making.[29] The place of marks and material signs in the evolutionary narrative of human origins (how we came to be human) has been to provide evidence for symbolic capacity (or else capacity for representational thinking). That evidence has been the best archaeological indication about when humans reached that stage or state of cognitive modernity that defines the human condition. The process of human becoming is changing that. The making and use of marks and material signs does not signify a state of modernity or the ability for symbolic representation. Rather, it provides itself a crucial semiotic mode for meaning making and creative material engagement. In that sense, the mark-making process is not a symptom or index of achieving humanity (becoming human) but rather an actual part of the ongoing process of human cognitive becoming.

So far as the understanding of human origins is concerned, the potential transformations in design thinking brought about, in the past, by the reductive/additive logic of Middle Stone Age engravings have the same epistemic value with any potential transformations brought about in the present—for instance, by the associative logic of digital drawing and parametric design used in contemporary architecture.[30] None of the two transformations in human creative practices can claim any special temporal or ontological proximity to the generative processes by which humans become. Similarly,

and returning to the examples of cello playing and walking by Tim Ingold that we discussed above, both skills relate to human becoming as equal parts of human biology enfolded in the ontogenetic constitution of a human person (at once body and mind). As we saw, they are both integral parts of an evolving human nature and a process of enskilment. That is, they are developmental achievements of the organism person, no more "the operations of a mind impregnated by culture than they are of a body designed by natural selection."[31]

There is no unchanging human nature in the form of an ensemble of discrete units of genetic information that can be assumed to be present in all cultures governing human body, thought, and action. Human becoming is never finished; it is always ongoing, undergoing creation rather than already created, or else *concrescent*—to borrow Whitehead's term.[32] Instead of the traditional question about when and how we came to be humans, the central question we should be asking is how humans become.

4.4 Human Evolution Is Creative Evolution

How do humans become? The short answer I would like to propose, as I alluded to before, is that humans become through their creative engagement with the material world. People are STRANGE. We create new things, which, in turn, shape our developmental pathways and our ways of being in the world. For humans, creativity and meaning making are existential conditions. Through their bodily movements and sensory alignments, humans create forms and material signs. They initiate paths, recognize and follow traces, measure and experience time, as well as read and draw lines and marks. Human creative labor is a fundamental condition of existence that defines the relationship between persons and things—however obscured by modern capitalist economic institutions. Joint action and material engagement bring about collective intentionality and consciousness through the distribution of labor[33]. The distribution of labor here does not refer to social differentiation among the individuals of a given community but rather to something more basic: the distribution of labor between mind and matter or thinking and making that allows the development of skills and tectonoetic awareness. The term *tectonoetic* derives from the Greek *tecton* for "carpenter" or "builder"—signifying more generally the maker and the poetic art of construction—and the word *noûs* for mind or intellect. The basic assumption behind tectonoetic

awareness is simple: A self or a person cannot emerge (ontogenetically or phylogenetically) aside from a process of material engagement. Tectonoetic consciousness should be understood not as a distinct separate stage but rather as a coupling process that grounds in action and integrates the noetic and autonoetic aspects of self.[34] The above applies to the Paleolithic hunter-gatherer and stone toolmaker (chapter 10), just as much as it applies to the twenty-first-century datafying[35] and data-mining forager of the metaverse[36] (chapter 11).

Inspired by the process philosophy of Henri Louis Bergson, I adopt the term *creative evolution* to designate this distinctive feature of human becoming. Not only is most of human thinking thinging (thinking with, through, and about things), it is also, as Henri-Louis Bergson neatly put it more than a century ago, "a manufacturing kind of thinking" (*une pensée de la fabrication*).[37] This is my point of emphasis too, and it is an important opening position in thinking about human becoming. Humans are creative thingers—that is, we have been evolving as relational beings that undergo situated ontogenetic histories and lead creative and self-reflective lives. We make new things that scaffold the ecology of our minds and which shape the boundaries of our thinking and the ways to understand the world and ourselves.

Human evolution is creative evolution. Instead of simply reproducing ourselves, we construct and transform the conditions of our own becoming. Biological heredity gives way to creative material engagement. Creative thinging is not an adaptation in the strict sense of denoting the product of natural selection. Rather, it is an important source of adaptive flexibility and variation. A simplified way to understand this is to draw the following analogy: Creative thinging is to human becoming as natural selection is to becoming human. What in evolutionary theory is described as adaptation by means of natural selection in the context of process archaeology is described as transaction by means of creative thinging. However, we should be careful not to mistake creative thinging as a form of cultural inheritance running parallel to but independent of genetic inheritance. The only way that discussion about genetic and extra-genetic inheritance (ecological and cultural) can help us explain what we see in the archaeological record is to recognize that they operate interdependently and interactively—and not necessarily analogously.

To explain, within an evolutionary framework, adaptation can be understood in two major senses. According to the first canonical sense, associated

with neo-Darwinian theories, the organism adapts to the environment, or else the organism changes in response to the selective environment. In the second sense, mainly associated with niche construction theory and EES,[38] organisms modify their own and other organisms' selective environment, or else the organism adapts the environment. Note that in both cases, although the pathways by which adaptation is achieved are different—the former being based on unidirectional causal processes to be contrasted with the latter reciprocal ones—the meaning of adaptation remains essentially the same, denoting a fit between organism and environment. Moreover, adaptation in both cases is the product of a selectionist evolutionary logic of change. In other words, adaptation is seen in the ways organisms counteract or respond to selection pressures generated by the external environment. So, although proponents of the EES would argue for organism–environment complementarity, recognizing that humans and things interactively adapt to each other, what they essentially suggest is that adaptation takes place between discrete and preformed entities or processes (human or environmental). This, in turn, assumes that these entities or processes interact (adapt) but do not participate. They do not participate because they exist before their adaptation. However, the participatory logic of creative thinging implies a different kind of interaction: one in which reciprocal causation gives way to trans-actional co-constitution. In the latter case, the casual coupling is so dense that it makes it impossible to separate cause from effect: organism and environment, body and world are coupled dynamic systems. There is no beginning or ending in that process, there is only becoming. The human that adapts the environment by mediating and regulating the flows of energy and matter is already adapted and adapting to the changing environment. All elements are affecting and affected by their participation in the interactional loop. Human situatedness entails the ontological inseparability of organism and environment or mind and matter: the two are entangled and do not exist before each other. Importantly, creative thinging is not denoting human action *on* the environment but rather action *with* and *through* it. The necessary unity between organism and environment is not one of adaptive fitness. Rather, it is one of kinesthetic semiotic attunement and skilled attentive engagement.

As already mentioned, niche construction theory, especially developmental niche construction[39] and the new trends in the extended evolutionary synthesis,[40] have well exemplified the way humans influence our developmental paths by changing, mediating, and regulating the flows of energy

and matter. However, there is more to it. A great variety of life-forms alter their material environments. But the meaning of making in human becoming is different. We are *Homo faber* not just because we make things but also because we are made by them.[41] And so long as we are made of the things that we make, it follows that humans are not made but in the making. The perpetual un- and remaking of ourselves—human becoming by means of self-bounding and enactive in/dividuation—gives consciousness a different meaning in humans from that it has in the case of other animals. This is why I argue that the term *Homo faber* should take precedence over *Homo sapiens*.

As I declared in the introduction, our attempt to understand human becoming and the emergence of self-consciousness must begin with the recognition of human capacity for creative thinging. Human becoming in the world is a becoming *with* and *through* the world—that is, humans become by consciously relating and creatively transforming the material environment at multiple spatial and temporal scales. The usual causal forces of selection and adaptation take the form of complex interactive, transactional, and participatory relationships with (biotic and abiotic) aspects of their material environment. As new modes of creative material engagement enter into human development, they interact with available extra-genetic inheritance mechanisms, adding friction and complexity to the processes of learning and remembering. Contrary to what some neo-Darwinian approaches to cultural evolution and individuation seem to imply, these transformations are not external, taking place outside of the human body. Rather, they are internal to it, crisscrossing the boundaries of inside and outside or of nature and culture. The things we create and use are *in* us as we are *in* them. This metaplastic process often results in epigenetic dynamics capable of altering the biological foundation of our minds. The term *epigenetic* denotes, to put it simply, modifications in gene expression brought about by mechanisms other than changes in DNA itself.[42]

We should be cautious of the fact that by highlighting these distinctive creative qualities, one could easily fall into the trap, or simply invite accusations, of human exceptionalism (as discussed in chapter 3). The paradox is that the moment you become truly un-Cartesian, you can be accused of being anti-Darwinian. It is important, then, to point out in this connection that the kind of continuity advocated here, and which derives from the ontological orientation of process archaeology and MET, is not one based on the neo-Darwinian logic of the adaptationist/selectionist program. It is, instead,

one based on the enactivist logic of the dynamical program. The asymmetrical organism–environment match that describes the logic of adaptation—at least according to the standard view of evolution by natural selection—gives way to the dynamical reciprocal structural coupling that characterizes the participatory enactive logic of creative material engagement. In other words, the continuity I advocate here is found where brains, bodies, and things conflate.[43]

People are continuous with the world in all vital material aspects—so that we are not in any sense a special aspect of creation. The human body and mind has no special ontological standing.[44] When I say humans are different (also from an intraspecies perspective), I am not denying that other animals are capable of thinging—we know to a certain extent that they are (e.g., see the growing literature on animal tool use[45]). Nor do I say that humans are different because I believe that by making things and by thinking through things we overcome the limits of our nature and enter into a separate cultural realm. As I explained in the previous sections (as well as in chapter 3), such a separation between nature and culture would contradict the reality of human becoming as a reciprocal belonging and mingling of the two in situated action. Rather, the difference I am trying to capture when I talk about human creative evolution can be put as follows: we humans have made thinging in general, and creative thinging in particular, part of our nature. With thinking, biological heredity becomes enactive material semiosis, the primacy of natural selection gives way to creative evolution. Instead of simply reproducing ourselves, we rather extend ourselves and we construct new cognitive and material ecologies for growing and instituting our minds. That is, we alter the predicates, conditions, and possibilities of human becoming. We accomplish that primarily by way of enactive signification and creative thinging. This is different from neo-Darwinian model of cultural inheritance. There is a different kind of bio-semiotic interbreeding among organisms involved here. Such a *synechist* (from the Greek *synechēs* for "continuous") inheritance embodied in acts of creative material engagement is complementary to the emerging postgenomic agenda and builds on other extended views of inheritance that can be found in theories of niche construction and developmental system theory and can provide new ways of understanding evolutionary continuities and discontinuities. This last point brings us right to the heart of human becoming and the central idea of metaplasticity and incompleteness that will form the focus of our discussion in the next chapter.

5 Metaplasticity and Human Incompleteness

A major theoretical assumption of this book is that the extraordinary plasticity of the human mind and its reciprocal openness to creative evolution becomes a distinctive feature of our species. What does this mean? To begin with, I should emphasize that I am not just talking about neural or synaptic plasticity here. I propose a broader view of plasticity that includes more than the usual alterations in the nature, strength, or number of interneuronal synaptic contacts that follow changes in behavior.[1] That the human brain changes both structurally and functionally in response to the environment and experience is a well-established fact.[2] It was the beginning of the twentieth century when Santiago Ramón y Cajal suggested that to understand how a pianist can achieve their remarkable skill, one should allow "in addition to the strengthening of pre-established pathways, the formation of new pathways via branching and progressive growth of dendritic arborization and nerve terminals."[3] In recent decades, our understanding of brain plasticity—the way synaptic connections, axon pathways, and the mapping of the cerebral cortex can change during the lifespan and human evolution—has been transformed.[4] New neuroscientific theories of embodied simulation,[5] neural exploitation,[6] neuronal recycling,[7] and neural reuse[8] provide a clearer view of the changing human brain. In particular:

- *Embodied simulation* centers on the brain's mirroring functions, particularly related to social cognition and perception–action coupling. This theory builds on mirror neuron research, which shows that observing actions activates the same neural circuits as performing them. Embodied simulation is the idea that understanding the actions, emotions, or even intentions of others involves simulating these experiences within our own motor and sensory systems—a fact which highlights the intimate relationship between perception and action.

- *Neural exploitation* refers more broadly to the general use of existing neural resources for various cognitive tasks. It refers to the brain's tendency to repurpose existing neural circuits for new functions. Instead of evolving new areas for every novel task (e.g., numerical thinking), the brain exploits the flexibility of its existing architecture (e.g., circuits responsible for spatial navigation) to serve multiple purposes.
- *Neuronal recycling* denotes more specifically the process by which culturally acquired skills (such as reading or arithmetic) are mapped ("recycled") onto preexisting neural circuits originally evolved for different purposes (e.g., reading utilizes brain regions originally evolved for object recognition).
- Last, the *theory of neural reuse*, in a manner very similar to neuronal recycling, posits that existing neural circuits are used for different, novel functions. However, unlike the emphasis of neuronal recycling on cultural practices, neural reuse extends the concept to include plasticity more broadly, emphasizing that various neural networks and brain areas participate in multiple, diverse functions. Thus, we should not be thinking of those networks or brain regions as being entirely specialized for any single task or cognitive domain. Instead, neural regions and networks are multifunctional and often overlap in their purposes, which also means that the conventional modular view of the brain is challenged. The strong claims of evolutionary psychology for cognitive modularity and their image of the brain evolved by developing dedicated circuits for each new cognitive function is now replaced with a more fluid and dynamic one in which the same brain region may support numerous neural networks serving a range of diverge cognitive abilities.

5.1 Extending Neural Exploitation, Neuronal Recycling, and Neural Reuse

All four theories emphasize the brain's ability to repurpose and reuse existing neural circuits for new functions. Each concept challenges the idea of strict modularity in brain function, suggesting that the brain's architecture is flexible and dynamic. In this way, these theories have drastically enhanced our understanding of the adaptability and plasticity of the human brain. They also make a strong case for the interactive and situated nature of the brain—one that I think better reflects the evolutionary history and embodied foundation of human cognitive life. Still, a limitation remains. These neuroscientific

theories illuminate different aspects of how evolution, experience, and cultural practices shape brain function and development by focusing solely on internal neural processes and mechanisms. Embodied simulation is essentially about the neural reenactment of others' actions, emotions, and intentions within ourselves. Neural exploitation highlights how the same neural substrates can serve different roles, depending on situational demands. Neuronal recycling stresses how cultural inventions (e.g., reading, writing, arithmetic) can exploit existing brain circuits and pathways that evolved for other purposes. Neural reuse suggests that rather than being modular, neural circuits are versatile and contribute to multiple cognitive processes throughout an individual's life.

No doubt, all these theories imply (implicitly or explicitly) that the internal neural adaptations they study happen in relation to cultural practices and real-world activities (mediated by different materials, tools, and artifacts). However, the theories themselves offer little scope or concern with the actual nature of those interactions and the changing material environments that effect those plastic changes. In short, the limitation I want to underline, and try to overcome, lies in the neuro-centric foundation of those theories. This foundation constrains their vision and does not allow them to follow those interactive dynamics into the changing world of situated activity and materiality. As a result, those theories cannot capture and fully comprehend the transactional nature of the interaction between brains, bodies, and things. However, if we accept, as MET argues and as the theories of neural exploitation, recycling, and reuse clearly imply, that cognition is embedded not just in the brain but also in our engagements with the world, it follows that a different and much broader theory of plasticity is needed. We need a notion of plasticity that is able to integrate and account for the continuous reshaping of both neural and extra-neural elements that co-constitute the human cognitive system.

The notion of metaplasticity aims to do exactly that. It reconnects the mind with the world, seeking to capture plasticity as manifest in different brain–body–material environment couplings. Metaplasticity denotes plasticity at a higher level. As briefly discussed in chapter 1, the term was originally coined in neuroscience to denote the plasticity of synaptic plasticity (the emergent higher-order properties of synaptic plasticity itself).[9] Metaplasticity essentially refers to a change in the capability of neurons to generate plastic changes and modify the effectiveness or strength of synaptic transmission,

and to the level of changes that can be expressed. In particular, it describes the ways in which activity-dependent synaptic plasticity, underlying learning and memory, is affected by prior neural activity.[10] Although this neuroscientific use of metaplasticity helps us to highlight the different forms and temporal scales at which activity-dependent changes in the plastic state of neurons and the development of neural circuits may occur, MET expands the meaning of metaplasticity beyond the brain's neural architecture to include the dynamic interactions between brain, body, and material culture. This adds an extra "meta" dimension by suggesting that plasticity can also be approached at a higher level as the product of the continuous interaction between different kinds of plasticity (neural and extra-neural). Metaplasticity now describes the nature of plastic changes that occur not at the level of the individual—transformations in neural structure or anatomy inside the head—but rather in the broader sociocultural context where mediated action takes place. I am gesturing toward a different kind of plasticity: the plasticity of a mind not limited by the skin—that is, the plasticity of thinging.

5.2 The Plasticity of Thinging

Metaplasticity refers to the dynamic, reciprocal relationship between neural plasticity (the brain's ability to change and adapt) and cultural plasticity (the ability of socio-material environments and artifacts to shape and be shaped by human action). The "meta" in metaplasticity signifies the hylonoetic space of self-becoming, where the plasticity of synaptic plasticity meets the plasticity of cultural plasticity—for instance, where the changes in the hippocampal volume correlated with the amount of time spent as a taxi driver in London[11] meet the diffractive impact of new GPS navigation systems that make such a plastic change unnecessary, or to use a more traditional example, when new cultural inventions and practices, such as reading and arithmetic, invade evolutionarily older brain circuits and inherit many of their structural constraints as proposed by the neuronal recycling hypothesis we discussed previously. The reason behind this shift in perspective and broadening of analytical units is simple. When it comes to macroscale processes of material engagement, simply knowing the neural context of activity (in terms of the relevant practice-induced changes in the brain) is not enough. We need to know more than simply what the rest of the brain was doing as a particular event occurred at a particular region of interest. Rather, we need

to understand the broader context—the cognitive ecology of the event. The changes in plasticity that matter are to be found not at the level of the individual but rather at the wider level of inter- and intrapersonal activity where different kinds of plasticity (neural and extra-neural) meet.

In this entanglement of neural, bodily, and socio-material processes, what matters—and needs to be understood—is not just the way by which one form of activity influences or causes the other but also how they become attuned and exchange properties by crisscrossing different temporal scales. From such a point of view, material and neural components of action compete in equal terms for a place in the nongenetic heritable structure of the human cognitive system. This is not merely a question about the hemodynamic couplings of blood flow and activity. It also concerns the dynamic nonlinear couplings of brains, bodies, and the material world that go well beyond those traditionally studied in short-term neuromodulation. This is the main reason why the concepts of neural exploitation, neuronal recycling, and neural reuse, although they share a common foundation with metaplasticity in that they all explore the brain's adaptability and dynamic capacity for integrating new functions or experiences, differ in focus and scope. Neural exploitation, neuronal recycling, and neural reuse essentially denote processes that happen inside the individual brain as a consequence of practice or other interaction with the world. For MET, metaplasticity is seen not as an internal consequence of practice or interaction with the world but rather as continuous and coextensive with it.

Different forms of plasticity (neural and extra-neural, biological and cultural) operate synergistically in a temporally and spatially distributed manner and thus cannot be understood in isolation. Importantly, this metaplastic process often results in unpredicted epigenetic forms of exogenetic inheritance (nongenetic influences on the expression of genes) and ontogenetic (developmental) dynamics potentially capable of altering the biological foundation and structure of the cognitive system. This is why, returning to the famous study of London cab drivers, from the perspective of MET, it is not enough to ask if and how a London cab driver's "gray matter" enlarges as a result of the complex navigational demands of the practice of driving in a modern city. Equally important is to compare and account for the plastic effects of different navigational practices as well as of the transformative effects of new digital technologies on these cultural practices. Consider, for instance, the plastic transformation effected by the introduction of GPS

devices, which effectively render the need to expand the taxi driver's hippocampus obsolete. The cognitive task (navigating from one point in the city to another) remains the same, but the process to accomplish that has changed. The new capabilities GPS technologies have effected a drastic reorganization of the cognitive operations involved in the navigation task. MET and the notion of metaplasticity are concerned with capturing and understanding the processes that mediate those plastic changes, not at the level of the individual but rather at the systemic level of socio-material practice, creative thinging, and innovation.

The notion of metaplasticity, seen as an expression for human biosocial becoming,[12] can be linked with other nongenetic forms of organization. However, it should not be confused or conflated with notions of individual phenotypic plasticity and variation. Metaplasticity brings an ecological-enactive perspective that sees the mind as a situated process—that is, an emergent product of complex semiotic ecologies and flexible incorporative forms of material engagement. What I am proposing with the notion of metaplasticity is that human intelligence is inextricably intertwined with a plasticity of the environment and of the forms we make. Metaplasticity is not a property of brains; it is a property and the differentiating feature of hylonoetic fields.

Two clarifications are in order. First, our discussion of metaplasticity as a distinctive feature of human becoming does not mean that other species are not plastic or intelligent in their own special ways. Humans exist in a world of differentiated intelligences, being one among many different types; human intelligence is plastic because it derives from the nature of the whole organism in skilled interaction with the things around it. The same is true of other intelligences. In fact, metaplasticity questions the dominant understanding of our modern "sapient" constitution, both as the supreme intelligence placed over and above the intelligence of other animals and as something complete and fixed—the product of human adaptation to past environments that no longer exist. There is a major contradiction between notions of cognitive modernity and the notion of metaplasticity. Metaplasticity argues against the notion of a universal modern mind. In its place, we have now a fresh conceptualization of human becoming as an unfinished process, amenable to extended reorganization and prosthetic amendment—thus, potentially, in a permanent metaplastic state of ongoing creative evolution. Humans are a species that is incomplete, which also explains our remarkable plastic qualities and prosthetic abilities (recall chapter 4). Bernard

Stiegler's notion of originary technicity also springs to mind here: "The prosthesis is not a mere extension of the human body; it is the constitution of this body qua 'human.'"[13] His theory of anthropogenesis, influenced by the paleoanthropologist André Leroi-Gourhan and philosopher Gilbert Simondon, also saw humans (species and person) as constituted by technics. Stiegler also coined the term *epiphylogenetic memory* to denote the mode of tertiary memory by which past epigenetic processes come to be accumulated within the spatiotemporal organization of material environments.

Metaplasticity also changes the conventional reading of the anthropological question on the psychic unity of mankind: What does it mean to say human ways of thinking are both unified and diverse? What is it that differentiates or unites the ways in which people think? As we discussed in the previous chapter, the question about the unity and diversity of the human mind, as usually posed within anthropology and archaeology, is unhelpful. It seems to reiterate the nature–culture dichotomy by focusing either on what makes our minds different or on the common evolved cognitive capacities that all humans share. The latter approach puts an emphasis on continuities, the former on discontinuities. A different manifestation of the same dichotomy, to which I shall return below, is the hardware/software computational analogy where cultural variation in thinking is seen as some kind of changeable or replaceable software for a genetically fixed computational hardware (the brain). Still the hard question, as with any other manifestation of the nature–culture debate, lies in the middle: How exactly can a unified human mind be reconciled with the pronounced diversity of human cognitive life?

From an intraspecies perspective, one could say, following the anthropologist Maurice Bloch, that "we are all far far more the same than different."[14] It is precisely because humans are so similar that difference matters so much in the case of our species as opposed to other animals—although it is not easy to evaluate the degree of difference present in other animals. Yet, placing too much emphasis on the animal nature of people can be misleading. Our shared animal nature should not obscure our shared culture nature. As we discussed, thinking about culture as something separate and above nature is also inherently problematic. As Bloch neatly points out, "There are no non-cultural bits of us as there are no non-natural bits. We are made by a single but complex process that creates, *inter alia*, specificity."[15]

The apparent conflict between the opposed views of the cognitive unity versus diversity debate is an epistemological obstacle that has to be overcome

if research is to advance. The first step is to recognize that neither the constructivist nor the universalist position is capable of touching the real conceptual core of human becoming. What I propose, instead, is a comparative ontology of human metaplasticity—the major comparable dynamic being the plasticity of the brain linked to the plasticity of our body and of the material environments that surround us. The aim is to make us aware of our surroundings, dependencies, and peripheries. As discussed, our everyday material habits and forms of material engagement are inextricably linked with our cognitive and emotional lives. This basic idea of metaplasticity should be at the center of any discussion of cognitive universality or variability.

Approached from the point of view of material engagement, the question about the psychic unity of humankind is transformed. The underlying logic of the question is reversed. Instead of positing a unified species identity as a biological constant that allows us to understand and compare the cultural diversity of human lifeways (e.g., the experience of time), we now posit a unified process of human becoming. That which unites all humans is not an enduring essence or nature but rather the manner in which they come to be—which inevitably is open to change and heterogeneity. There is no underlying genetic prescription that ensures the comparability of human variation. Rather, it is only through the processes of change that a comparable species identity can be formed. To put it more simply, change is the nature of human condition—not just any change but ever-changing change or becoming. Human becoming gains primacy over species membership. Unity is not the passive substratum of difference. Instead, there is unity in difference or what we could describe as a continuum of differential becoming. The only sense in which popular notions such as the psychic unity of humankind could be retained is if, contrary to their current use, they explicitly refer to the only true universal characteristic of the human mind—that is, its continual openness to change and alterability by incorporating new means of material engagement. The classical opposition between culture-invariant neurophysiological structures and culture-mediated cognition is dissolving. The only true universals about the human mind are those that speak, like metaplasticity, of its ability to change, to relate, to affect, and to become affected.

This brings us to the second clarification I mentioned. It relates to the creative tension between stability and change that characterizes human plasticity and incompleteness. The anthropologist Clifford Geertz, in his seminal

The Interpretation of Culture,[16] also seems to struggle with this tension at the heart of human becoming when he declares that humans are "incomplete or unfinished animals who complete or finish ourselves through culture."[17] The argument for human incompleteness I propose in this book is different, but it is not incompatible with Geertz's view. In particular, I have two points of agreement and one of contrast. I start with the former. My first point of agreement with Geertz is that "there is no such thing as a human nature independent of culture."[18] He phrased the issue in this especially insightful way: "Culture, rather than being added on, so to speak, to a finished or virtually finished animal, was ingredient, and centrally ingredient, in the production of the animal itself." I also agree with Geertz when he explains that the way we as humans try to complete ourselves through culture must be understood in a situated and culture-specific rather than general way: "Dobuan and Javanese, Hopi and Italian, upper-class and lower-class, academic and commercial."[19] On the other hand, and turning now to the main point of contrast, Geertz understands culture from the perspective of his interpretive anthropology, as essentially a system of "significant symbols" that provide guidance and organize human experience. Those "significant symbols," Geertz writes, are "not mere expressions, instrumentalities, or correlates of our biological, psychological, and social existence; they are prerequisites of it."[20] Where I diverge from Geertz's formulation described above is in that I see culture as a cognitive ecology grounded in action and material engagement rather than as a shared system of symbols and representations. From the perspective of MET, making sense of the world essentially means thinging the world rather than interpreting it. I am not denying the importance of meaning making. Rather, I see meaning as the product of enactive material signification with and through the world. As I explained in chapters 1 and 2, enactive signification is the process by which a material sign emerges as a sign and acquires semiotic force (indexical, iconic, or symbolic). That is, enactive signification is the process by which a material sign becomes meaningful (known also as *material semiosis*). It is precisely this becoming that characterizes metaplasticity as a semiotic procedure. The concept of enactive signification challenges traditional views of signs as static representations and carriers of preexisting meanings. Material or enactive signs are not merely abstract symbols but also deeply intertwined with our bodily actions and sensory perceptions and thus integral to the process of meaning making itself. The meaning of those signs is not just a mental construct. It is also

shaped by their material properties (e.g., their shape, texture, weight) and the ways our bodies engage with them. In addition, enactive signs are closely linked to the concept of affordance, which refers to the possibilities for action that an object offers. In this view, signs do not just passively represent meaning but also afford certain actions and possibilities for engagement.

Relevant here is the hardware/software analogy that lies at the heart of the computational framework of thinking about the mind and the brain. Ever since the advent of computers and information technologies, there has been a general tendency to think of the human cognitive system as comprising a cultural software associated with local information processing and the brain as the natural hardware. This tendency has increased and extended, with the recent growth of digitalization and networking directly affecting how we understand human consciousness and our sense of self (see chapter 11). The core analogy remains intact: the mind is to the brain as a computer program is to the hardware of the computer on which it runs. The software, as the product of our culture, might change, but the hardware, predetermined by our genes, is fixed.

The notion of metaplasticity advanced here falsifies this common view of culture as some kind of changeable or replaceable software for a genetically fixed computational hardware (the brain). The classical software/hardware computational analogy is no longer applicable here. Metaplasticity implies that software and hardware are one. The connection or relation between thinking, self, and the world is not, at least not primarily, one of representation. Rather, it can be better described as a rhizomatic relation—I borrow the term *rhizome* here from Deleuze and Guattari.[21] The mind's primary function is not to represent the world but rather to form rhizomes with the world. But rhizomes are decentralized and open ended, spreading in all directions. They also operate like a map, having multiple entryways and no main or privileged starting point.[22] A rhizomatic approach to thinking is one that sees the mind as an assemblage, a gathering together of different materials in movement. But thinking is not the process responsible for moving the materials. Rather, thinking becomes constituted in their movement. Thinking is thinging—an open-ended process that grows like a rhizome formed by the ways our bodies move and open up to the surrounding environments, affecting them and becoming affected by them. An analogy can be drawn here with Deleuze and Guattari's famous example of the wasp becoming an inseparable part in the orchid's reproductive apparatus by transporting its pollen: "There

is neither imitation nor resemblance . . . but a capture of code, surplus value of code, an increase in valence, a veritable becoming, a becoming-wasp of the orchid and a becoming-orchid of the wasp."[23]

5.3 Brain–Body–Material Environment Couplings

In the first part of this book, I have been seeking to liberate discussion from narrow disciplinary constraints and to challenge conventional units of analysis, thereby encouraging a radical rethinking of human cognitive life and its evolution. I have been arguing for the need to escape from the unhelpful and sterile dichotomy of biology and culture, focusing instead on the modes of human becoming and creative thinging. This creative dimension of human evolution speaks of the unity of growth and making in situated action. It also indicates that the nature of human intelligence, seen now as a mode of becoming, is to remain subject to change and deep reorganization. In this chapter, the notion of metaplasticity (neural and extra-neural) has been advanced as a fruitful way for approaching that middle space where brain, body, and culture conflate.

Shifting attention outside the brain and onto the interplay between neural plasticity and cultural plasticity, the concept of metaplasticity suggests that cognition is distributed across brain, body, and environment. This reflects MET's interconnected, relational view of reality and of human becoming. The notion of metaplasticity represents the culmination of that insight about the dynamic and relational nature of human becoming, embodying MET's shift from a substance-based to a process-oriented ontology. Thinging become an inseparable part of our experiencing and thinking apparatus by expanding the spatiotemporal reach and phenomenal depth of human consciousness. Applying the notion of plasticity in the domain of things and material culture, we refer not only to their physical properties and their transformations but also, more importantly, to the role that those transformations play in the context of material semiosis (enactive signification) and their affordances (in the ecological sense of interactive possibilities).[24]

Take the example of time and temporality, especially their intimate links of material engagement, which are defining features of human phenomenal experience and self-consciousness. The notion of metaplasticity provides a point of intersection for three interconnected timescales: evolution, development, and situated action. Situated action also includes the phenomenal level

of our protentions and retentions, which Husserl[25] famously recognized as constitutive of human time-consciousness. The role of material engagement is crucial for binding the temporality of daily life and action to that of the *longue durée* of history and evolution. We should bear in mind that human time is multi-temporal, it "flows on a number of levels"[26] and operates at different speeds, durations, and rhythms (e.g., neural, bodily, cultural, and evolutionary). The engagement of mind with the material world provides temporal anchoring and binding that helps us to move and think across the scales of time.[27] When humans engage the material world by using a simple artifact, they establish a bridge with the larger-scale processes at work beyond their awareness or control, which are embodied in the objects at hand. What the human brain and body can experience (pre-reflectively or reflectively) on a scale of milliseconds, seconds, or minutes can now be extended through the physical presence of a material artifact to time experiences on the scale of days, months, years, decades, centuries, or even millennia. Through their physical persistence and durable properties, things "give to human awareness a sense of time extending beyond individual lives and perceptions."[28] Material culture, then, becomes a dynamic attractor for the meeting of large-scale events with small-scale temporalities of human action. By engaging an object in the present, we simultaneously share something of the object's past. With things, the past becomes present.

Moreover, things and material practices are not just objects that exist *in* time. Rather, they are processes for *making* time.[29] Sometimes, we participate knowingly and willingly in the temporality of things, such as when we choose to text a message instead of writing a letter. But very often, we simply follow their rhythms without any critical understanding of how the temporal structure that things embody actually modulates our phenomenal experience and sense of self (see the discussion of digital materiality in chapter 11). Thus, understanding how the temporal structure that things embody influences and partially constitutes the temporal experience of our shared present is important for understanding how humans coordinate their actions and intentions in social space. The notion of metaplasticity captures the flow and experience of time among brain–body–world. It allow us to think comparatively about the changing *chronoarchitecture* of human action and intersubjectivity by integrating pre-reflective bodily patterns and reflective biographical and historical time-consciousness. I suggest that one way to gain empirical access to metaplasticity is to focus on specific events where brains, bodies,

and things conflate and which will inevitably vary with different people and in different times and places. Human beings, understood as real living creatures that move and act in this world, are the developmental products of this conflation. If you separate the three—if you separate brain, body, and culture—you end up with a number of overly simplified abstractions about lifeless categories. I am not denying the analytical value of those abstractions for many disciplines, but I do think they are misleading when it comes to understanding human becoming.

Thinking and experiencing are processes that cannot be easily contained. They presuppose motions, interactions, and transformations of energies that cannot be enclosed within the conventional organismic boundaries and demarcating lines. Instead, we must allow their local socio-material situation to delineate their boundaries. A precondition for that, however, is the recognition that the mind has no exact and prespecified location. Thinking (reflective or pre-reflective) is not a within property; it is an in-between process.

II Varieties of Self-Becoming

6 What Is This "I" That I Know?

What is it that we call *self*? What do we mean by the sense of *me-ness* and *mine-ness*? What is the relation between bodily ownership and agency? What are the necessary conditions for the appearance of a minimal phenomenal self? The history of philosophy and, more recently, of cognitive science are replete with possible answers and ways to articulate these questions. This chapter selectively reviews some influential analytical models and conceptual distinctions relating to self-knowledge. I shall be focusing on classifications that capture some major aspects of self-experience that I am hoping to rethink from a material engagement perspective. Beyond conceptual clarification, this chapter's aim is to introduce the basic analytical tools for the articulation of the different levels, varieties, and qualitative transformations that mark the emergence of self-awareness from an ontogenetic and phylogenetic perspective. To this end, I will be looking at several distinctions that may help us reveal and highlight aspects and nuances of selfhood that would otherwise go unnoticed. Establishing a clear conceptual foundation is essential for grounding the relational ontology of the situated person perspective, which forms the key idea of this book (fully discussed in chapter 9). It will also facilitate cross-disciplinary analysis by helping us to evaluate the validity of competing methodologies and the criteria for avoiding incommensurability in the way we frame our research questions. Are an anthropologist, a philosopher, and a neuroscientist really dealing with the same question when they ask what a self is? Our conceptual analysis of selfhood in this chapter, seen as an ontology of selfhood, will provide the necessary background for exploring in chapter 7 some of the historical and anthropological nuances and complexities of the notion.

6.1 Domains of Self-Knowledge: Neisser's Five Selves

I begin with Ulric Neisser's proposal of five selves or kinds of self-knowledge (figure 6.1). Considered as a unity, Neisser writes, "The self is full of apparent contradictions."[1] Is there a way to disambiguate the situation? One useful place to begin such an enquiry is with the very conditions of the possibility of self-knowledge—that is, asking what makes it possible for humans "to know themselves at all."[2] The primary focus of Neisser's analysis of the self, then, is on what we know and how we know it—that is, on the nature of information on which self-knowledge is ultimately based.

He distinguishes among five major kinds self-knowledge: ecological, interpersonal, extended, private, and conceptual. Each of these is based on different forms of self-specifying information. These senses of self make their own distinctive contribution to self-experience—although they are rarely experienced as such—and have different developmental histories as well as pathologies. Nonetheless, despite their differences, they form an interconnected system and a continuity. To give one example, our knowledge of the extended self is based on episodic and autobiographical memory about oneself in the past. However, given that memory processes have been increasingly recognized as (re)constructive and contextual, it is inevitable that the recollected knowledge about oneself in the past cannot exist independently of the conceptual self that provides the self-narratives that influence how and what we choose to recall.

I will focus on three of the mentioned types of self-knowledge (i.e., ecological, interpersonal, and extended), since they are especially useful for our purposes in this chapter.

The *ecological self* refers to the type of self-knowledge that provides a sense of one's own location in and distinctness from the environment. It is the kind of self-knowledge that is intimately linked to bodily sensorimotor experience, position, and movement. It gives rise to the direct experience that there is a subject, an "I," who is engaged in situated action. This kind of self-specifying information enables us to experience emplacement as *embedded in* the environment. It allows us to act with respect and in response to our environment (and its affordances). It also exists from early infancy, although it develops with increasing age and skill.[3] Is this a form of minimal self-consciousness then? "Are we *conscious* of our ecological selves?"[4] A negative answer would imply that ecological self-perception is

"phenomenally 'silent.'" On the contrary, Neisser would argue that ecological self-perception is a definite and often powerful mode of consciousness or awareness. This applies in the case of both adults and infants, as well as in the case of nonhuman animals equipped with a perceptual system capable of providing self-specifying information. Still, Neisser would also claim that this awareness "is not what we would ordinary call 'self-consciousness'": "The ecological self *per se* is not an object of thought; very young infants have no internal self-representations to be conscious of or to think about. Such representations appear only in the extended, private, and conceptual selves. The ecological self, in contrast, is directly perceived."[5]

The *interpersonal self* can be seen as an extension of the ecological awareness of one's engagement with the world to the social sphere of basic interpersonal encounters. It refers to a sense of oneself as a locus of emotive reaction and "immediate unreflective social interaction" with conspecifics.[6] Like the ecological self, the interpersonal self can be directly perceived on the basis of existing kinetic information about the nature, direction, timing, and intensity of joint interaction between two (or more) people. Moreover, there is nothing inferential or representational about this kind interpersonal self-perception: "Just as the ecological self is specified by the orientation and flow of optical texture, so the interpersonal self is specified by the orientation and flow of the other individual's expressive gestures; just as the ecological self is articulated and confirmed by the effects of our own physical actions, so the interpersonal self is developed and confirmed by the effects of our own expressive gestures on our partner."[7]

Finally, the *extended self* refers to the sense of oneself as an individual existing over time—"the self as it was in the past and as we expect it to be in the future, known primarily on the basis of memory."[8] However, not all types of memory contribute to the extended self. For instance, procedural memory—"knowing how"—in contrast to episodic memory—"knowing that"—cannot be seen as a source of information about the past self.[9] As Neisser points out, it is "by remembering *that* I did it rather than merely how to do it" that "I necessarily became aware that my existence transcends the present moment."[10] Thus, autobiographical memory and episodic recall are central for developing the sense of extended self as existing outside the present moment. For example, in the case of knapping stone, which we are going to discuss in chapter 10, more important than merely being able to execute a technical routine is the ability to recall the occurrence of such experience in the past. It is in

the acts of recollecting events from one's own past and reflecting on future plans for oneself that the developmental roots of extended self can be found. According to Neisser, this form of temporal personal extension becomes more important with age and takes the form of a life narrative that "effectively defines the self in terms of a particular series of remembered experiences."[11]

Neisser's classification provides a useful conceptual foundation for the analysis of different aspects of self-experience. However, from a material engagement perspective, a potential limitation should be underlined. Because Neisser's main objective has been to analyze the information on which self-knowledge is ultimately based, he is focusing, as he admits, "more on what we know and how we know it than on what we do and how we do it."[12] But as will see, it is the doing that provides the foundation of self-experience.

6.2 The Minimal and the Narrative Self

More recently, the philosopher Shaun Gallagher, integrating perspectives from philosophy of mind and embodied cognitive science, proposed a more general distinction between two major kinds of self: the minimal self and the narrative self (figure 6.1).[13] The *minimal self* relates to Neisser's ecological sense of oneself as an immediate subject of experience, acting in and on the environment at a time, without having to know or be conceptually aware of this. In other words, the "information that constitutes the minimal self is generated in ecologically embodied experience."[14] Given that this minimal self-experience is limited to that which is accessible to immediate self-consciousness, it is also devoid of temporal extension. Instead, it is grounded in the basic experiences of agency and ownership of actions that I will discuss below. The minimal self is contrasted with the *narrative self*, which incorporates elements from Neisser's extended and conceptual selves—as well as Damasio's autobiographical self[15]—and essentially refers to the sense of oneself as a unique individual persisting over time. The narrative self, then, captures our unique human ability to think and speak of ourselves as entities extended in time. Gallagher sees this continuity between our past and our future as the representational product of the various stories that we and others tell about ourselves.[16] Humans are unique in that we have language, and with language, we can not only tell stories but also use these stories to create ourselves by making our experience relatively coherent over extended time periods.[17]

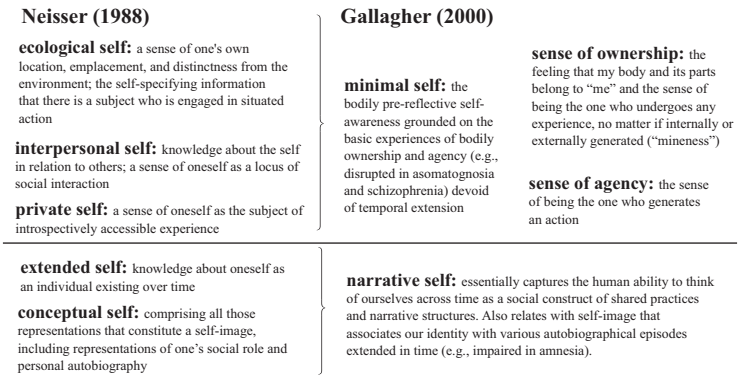

Figure 6.1
Domains of self-knowledge. Basic philosophical domains and conceptions of self-knowledge proposed by Neisser[18] and Gallagher.[19]

Another way to understand the notions of the minimal self and the narrative self is to explore them at the level of neuropsychology and neurophysiology. For instance, the concept of the minimal self can be examined within the neurological domain with specific reference to schizophrenia. Gallagher proposes that in certain schizophrenic experiences, the sense of self-agency may be disrupted. For instance, patients with schizophrenia may misidentify the source of their thoughts as coming from outside (thought insertion), confuse intrusive thoughts for external voices (auditory hallucination), or even perceive one's own acts as alien and report that their body is under the control of other people or things. Asomatognosia offers another interesting condition where the minimal self is disrupted. Here, the patients mistake one of their limbs for an external object. On the other hand, amnesia, associated especially with episodic memory,[20] affects one's narrative self. Erica Cosentino discuss the case of a patient who was unable to recall past events as a result of severe retrograde and anterograde amnesia caused by hypoxic brain damage following a heart attack.[21] Interestingly, the same patient has been found to be equally unable to anticipate future events. Indeed, several neuropsychological and imaging findings suggest that human abilities to project into the past and into the future (foresight) may share the same neural substrate in the hippocampus and prefrontal cortex.

6.3 Sense of Agency and Sense of Body Ownership

It is widely accepted that the minimal sense of self comprises two major and distinguishable aspects of self-experience: the sense of self-ownership and the sense of self-agency. Think of an ordinary action or bodily movement we perform every day—for instance, reaching to pick up a glass of water. Simple and automatic as it may feel, the execution of this action sequence involves a complex intertwining of bodily movements, anticipatory postural adjustments, and multimodal sensations, which are entangled with our previous learned abilities and acquired know-how about identifying, reaching for, and grasping objects in general.[22] Indeed, a complex dynamic ensemble of multimodal proprioceptive signals must come together in a delicate synchrony for our intention to act to be successfully performed. If everything works as it should, we not only get to reach for the glass but also get the "sense" or the "feeling" that "we did it." In other words, we seem to experience, albeit in a minimal preconceptual sense, "that we are the agents, that is, initiators and executors of our grasping the glass of water."[23]

Why do I experience myself as an agent? When I reach for the glass, usually I do not reflect upon my actions. I experience, nonetheless, some minimal sense of control over the movement of my hand and thus agency for this movement. The sense of agency has been defined as the awareness "that I am the one who is causing or generating an action"[24]—for example, that I am the one who is causing the hand to move and reach for the glass. There is also another basic form of bodily consciousness—that is, a minimal detectable "sense of ownership" about the hand that performs the movement, a "sense that I am the one who is undergoing an experience,"[25] that it is *my* hand and not someone else's. It is interesting to note that although in normal conditions of intentional actions, both senses, agency and ownership, are usually indistinguishable, one could also think of examples of involuntary movement (e.g., when my arm is moved by someone else) where one could have a sense of ownership without a sense of agency. I will return to this point below when I discuss the experimental manipulation of the distinction between agency and ownership in self-recognition tasks.

Meanwhile, Gallagher's notion of a sense of agency could be differentiated between a lower-level "feeling of agency," characterized by pre-reflective sensorimotor processes, and a higher-level "judgment of agency," characterized by reflective or belief-like processes.[26] Between these two levels of agency

processing, the feeling has a priority over the judgment of who has caused an action: the lower-level feeling of agency must be present for an attribution of agency to occur.

So, what do all these different agency indicators and levels of agency processing tell us about how and why I experience myself as an agent? For simplicity, I will focus on the kind of intentional action I am performing at this very moment—namely, writing this chapter by pressing certain keys on the keyboard of my computer. Think of the different experiences and processes involved while I am writing these sentences. At the phenomenological level, there are certain aspects that I am consciously aware of or able to control and maybe reflect upon. Other aspects have "thin" phenomenology—that is, they happen automatically without any reflection or conscious attention on my part. For instance, being a poor typist and undecided about how best to express what I want to argue results in many unintended mistakes that I cannot control. As a result of these common unintended mistakes, nonetheless, I become very conscious of my frequent use of the backspace key to correct the result of my previous action. I am also forced to reflect more carefully and attend more closely to the details and execution of my subsequent corrective action. Underlying all this is a deeply felt experience of myself as causing a certain effect in the world. I feel or I think that I am the cognitive agent who thinks and presses the keys to put the words in the order I see on my computer screen. I started with the intention of writing something, which was momentarily associated with a minimal awareness of initiating a voluntary movement. Then, during the actual performance of my intention in action, things, feelings, and causes became enmeshed as they become emplaced and extended. But finally, at the end, as I finish the final draft and read the text I have produced, it seems that I regain part of my initial experience as the author.

Am I then correct in attributing agency for this action to myself? The question is far from trivial. In the contexts of material engagement, both reflective attributions of agency and non-reflective feelings of agency are not to be trusted. As pointed out, the phenomenology of our sense of agency is rather ambiguous.[27] The last point seems to be especially true in the contexts of mediated action. Within material engagement theory, the notion of *material agency* has been developed to highlight that point (recall our discussion in chapter 2).[28] In brief, the claim is that although the sense of agency, as a minimal kind of self-consciousness, is uniquely human, agency, as an action

potential, is an emergent property of material engagement and thus something shared by both animate and inanimate entities. As such, although only human beings are able to develop a sense or awareness of their ability to act as agents, other nonhuman physical entities and structures (natural or artificial) are able to exercise agency. We will have the chance to return to consider the distributed, enactive logic of material agency many times in this book.

More important for the purpose of this chapter is to briefly discuss the prevalent neuroscientific understanding of human sense of agency. My main concern is to underline one important methodological limitation of many neuroscientific models of agency. This limitation relates to the fact that neuroscientific methodologies fail to take into account the phenomenological perturbations and ambiguity involved in those feelings and attributions of agency, especially in the context of real-life situated action.

In particular, neuroscience basically tells us that the sense of agency quite possibly originates at the level of primary sensorimotor processes and, more specifically, in the neural processes responsible for motor (efferent) commands and proprioception. But what does it really mean to speak of the origins of the sense of agency in the above context? So far as the motor aspects of action are concerned, one could speak of the origins of the experience of agency in reference either to the temporal stratigraphy of the neural and causal antecedents of action or to the primary neural constituents of that action. For instance, according to the computational comparator model, our sense of agency arises principally from internal motor signals responsible for generating and controlling movement. The process, in brief, involves an internal forward model based on an efference copy predicting respective sensory consequences.[29] If predicted sensory information matches subsequently sensed information, then the subject will experience a sense of agency for those events or attribute the sense of agency to oneself. If, on the other hand, there is an incongruence of the predicted with the actual sensory outcome, then another agent must be the cause of an action, and thus there is no sense of agency. This comparator model has also been used to explain several pathological experiences in schizophrenia, such as delusions of control. In particular, the misattribution of action experienced by delusional patients can be explained by a deficit in the internal forward model.[30]

As we have seen for the comparator model, the sense of agency primarily depends on internal signals translated into a motor command and its accompanying efference copy. Nonetheless, other sources of external sensory

signals have also been proposed as contributing to the sense of agency. For example, many studies have shown that the sense of agency can be the result of an experienced consistency between thought and action and may even occur in situations in which the participant's action plays no causal role in bringing about the outcome. On this view, the sense of agency (often illusionary) is based on the combination of internal and external cues about the origin of action or movement.[31]

There are several ways by which neuroscientists have attempted to find the neural correlates of the sense of agency. Most of them, employing a combination of behavioral and neuroimaging methods, have focused on the neural processes responsible for the motor and sensory aspects of action recognition.[32] The usual procedure in studies of self-attribution of action is that subjects are presented with visual feedback on their own actions, which can be distorted to varying degrees. The reported fluctuations in the subjects' sense of controlling their actions (sense of agency) relevant to the degree of match between the performed and viewed movement are then associated with observed patterns of neural activation. For example, a positron emission tomography study,[33] using visual feedback distortions, showed a possible correlation between the subjects' felt control of their bodily movement and brain activity in the right posterior insula. Can it be argued, then, that the insular cortex may be responsible for the sense of agency? Subsequent analysis of the above experimental design suggests a more complicated picture.

One problem with studies seeking the neural correlates of action recognition employing a sensorimotor mismatch by way of incongruent visual feedback is that they usually focus exclusively on self-generated voluntary actions. But voluntary actions embody an inseparable combination of efferent and afferent information pathways—leading, respectively, away from (efferent) and to (afferent) the cortex—that makes it extremely hard to isolate experimentally their specific contributions to the sense of controlling one's body (agency) rather than the sense of ownership for movement of one's body.[34] That means, more simply, that it remains far from clear whether the observed neural activations associated with experimental manipulations of voluntary movements (e.g., activity in the right posterior insula) correspond to the experience of agency or the experience of body ownership.[35] To overcome this problem, a series of experiments was conducted, focusing instead on "the (neuro)logic of involuntary movement."[36] As previously discussed, the case of involuntary movement is especially interesting for finding the

neural correlates of the sense of agency because, in contrast to self-generated movement, there is an experience that I am the subject of the movement (sense of ownership) without the experience that I am the cause or author of the movement (sense of agency). So, what is it that the sense of agency adds to ownership at the experiential level?

One way to answer not only this question about the differences between sense of agency and sense of body ownership but also the question about how the presence of agency modulates body ownership is to investigate how "comparable afferent body-related events are differentially experienced depending on the presence or absence of efference."[37] One experimental implementation of this manipulation of the afferent–efferent interaction that facilitates the investigation of the effect that the latter has for the experience of one's own body in the absence of movement and efferent information is the so-called Rubber Hand Illusion (RHI).[38] In this experiment, participants rest their arm on a table, hidden behind a screen. They look at a rubber hand presented in front of them, being stroked synchronously with their own unseen hand. This causes participants to report feeling as if they were touched on the rubber hand. The rubber hand feels like it is part of their body. In other words, in allowing for an external object to be treated as part of the body or not, under experimental control, the RHI provides a means to study the necessary and sufficient conditions (perceptual and cognitive) for a body part to be experienced as one's own.

How does it happen? How does the rubber hand come to be experienced as part of one's own body?[39] One factor that has been shown to modulate body ownership in the RHI is multisensory correlation.[40] However, the correlation of visual and tactile percepts is a necessary but not sufficient condition for the sense of body ownership. It seems that the feeling of body ownership during the RHI requires the viewed object to fit in a general preexisting cognitive representation of one's body. Specifically, the viewed object cannot be just any object with no functional connection with the body but rather a body part in a plausible posture that is congruent with the posture of the subject's own stimulated body part.[41]

What do we make, then, of the RHI as an experimental paradigm? No doubt, RHI experiments provide a useful source of information about the necessary and sufficient conditions for inducing a purely sensory form of body ownership.[42] In short, the rubber hand is perceived as actually being

part of the participant's own body when brushed synchronously—but not when brushed asynchronously—with the participant's own hand.[43] However, the RHI paradigm is lacking the ecological validity needed to develop a truly naturalistic account of body ownership and agency or to investigate how these basic bodily experiences interact in the context of real situated action and material engagement.

Three further worries about the RHI should be stressed.[44] First, it is unclear whether the sense of ownership that is rated by questionnaires refers to a feeling of ownership or to a judgment of ownership. Second, and related to the first worry, it is hard to interpret on the basis of the usual scale of ownership used in questionnaires whether what is measured reflects the vividness of the feeling of ownership experienced by the participants or the feeling of confidence in their judgment of ownership. Most studies of the RHI simply report and discuss the behavioral or neural correlates of the illusion without offering any systematic description or measurement of the participants' statements relating to their subjective experience of the illusion and their changed sense of embodiment.[45] Finally, focusing exclusively on RHI studies, without trying to show how these findings are relevant to issues of embodiment and situated action, can be an impediment to achieving a real understanding of the grounds of ownership. One needs to explain, as the philosopher Frédérique de Vignemont remarks:

> how it is possible that it takes less than two minutes to induce ownership of a rubber hand while it takes months for a hand transplant to be experienced as one's own, or that one can experience sensations at the tip of a tool and modify the representation of the boundary of one's body to include it, and still not feel ownership towards it.[46]

I will return to explore the relation between ownership, embodiment, extension, and incorporation in our discussion of self-bounding and the situated extended person in chapters 7 and 8. In the remainder of this chapter, I want to focus on the issue of embodiment and its relation to the prereflective aspects of self-experience / bodily self.

6.4 Embodiment: Dimensions of Being and Having a Body

The term *embodiment* is often used to denote the basic sense of one's own body. It denotes the kind of bodily self-experience we associate with a

minimal or pre-reflective level of self-awareness. It answers the question of what it is like to have a body[47] or, more accurately, what it is like to be a body. Seen as a form of knowledge, it can be described as a nonconceptual, somatic, and, at the same time, necessary prerequisite for other types of self-knowledge. But what is embodiment really?[48] How exactly does it relate with the minimal pre-reflective aspects of self-experience? When is something embodied? What does it mean to say that, for instance, the mind or the self is embodied? Despite the growing interest in all aspects of human embodiment, there is little agreement about just what this term really means or implies for human experience.[49]

At a first level, the meaning of general terms such as that of the embodied mind or the embodied self is quite simple. Our ways of thinking, and experiencing ourselves and the world, are deeply rooted in our modes of bodily action, movement, and sensation. The body is not a passive means of implementing perceptual input for representing the world inside the head or an output device for commands generated by the processing of those internal representations. By contrast, it is an integral component of the act of thinking and the process of thinging. At a second level of analysis, however, important differences relevant to the actual role played by the body can be discerned. For instance, the term *embodied cognition* has been traditionally associated with a simple shift from the old idea of disembodied intelligence to one that is now fully grounded in neural structures and brain networks associated with somatosensory areas. Although the exact relationship between the mind and the body is still debated, there seems to be agreement—at least among those advocating a simple or weak version[50] of embodied cognition—that (a) the mind is fully reducible to the brain (this is where the influence of the body is realized) and, by extension, (b) the mind exists within the body's interior.

However, for those committed to a genuinely ecological-enactive grounding of human mind, such a weak use of embodiment looks rather unnecessary if not misleading. They would argue that a weak sense of embodiment not only fails to dissolve the old mind–body division but also seems to reiterate and strengthen it. A more radical sense and use of the term *embodiment* is thus needed—a sense that would enhance the value of embodiment over cognitivism,[51] demonstrating the important ways that the body (and, by extension, the world) matters.

6.5 Rethinking Our Bodily Self

There are several questions, and potential caveats, that we need to address in order to disambiguate the meaning of embodiment. One important question that can help us understand those differences between radical and simple or weak uses of embodiment concerns what is meant by *body* here. Consider the following simple definition proposed by Frédérique de Vignemont: "E is embodied if some properties of E are processed in the same way as the properties of one's body."[52] What makes our body so special is that unlike other objects and other bodies, "we have an internal access to it."[53] In other words, not only do we get to know our body like no other object, but we also know it from the inside (recall our discussion about the paradox of human subjectivity in chapters 1 and 3). Moreover, we feel, perceive, control, and care for our body like we do for no other body or object.

I argue that if notions of embodiment are to have any real explanatory value in the study of self-consciousness and the mind, they ought to mean something different than the brain. This is not because the brain should be kept separate from the body. Rather, it is because if in our discussion of embodiment we allow the brain to qualify as part of the body, we run the risk of trivializing the claim that the body is crucial to mental life, ending up with some version of brain identity theory.[54] This kind of embodied cognitivism—namely, the limited representational view of embodied mind as something contained, localized in, caused by, or identifiable with the brain—must be overcome. The embodied self must be more than a collection of neural representations. Otherwise, it is an empty concept. Those weak perspectives on embodied cognition can be useful when it comes to understanding the links between high-level cognitive processes and low-level bodily experiences in the brain, but they also serve to reiterate and hide the traditional drawbacks of cognitivism. Specifically, they create the illusion that embodied cognition and classical representational cognitive science are compatible, subject to limited adjustments (e.g., the recognition of the importance of an organism's sensorimotor experience, which nonetheless becomes realized by means of neuronal representations). I am not saying that the embedding of cognitive processes in brain circuitry is wrong as long as one specifies what this embedding means and how it relates to the body and the material world. The hand and the brain *transact*, and to reduce the action of the former to the

latter is to miss the very point of introducing the term *embodied cognition*.[55] The material engagement approach subscribes to a hard or radical version of embodiment, according to which cognition is grounded in situated action and constrained by the specific kind of body we possess (see also the discussion in chapter 2). It is important to clarify here that the meaning of the term *body*, far from reductive and fixed, also relates to the details of bodily constitution (developmental and evolutionary) as determined by the nature of local transactions, skills, and modes of material engagement. The latter goes against the functionalist claim (often implicit in some versions of extended mind theories) that the same kind of cognitive process or state can be realized in different kinds of bodies or material instantiations. In contrast to the functionalist principle of multiple realizability (for some, the key premise of AI), for MET, different kinds of bodies/embodiment equal different kinds of minds (see also the discussion of the hardware/software analogy in the previous chapter). This last point is worth stressing.[56]

It is important to note here that although the majority of scholars who recognize the self as embodied would naturally allow for a crucial role to the body in the constitution of the self, they actually see the self and the body as separate entities. The embodied self, as the philosopher Dorothée Legrand rightly observes, is more of a "mental self (i.e. a self characterized mentally) 'put into' a body, that is, for instance, a self whose mental states would be correlated with bodily (notably brain) states."[57] It is important, then, to specify the nature of the relationship between self and the body: "Is there a genuine *bodily self*, or is there only an *embodied self*?"[58] Legrand suggests that the self, more than embodied (i.e., attributed to the body), exists through the body (i.e., as a genuine bodily self). The logic of her thesis is summarized by four main premises[59]:

If (1) self-consciousness is constitutive of the self,

And if (2) bodily consciousness is a form of self-consciousness,

Then (3) bodily self-consciousness is constitutive of (a part of) the self,

Which implies that (4) (part of) the body is (part of) the self

Hence the definition of a *bodily* self.

Legrand's framework, seen as an interactive continuity between the reflexive self and pre-reflexive bodily self, can be easily translated into, or in any case is comparable to, the notions of the minimal and the narrative self we discussed earlier. Still, a problem remains. Although the emphasis on embodiment

made clear that the study of self necessitates anchoring to one's body, the implications of the fact that one's body is always embedded in one's environment remains less recognized and is not well understood. In the last part of this chapter, I seek to clarify that issue, which is a major concern for our purposes in this book. The question is: Where does the material environment fit into this picture of the embodied self? Answering that question will also prepare the ground for our discussion of self-bounding and the notion of the situated person perspective.

6.6 Profoundly Embodied Agents: From Embodiment to the Act of Embodying

One thing that must be clear so far is that the view of human becoming that emerges from the point of view of material engagement theory, even if not incompatible, cannot easily fit with any of the weak versions of the term *embodiment*. Despite the productive emphasis on the body, a weak understanding of embodiment essentially implies that the human agent remains trapped inside the biological boundaries of the individual. Consequently, the traditional drawback of mistaking the properties of the extended system for the properties of the person[60] holds still. On the contrary, as discussed, material engagement theory, advocating a thorough reconfiguration of the relation between mind and matter or persons and things, is proposing a level of analysis not reducible to the individual. Instead, our bodily worldly engagements with the material world become the new analytical unit for the study of self.

Within this cognitive ecology, the human self (minimal and narrative, pre-reflexive and reflexive) emerges above all "as a soft self."[61] Softness here signifies the porosity and plasticity of self-boundaries or what Andy Clark describes as *profound embodiment*. But what exactly does it mean to say that humans are first and above all profoundly embodied agents? Clark has a simple answer, which is very much in line with the one proposed in this book: "Our best tools and technologies literally become us."[62] The challenge, as we have identified repeatedly and in different forms in the previous chapters, is how to come up with new ways and tools for understanding this union of brains, bodies, and things in human becoming.

The proposal of this book is that we need to replace the weak conventional understanding of embodiment with something more radical, seeking to understand the situatedness of the human body as something inherently

plastic, prosthetic, and incomplete. This is what the material engagement approach does by shifting attention from embodiment (the condition of having a body) to the act of embodying (the actualization of the capabilities that emerge from that condition). The term *embodiment* now takes on a new relational meaning. Specifically, embodiment is less of a property that a self has by virtue of having a body and more of a process that a body undertakes by virtue of becoming a self—specifically, an act of embodying. Embodiment is the process that allows for diverse neural and extra-neural multimodal resources (bodily, artifactual, or semiotic) to come together and interact through acts of bodily prosthesis and incorporation. This way, it establishes the local possibilities and rules of engagement.

This minor shift in perspective, from embodiment to the act of embodying, has some important implications that will be exemplified and spelled out in part III of this book through the idea of self-bounding (chapter 8) and the notion of the situated person perspective (chapter 9). For now, a good way to end this chapter is to point out two major implications relevant to the major analytical distinctions we have been discussing.

The first implication is that embodiment is no longer a delimiting property or bodily boundary but rather a dynamic perturbatory channel through which the world becomes part of us and we become part of the world. In other words, embodiment is not a condition of bodily containment but instead a condition of enactive extension, participatory interaction, and distribution.[63] This also means that the local details of embodiment, in terms of emplacement, enskilment, situation, and material mediation, *matter*.

The second implication is that the meaning of the body relevant to human embodiment and the embodied self, far from reductive, universal, and fixed, must include and refer to the details of bodily implementation (neural and extra-neural) and action-taking potentials, as those can be determined by the nature of local interactions, cultural practices, and prostheses. In contrast to the functionalist principle of multiple realizability, different kinds of bodies and conditions of embodiment create different kinds of minds and possibilities of self-identity. In short, the act of embodying forms the precondition for self-becoming and vice versa. Self is not embodied; it is a self enacted through the act of embodying.

7 Beyond This "I" That I Know

In the previous chapter, we looked at the different levels and varieties of self-experience, highlighting several aspects and nuances of the self from the point of view of philosophy and cognitive sciences. Our attempted ontological stratigraphy of the self, however, can only ever be incomplete until our analysis is supplemented and informed with the historical and anthropological nuances and complexities of the concept of self. In this chapter, I set out to do precisely that by looking at some particularly salient historical and anthropological examples of self-making. The main objective, which will guide also my selection of the material to be discussed, is to expose and suggest ways to overcome two major misconceptions or discontinuities in the way selfhood have been traditionally approached. The first misconception concerns our deeply entrenched modernist presuppositions about the ontological boundaries of self. It concerns, in other words, the classical distinction between inside and outside. The second misconception concerns the perceived discontinuity between the level of minimal or bodily self and the level of conceptual, reflective, or sociocultural selfhood we discussed in the previous chapter. I start with the former.

7.1 *Héautoscopies*: Self-Knowledge in Homer

A particularly telling early example that one could use to illustrate the contrast between the malleable, historically embedded character of self and our often taken-for-granted modern ideas about its fixed and universal nature can be found in the famous world of Homeric epics. Although it is little known outside the field of classical discourse, many scholars, following the lead of Bruno Snell,[1] have raised doubts about whether the kind of person presented in the Homeric text can be seen to act as a fully integrated and

autonomous agent.[2] The crucial question, as phrased recently by the historian Christopher Gill, can help us expose the heart of the matter: Was the Homeric person "conscious of having, or being, a unitary self, an 'I', and conscious that it is this 'I' that makes [choices]"?[3] Established convention—and common sense—wants us to think that the answer is yes. And yet, many researchers have answered this question in the negative. They have argued that the Homeric epics show an absence of awareness of a unitary self and have questioned the supposed continuity and individuality (indivisibility) of the self. How can this be?

The problem of the Homeric self remains, of course, a matter of extensive debate and speculation. It helps to approach the issue using some of the available conceptual stratigraphies of selfhood we discussed in chapter 6. The differentiation between a minimal and narrative self offers a useful starting point. There are two principal ways to proceed. The first is to focus on the conceptual or reflective domain of selfhood and to situate the Homeric self at the center of some fictional, personal, or cultural narrative. This would be fine as long as we avoid a common mistake that such a conceptualization embodies—that is, the mistake of assuming that our own contemporary ideas and narratives of selfhood are somehow more real or true than those existing in the time of Homer. This is precisely the mistake Snell made by misinterpreting the differences in the nature of the Homeric self as an absence or deficit of selfhood.[4] His normative developmental perspective, firmly grounded in a Cartesian conception of what is like to be a person, failed to recognize that there can be varieties of selfhood of a very different kind. Obviously, what Agamemnon lacks is not a proper self but simply the fundamental awareness of the organic unity of its soul parts characteristic of post-Platonic Western ideas about what a proper self should be. As Bernard Williams correctly observes, criticizing Snell's thesis, "there is certainly one thing that Homer's descriptions of people did without, and that was a dualistic distinction between soul and the body."[5]

With this last consideration in mind, let us now return to the second available approach to the question of the Homeric self, focusing this time on the minimal domain of selfhood. As discussed in chapter 6, it is this minimal self that is disrupted when, for instance, patients with schizophrenic delusion of control fail to identify the correct source of their own actions or mistake their intrusive thoughts for external voices.[6] Here is how a deluded patient would describe such an experience: "Thoughts have been put in my head

that do not belong to me. They tell me to dress. They check the bath water by doing this gesture."[7] Strange as it might appear, it is precisely this feeling of extraneity, a disturbance of the sense of agency, with the sense of ownership remaining intact, that can be seen to characterize many aspects of the Homeric self. Agamemnon and the other Homeric heroes act as if they experience the world from the perspective of the anarchic hand—that is, they act as if they own the hand but not the action.[8] Should the above comparisons lead us to the rather extreme conclusion that people in the Homeric world suffered from some contagious agency delusion?

Naturally, we do not have to suppose anything so bizarre. The Homeric self, I propose, is neither a "figment of metaphysically fevered imaginations,"[9] to use, for example, Daniel Dennett's description of this sort of conceptualization, nor the sign of some sort of archaic Schneiderian syndrome (delusions of control).[10] A simpler solution may present itself if, instead, we simply recognize, following the suggestion of Michael Clarke, that for Homer, there is no mental part or true self that can be distinguished from the body because the "body is indistinguishable from the human whole."[11] For Homer, the parts of the soul are not of a different kind than the parts of the body. This is not to deny that people in Homer had a brain and a body in the same manner that the later Greeks, modern Europeans, or Melanesians do, but simply to say that people in Homer did not know that body qua body but merely as the sum total of their limbs. What it means is that the Homeric self did not have a body in the sense that a modern individual understands what it is like or what it means to have a body from a Cartesian viewpoint. This also explains Clarke's suggestion that to seek a word for *body* is to ask Homer a wrong and unanswerable question. That a human should have a body makes sense only if s/he has another part to be distinguished from it: soul, mind, and the ghost in the machine.[12]

This is not the place to resolve the debate about whether people in Homer act or do not act with full self-consciousness or from the perspective of a unitary "I." What is more important, for our concerns in this chapter, is to discuss the implications of this controversy for the ways we understand and approach the question of self—that is, to discuss the possible lessons the debate over the Homeric self can teach us. One such lesson, very important from the perspective of cognitive archaeology, is the following. If, contrary to our commonsense dualism, the traditional notions of human agency and intentionality did not make any sense for the Homeric person who "does not

yet regard himself as the source of his own decisions,"[13] then why assume, as archaeology often does, that they made sense for humans in the deep time history of our species? If the attribution of agency—the "who did it" question—can prove to be such a tricky and complex matter for a society of minds that lived just a few centuries before the dawn of Greek philosophy, then why assume the existence of such a self-conscious individual agent, fully aware of being the source and initiator of one's own actions and their consequences, painting the walls of the Chauvet cave approximately thirty thousand years earlier or shaping symmetric hand axes approximately hundreds of thousand years earlier?

Every phrase written about human prehistory that implicates some sort of conscious "I" that acts, plans, and thinks invites these questions in one form or another. Maybe, as the philosopher Charles Taylor argues in his *Sources of the Self*, underlying the "baffling contrasts" of human agency, "we can probably be confident that on one level human beings of all times and places have shared a very similar sense of 'me' and 'mine.'"[14] But from where does our confidence concerning the universality of a similar sense of "me" and "mine" emanate? What is the evidence that qualifies such a certainty and warrant the universality of this unitary minimal self?

Even if we decide to disregard those questions, setting aside the possibility of a Homeric non-unitary or distributed self as the product of mythopoetic narrative, or even as a mere misinterpretation of the Homeric poems from Snell and his followers, the crux of the problem cannot be dismissed as easily as our modern predispositions would have wanted. A substantive amount of anthropological evidence from a variety of ethnographic contexts testifies that persons are not necessarily predicated either on the category of individual self-contained being or even on the category *human*. In what follows, I discuss some representative examples.

7.2 Ontologies of Relatedness and Dividuality

Take for instance the example of the Ojibwa in northern Canada. Irving Hallowell's provocative ethnography of Ojibwa ontology based on his fieldwork conducted in the Lake Winnipeg area during the 1930s describes a fundamentally different sense of self in comparison to the modernist one. In particular, the familiar axiomatic dichotomy between human and nonhuman, with person or self being a subcategory of human, gives way to a radically

different conceptualization in which the concept of self becomes an overarching category in which not only humans and animals but also natural elements and forces such as stones, trees, thunder, or the wind may equally participate. According to Hallowell, "all animate beings of the person class are unified conceptually in Ojibwa thinking because they have a similar structure—an inner vital part that is enduring and an outward form [e.g., human, animal, stone] which can change. Vital personal attributes such as sentience, volition, memory, speech are not dependent on outward appearance, but upon the inner vital essence of being."[15]

Strangely enough, humans are simply one among other subcategories through which Ojibwa experience selfhood. This raises a crucial question for anthropology: What is it like to be a person or self (I use the concepts of person and self, or personhood and selfhood, interchangeably) in a context where other-than-human entities are recognized as persons?[16] I will return to this question below in our discussion of Amerindian perspectivism. First, and before we delve into the Amazonian ethnography, it is important to take a short detour to Oceania in order to properly introduce two closely related notions, briefly discussed in the book's introduction, with a huge impact on the anthropological study of self. These are the notions of *dividuality* and *partibility*. Marilyn Strathern's examination of the dividual Melanesian person in her much-quoted work *The Gender of the Gift*—drawing extensively on her ethnography of the Hagen people in the Western Highlands of Papua New Guinea—offers the classical example: "Far from being regarded as unique entities, Melanesian persons are as dividually as they are individually conceived. They contain a generalized sociality within. Indeed, persons are frequently constructed as the plural and composite site of the relationships that produced them. The singular person can be imagined as a social microcosm."[17] Few other notions in recent anthropological literature have been as influential in shaping the comparative understanding of selfhood as this relational Strathernian description of Melanesians.[18] Through this new emphasis on dividuality, the category of person was reconfigured to a composite being constituted of detached parts comprising relationships, gifts, land, labor, knowledge, and gendered substances. The absence of clear distinctions between subjects and objects and the embodied dynamics of partibility became the new defining features of the Melanesian self. They also offered to anthropology a much-needed contrast and way out from the egocentric tyranny of modernity and the Western ideals of personhood. At

the same time, taking momentum from Strathern's radical reading of Melanesian societies, numerous ethnographic studies began to challenge our conventional ideas on agency and causality and to develop a more radical view of selfhood based on relatedness. Various ethnographies of personhood, from the Nayaka of South India[19] to the Siberian Yukaghirs[20] to the Amerindian peoples in Amazonia,[21] can be invoked to support, albeit each in its own distinctive way, the authority of intersubjective compound beings (comprising human and nonhuman elements) over the singular person. Let us briefly review four indicative examples of the relevant ethnography.

7.3 *Devaru* Superpersons

I begin with Nurit Bird-David's ethnography of the Nayaka—a hunter-gatherer community in the forested Gir Valley in the Nilgiri region of South India.[22] What is the Nayaka self made of? Is it really different from the modernist subject? Consider for instance the enigmatic notion of *devaru*. This concept is hard to translate or understand from a modernist point of view. Bird-David suggests that it corresponds to a process of dividuation or "Nayaka-in-relatedness" that creates nonhuman superpersons—that is, persons with extra powers. Bird-David argues that *devaru* are dividuals, both in Strathern's sense of a person constitutive of relationships[23] and in the sense of a person constitutive of transferable particles, which form a composite substance. What does this mean?

Put simply, it means that the *devaru* are objectifications of the peculiar participatory relationships between the Nayaka and their environment. A simple but powerful way to illustrate this peculiar mutuality of Nayaka's "we-ness" is to use a specific instance from the relevant ethnography. Bird-David reports how two particular stones moved toward and jumped on two Nayaka women, who then designated the stones as *devaru* and brought them to their places "to live" with them.[24] As Bird-David explains, this does not mean to imply that every stone in the area was recognized or dividuated as a *devaru*. On the contrary, most stones were seen as stones rather than persons. As Hallowell's provocative ethnography of the Ojibwa, discussed in the previous section, reminds us, not all stones move or are considered alive, but "*some* are."[25]

What does all of this imply for Nayaka's ability to dividuate other beings in their environment, creating persons and superpersons? Seen from the point of view of modernity, these kind of participatory relationships between

humans and their environment can be described as animistic and classified as instances of failed epistemology—even if they are often reasonable errors or what Guthrie would see as parts of a "good perceptual strategy."[26] However, viewed from an ecological-enactive perspective, they can be also interpreted as instances of relational epistemology—that is, as ways of educating Nayaka's perception to the relational affordances for joint attention and "we" intentionality needed for experiencing and reproducing *devaru* as dividual persons.[27]

What is it like to be a Nayaka then? As with many other anthropological questions, kinship offers part of the answer. To understand Nayaka's self, you need to understand first Nayaka's modes of relatedness. You need to understand, in other words, the Nayaka's ways of sharing the world and participating in each other's existence. Nayaka relate to the world in the way they relate to each other. Nayaka's sense of self is on a par with their sense of kinship.[28] In particular, the Nayaka person is sensed and made on the basis of sharing relationships with surrounding human and nonhuman beings (e.g. hills and elephants). This does not mean that the Nayaka do not recognize that humans, hills, or elephants are beings of different sorts and embody different situational affordances. It simply means instead that, for the Nayaka, the fact they intimately share the local environment and interact with some of these beings is sufficient reason to override these differences and participate into one "we-ness."[29]

7.4 Perspectivism

I now turn to perspectivism. The work of Eduardo Viveiros de Castro[30] and Fernando Santos-Granero[31] among Amerindian peoples in native Amazonia will provide the main focus of our discussion.

Perspectivism is essentially a description of the lived experience and understanding of the Amazonian cosmological system and beliefs about human–animal relations. It seeks to account for what came to be known as the perspectival quality of Amerindian thought—namely, the native Amazonian animistic view of the world as an ontological compound of human and nonhuman subjectivities and distinct points of view. This should not be understood either as yet another extreme form of anthropological relativism or as a translation of the ways native Amazonians naively take things to be. Perspectivism was never intended to be anything of that sort. Instead, it is an

onto-ethnographic system that seeks to express the metaphysical continuity and communication between otherwise discontinuous bodies and species. A good way to explain this is by looking at the major immutable and transformative attributes in native Amazonian theories of personhood. At the heart of Amazonian animism, there is a tension between, on the one hand, the continuity of the soul as a given spiritual quality and, on the other, the discontinuity of body as the physical dimension of the person among different natural forms (human or animal). The distinctive feature of perspectivism is that it seeks to recast this tension in terms of natural differences in their point of view rather than cultural differences and representations. According to perspectivism, all kinds of living sentient organisms see themselves as humans—that is, they are endowed with subjective selves and culture and are able to communicate—if they want to—with one another. If all animals are people, then the bodily appearance of each individual species is mere clothing, concealing an internal human soul or consciousness. According to Viveiros de Castro, this notion of species' physical form as changeable and removable clothing expresses the principle of metamorphosis found in Amazonian ontologies. However, as long as different bodies incorporate and thus produce different points of view, the perspectivist self is seen no longer as comprising a multiplicity of subjective experiences but instead as comprising a multiplicity of objective realities.[32] This perspectivity—that is, the capacity to occupy a point of view—becomes the diacritical element of personhood as a property of degree and context rather than of some species and not of others.[33] To express the distinctive feature of Amerindian thought, Viveiros de Castro uses the term *multinaturalism*, (founded on the unity of culture and the multiplicity of natures or ontologies) which he contrasts to modern multiculturalist cosmologies (founded on the unity of nature and the multiplicity of cultures or representations).[34]

This brings us back to Hallowell and the postponed question about what it is like to be a person in a context where other-than-human entities are recognized as persons. We saw that for Viveiros de Castro, the question of personhood (human or animal) is essentially a question of context. But contexts, he writes, "cannot be imported ready-made from our own intellectual context—they must be defined in Amerindian terms."[35] Another interesting attempt to answer the same question can be found in Fernando Santos-Granero's examination of people-making practices (beinghood) among the native group of Yanesha of the mountains of eastern Peru,[36] which I turn to discuss now.

7.5 People-Making Practices Among the Yanesha

What goes into the making of Yanesha persons? Santos-Granero's examination is especially interesting because although he adopts a constructivist standpoint, he is more interested in the phenomenological composition of persons/bodies than the processes of their social or discursive fabrication. He is also interested in the role of objects in people-making processes. What does this mean? If the Yanesha are constructed entities, what kind of stuff or substances might be involved in their fabrication and constitution to the kind of beings they are? What are the different processes, and how is the anatomy of the Yanesha affected by these processes?[37]

Santos-Granero argues that Yanesha persons are heterogeneous and composite and that their composite character "is not a root metaphor but a physical actuality."[38] This physical actuality comprises a variety of material forms—for instance, plants, animals, and gifts provided by a person's parents, relatives, and friends, as well as by the gods. All these are thought to be extensions of self and constitutive parts of the person's body.

Let's consider a specific example. Take for instance, the gifts of ornaments that parents offer to their children:

> These ornaments are thought to be endowed with the subjectivities of their parents, as they are made with their own hands. Through prolonged intimate contact, these gifts undergo a double process. On the one hand, the subjectivity of the makers of the gift is incorporated into the subjectivity of the gift receiver. On the other hand, gifts undergo a process of ensoulment—or subjectivation of the gift by the gift-receiver—and as a consequence they become, literally, part of their owner's body.[39]

What does it mean to assert that Yanesha have composite anatomies and extended subjectivities? What does it mean to consider the personal ornaments worn by the Yanesha as constitutive parts not only of their bodies but also of their souls? From a Yanesha point of view, personal ornaments are part of the stuff out of which persons are made. Santos-Granero proposes that the way to understand this transference of substances and qualities (of animals, plants, or things) responsible for the body-making processes of Amazonian persons is not that of Frazerian principles of contiguity and contagion "but rather through the actual incorporation of the bodies and subjectivities of such entities."[40] Specifically, there are two modalities of incorporation that operate in parallel: embodiment and ensoulment.

As an example of the first modality (i.e., embodiment), Santos-Granero suggests the transformation of "particular forms of ritual knowledge into a strong heart." A good example of ensoulment is the incorporation and gradual transmutation of personal ornaments and tools into body parts. But how are we to make sense of this process of ensoulment that Yanesha gifts undergo becoming, "literally, part of their owner's body"?[41] Santos-Granero has no satisfactory answer to this question. And yet, it is here that real challenge for the anthropology of self lies. I will return to this question at the end of the chapter (as well as in chapter 8). I turn now to our final ethnographic example.

7.6 Yukaghir Metamorphosis

Rane Willerslev's account of the Yukaghirs of the Russian Republic of Sakha[42] uses the ontological principles of metamorphosis to illustrate a similar process of personal transformation and incorporation. The transformation involved here concerns the perceived capacity of Siberian Yukaghirs to take on, for short periods of time, the appearance and viewpoint of another species in an effort to manipulate and control it. Similar to what we discussed in the case of Amerindian perspectivism in the world of Yukaghir hunters, everything is animated and said to have an *ayibii* or what we would understand as a life essence or soul.[43] Although Yukaghirs do differentiate between conscious and unconscious beings, their conceptions of personhood can take on a variety of other-than-human forms. Personhood can be an attribute of rivers, trees, or animals as it is of humans. Moreover, it is commonly held among the Yukaghir hunters "that humans and animals can turn into each other by temporarily taking on one another's bodies."[44] This seems to be especially the case for the principal species of prey (elk and reindeer). But in what sense can we seriously conceive that "humans and animals can move in and out of different species' perspectives by temporarily taking on alien kinds of bodies"?[45] Can it be possible that different species take on each other's appearance and perspective beyond the symbolic realm of Yukaghir myths, language, and imagination?

This experienced metamorphosis is never complete. It should be construed not in an absolute sense but rather in a partial sense. The elk's body and the hunter's body never become the same. The Yukaghir hunter, when

approaching reindeer or an elk, does not strive for an actual metamorphosis (i.e., literally becoming the animal), which inevitably could result in the loss of one's own original species identity and past memory. Rather, the hunter simply "assumes the viewpoint of his prey"[46] in an attempt to deceive the animal by taking on its bodily appearance and by moving, smelling, and sounding like them.

For instance, Willerslev describes how the hunter, when approaching an elk, will move his body like an elk or try to sound like the animal by wearing wooden skis, covered underneath with smooth skin from the leg of an elk, so as to imitate the sound of the animal when moving in snow.[47] The hunter who takes on the body of a species other than his own becomes not a faithful copy of the host species but instead an incomplete image of it. What the Yukaghirs strive for when changing bodies is not to actually become the animal. On the contrary, as mentioned, it is imperative that an absolute transformation should be avoided at all costs. Adopting the point of view of an elk requires retaining a sufficient number of human physical qualities to identify them as a special kind of transformational beings able "to act in a manner similar to, but not altogether identical with, their host species." The bodily transformation is not absolute. Rather, "it permits the person to act in-between identities," freeing it "from the bodily limits of both his own species and those of the species imitated."[48]

But how does this work really? To answer that question, Willerslev draws on Michael Taussig's account of the mimetic faculty.[49] In particular, first, he points out that mimesis, like sympathetic magic, is a powerful way of perceiving, understanding, and thus relating to things and people outside oneself: "to mimic something is to be sensuously filled with that which is imitated, yielding to it, mirroring it—and hence imitating it bodily."[50] The second point about mimesis that Willerslev emphasizes is that it collapses the dichotomy between self and other. To explain, under normal conditions, humans experience their bodies from within (i.e., as subjects) rather than from outside (i.e., as objects). A person's body can be an object only from another's perspective in the same way as another's body can be an object from the perspective of the person. When the hunter is mimicking the prey, this distinction between subject (the hunter's body) and object (the animal's body) partially dissolves. In this situation, the hunter's own body and the body of the animal come to be experienced "ambiguously as both subject

and object, Self and Other." Here is how Willerslev describes this "reciprocal mirroring of perspectives":

> While the elk sees its body through the hunter's act of mimicry—that is, it sees its own species kind—the hunter for his part sees the reflected image of his own body through the acts of the elk, mimicking his acts of mimicry. In other words, the hunter does not just see the elk walking towards him, he also sees himself from the "outside," as if he himself were the elk—that is, he adopts towards himself the kind of perspective that the Other (as subject) has on him (as object).[51]

Mimesis, or what might be more appropriately characterized as mimetic empathy,[52] is what enables the hunter to assume a hybrid transformational identity, neither that of a hunter nor that of the animal but somewhere in between or both at once. The success of the hunter rests in this imitation-based hunting technique of keeping up a double perspective, which enables the transgression of the interspecies boundary. Thus, more than a mere metaphor, this capacity to take on the appearance and viewpoint of another species is a real mimetic bodily performance of being in the world, which allows the hunter to be similar to, yet also different from the animal impersonated. Yukaghirs undergo a physical process of partial dehumanization: "The elk is perceived as similar to, but not altogether identical with, the hunter himself. In other words, what we are dealing with is a strange fusion or synthesis of me and not-me into not-not-me: I am not the elk, but I am also not *not* the elk. And likewise: the elk is not human and yet it is also not *not* human."[53] It is this ability of partial transformation and metamorphosis that enables the hunter to seduce and kill his prey that offer one of the key aspects of being a person for the Yukaghirs. Indeed, what makes the Yukaghir conception of the animal's personhood a real aspect of their lived experience rather than a cosmological abstraction is the distinctive way in which Yukaghir hunters engage with their prey through an act of mimesis.

7.7 Some Problems: We Have Always Been In/Dividuals

Following this brief and inevitably selective ethnographic exposition of the question of personhood, I wish now to offer a more critical exploration of the use and possible contribution of comparative anthropological discourse to the study of self. In particular, I want to identify the main problems and delineate the theoretical basis for a possible cross-disciplinary framework that will enable us to tie and integrate the radical anthropological ideas

discussed in the previous sections with those found in philosophy and the cognitive sciences of selfhood (as discussed in chapter 6).

Two general questions guide my thinking here. First, are an anthropologist, a philosopher, and a neuroscientist talking about the same thing when they are using terms such as *person*, *selfhood*, or *self-consciousness*? Second, can anthropology, philosophy, and cognitive science, beyond their respective particularities and limits, produce commensurable knowledge on the question of self? The benefits of attempting such a cross-disciplinary integration of epistemic practices and sources of insights are many. However, a coherent attempt at linking what seems, at first sight, an incommensurable collection of ideas and analytical levels is yet to come.[54]

One reason for that relates to the second of the two misconceptions I identified at the beginning of this chapter and which I will now explore and try to overcome. This misconception concerns the commonly perceived discontinuity between, on the one hand, the minimal or bodily dimensions of self and, on the other hand, the conceptual, reflective, or sociocultural attributes of selfhood (see chapter 6). The roots of this misconception are deep. A characteristic early example can be seen in Mauss's famous essay *A Category of the Human Mind: The Notion of Person; The Notion of Self* published in 1938.[55] There, he assumes, as many scholars have done before and since, that one could, and should, be clearly differentiating between the concept of self and the sense of self (*moi*). It is the socially constructed nature of the former (i.e., the concept of self) that Mauss recognizes as the subject of cultural variation and explicitly identifies as the object of his analysis. In contrast to this, the sense of self (*moi*) remains unaffected from sociocultural influences and provides the common source of human individuality.[56] The proposed division between the concept of self and the sense of self also resonates with another classical distinction between a physical or natural body and a social body as originally posed by Mary Douglas in her *Natural Symbols*.[57] These two bodies correspond to different realms of experience. One realm—the domain of social anthropology—is the symbolic representational reality of the body as a medium of social expression, communication, and control. The second is the physical realm—the domain of life sciences—where the body emerges as an unmediated and clearly demarcated biological fact. From the point of view of the former, self is seen as the product of enculturation and personal narrative; from the point of view of the latter, it is the product of human biology and evolution.

To this day, this basic distinction can be found in most anthropological studies, where the self is essentially treated as an abstract discursive construction (dividual or individual) and, as such, separate from the minimal bodily aspects of self-consciousness. The problem with this division, which is but another manifestation of the deeply engrained dichotomy between nature and culture, is that it implies (wrongly in my view) the existence of different isolated layers of selfhood that can and should be studied independently of one another. Specifically, we have, on the one hand, the bodily or minimal self, which is universal and suited for experimental testing, analysis, and generalization and, on the other, the narrative self, which is made of local beliefs, memories, and cultural representations and, as such, is suited for contextual interpretive analysis, comparison, and ethnographic description. Such a division of epistemic labor is, of course, convenient. It provides the purified epistemological space that enables different disciplines to operate freely without having to defend or justify their analytical units, scales of observation, and meta-theoretical assumptions. So, to give an example, the neuroscientist could conduct her brain-imaging studies—for example, exploring the role of the right temporoparietal junction in human embodiment and sense of agency—and discuss the neural correlates of the Rubber Hand Illusion (see discussion in chapter 6), implicitly assuming that there is no need to look for possible correspondences with comparative anthropological studies searching for cultural differences in embodiment and the feeling of agency.[58] By the same token, the anthropologist could produce ethnographic accounts regarding local perceptions and ways of experiencing agency that may be compatible or not with the interpretations of the neuroscientist without having the slightest concern about why that happens or what this possible commensurability or incommensurability implies for the study of embodied self and agency.

As mentioned, the epistemic purity, power, and autonomy gained from this departmentalization of self-knowledge may seem convenient and pragmatic. But it comes at a great cost. The very boundaries we have carefully constructed to house our most precious disciplinary assumptions, sealing them and protecting them from external exposure or contamination, become our limits, obstructing any attempt for serious cross-disciplinary examination of the diverging insights produced from different methodologies at different analytical scales. As a consequence, major assumptions remain unquestioned, and important findings are not allowed to be cross-examined and

synthesized in a manner that could have provided a comparative basis for a more encompassing naturalistic interpretation of the different process responsible for how the self comes about.

A further indirect consequence of this epistemic split for the anthropology of self is that despite its diversity and unique power of descriptive analysis, it can easily be accused of a lack of consistency, if not imprecision. Such ambiguity inevitably discredits many of its foundational claims.[59] Take, for instance, Amazonian perspectivism. What does it mean to say that animals and spirits see themselves as humans and humans as spirits or as animals? As I explained in the relevant section, perspectivism should not be confused for a radical form of cultural relativism. To understand perspectivism, we are asked to abandon our usual epistemological concerns with cultural representations and adopt an ontological stance where the multiculturalism of Western relativism gives way to the multinaturalism of Amerindian perspectivism. On what basis are we then to assume, as Viveiros de Castro seems to imply, "that animals are endowed with a type of intentionality-based agency analogous to that of humans"?[60] To take this statement at face value, as a means of constructing richer (other-than-human) ontologies of personhood, is to take for granted and uncritically reiterate the central role that intentionality-based notions of agency have in human self-making. But it is precisely the meaning of those notions and their role in the constitution of self (human or nonhuman) that we should have been seeking to question and scrutinize from an anthropological perspective. In not doing so, for the sake of ontological purity or radical alterity, we are simply denying perspectivist ontologies to have any important transformative effect on current debates regarding the meaning of agency and its possible links with intentionality. So, how can we facilitate that?

7.8 Really "Real" Selves

Merely adopting any of the ready-made orthodox philosophical or cognitive science approaches to the study of human relatedness and using them as our guidelines to understand issues of perspectivism and the process of dividuation is not going to help much either. Traditional cognitive science approaches usually disregard or have grossly misunderstood the meaning and complexity of "we-ness" in anthropological discourse.[61] In addition, they have been largely dismissive of ethnographic encounters with self-making

processes and self–other divisions that violate or contradict established naturalized views of what self is and does. The dominant tendency here is to immediately reduce any abnormal perspectivist understanding to the general category of personal narratives or beliefs seeking to minimize or eliminate the impact of such anomalous self-experiences. The underlying assumption is that because local beliefs about the self are formed, in some sense, after the fact, they don't really count. Whatever the exact narrative (dividual or individual) that informs our ethnographic accounts of self-identification, and however interesting or detailed it may be, it does not compare with the epistemic status of experimental and brain-imaging methods. The same asymmetry applies for the epistemic value of the evidence derived from the structured questionnaires and psychometric scales used in the neuropsychology and psychopathology of self.[62]

To clarify: nobody denies that, for example, the Nayaka participate in what a modern observer can only classify as an animistic ontology, and that it is this ontology that provides Nayaka the root metaphors for their dividual ideas of self and their extraordinary conceptions of the *devaru* superpersons. However, there is also a general perception that neither of these culturally derived local aspects of Nayaka's self are really real. In other words, the outsider's assumption is that these striking differences in self-experience and self-knowledge are interesting, and certainly worth discussing, but they have little real explanatory value and epistemic significance in helping us understand the true nature of self. The reason for that is the commonly perceived ontological priority of the universal bodily self over the local (reflective or relational) narrative/discursive constructions. The implicit claim is, in short, that only the physical or bodily self is really real and matters. Cultural differences in self-concept, such as those entertained by the Nayaka or any other community, are real only if they can be shown by controlled experimental means that they influence or change the underlying neural or somatic substrates of self-representation. To put it simply, while it is widely recognized that there are many important differences in the concept of the person between and within cultures, the general assumption is that these differences are not of the kind that makes a difference. What kind is that?

Before I answer that question, I want to explain why this modernist critique is unsatisfactory. I will focus on one reason I consider the most important. It relates to our failure to realize the following substantive point. The kind of animistic thinking we see in the case of the Nayaka is not a sign

of failed epistemology (one that wrongly projects life and consciousness where there is none) but rather the product of their relational ontology of personhood. The latter has precedence over the former or, in any case, it is present from the very start (rather than occurring after the fact). Moreover, the perspective from which to look at Nayaka's construction of personhood cannot be that of the Western autonomous individual agent, which is characterized by the fact that persons seek to retain their independence (individuality) from the relations they participate in—on the contrary, for the Nayaka relationality or dividuality is the foundation of everything. In other words, personal identity is not a stable mental representation or first-person perspective from which to subsequently perceive and individuate self and the world but rather a dynamic (unstable) experiential locale (lived space) through which to dividuate the world and other beings in it by becoming attentive to them.[63]

Similarly, to use the example of the Yukaghir hunters,[64] the perspectival thinking that goes into the human–animal transformations is not made of representational abstractions (expressed in myths and other types of cosmological discourse). Rather, metamorphosis is an integral part of their self-experience—an affordance of their material environment (lived space) and hunting activities. The hunter's engagement with the material world, as it can be observed specifically in the context of imitation-based hunting techniques, offers the necessary point of departure for a proper understanding of Yukaghir's in-between, metamorphic identity (neither that of a hunter nor that of the animal).

The challenge for anthropology here is twofold: first, to avoid idealized conceptions of persons and "bring perspectivism 'down to earth'"[65]; second, to avoid prioritizing or exoticizing differences and ignoring or obscuring the possible similarities in the human modes of self-becoming. Principles of perspectivism and processes of dividuation are as present and active in non-Western ontologies of relatedness (Amazonian or Indian) as they are in contemporary Western ones—which is another way of repeating Bruno Latour's mantra: we have never been modern.[66] Partibility and dividuality, permeability and porosity are not special modes of self-identification that only some people (e.g., distanced "Others," who, like the Nayaka, live in animistic societies) are capable of experiencing. Instead, they are local instantiations of the fundamental features of human situatedness and enactive in/dividuation (see chapters 8 and 9).[67]

7.9 Demystifying Dividuality

Our anthropological overview of self in this chapter started with Strathern's exposition of the Melanesian person as a composite site, where aspects of the self are distributed among others, as are others in oneself. We saw, using different ethnographic encounters, that this basic idea of relational and composite personhood is not restricted to Melanesia, and we discussed some characteristic ethnographic examples that illustrate the different perspectival meanings and cross-cultural instantiations of such peculiar phenomena or entities referred to as other-than-human persons.

However, behind the obvious heuristic and comparative merits that the anthropological framing of the question of self by way of the perspectival polarities of dividual–individual has, there are also a number of pitfalls. I want to underline three of them.

First, the explanatory validity of the classical individual–dividual distinction in the cross-cultural analysis of selfhood can be questioned as wildly overdrawn.[68] There are as many important differences within Western persons as there are between Western and Melanesian persons or between Indian and Melanesian persons.[69] Consider, for instance, Cecilia Busby's distinction between permeable and partible persons in South India and Melanesia.[70] Seen in the context of the conventional comparisons between the Western bounded individuals and non-Western dividuals, both Melanesian persons and Indian persons have been characterized as examples of the latter. However, a closer anthropological look at the notion of dividuality reveals a more complex picture. Busby's comparative analysis of bodily personhood contrasts the ways Melanesian bodies are internally divided and partible—"a mosaic of male and female substances, *internally* dividing up the body into differently gendered parts"[71]—to the ways South Indian bodies are internally whole—"a definitively (wholly) male or female person"[72]—but with a fluid and permeable body boundary. As she argues:

> While gender in South India is a fixed and stable attribute of the body, gender in Melanesia appears to be primarily performative, concerned with what people do (or how they do it) rather than what they are. Here, attributes such as gender cannot be known in advance but must be drawn out, or displayed, through the successful manipulation of relationships.[73]

Even within the native Amazonian peoples, conceptions of self vary between, for example, the Wari'[74] and the Yanesha.[75] These variations are often reduced

to the broad category of the Strathernian dividual, which, as Marshall Sahlins observes, "is threatening to become a universal form of pre-modern subjectivity."[76] Any absolute or simplistic contrast between the West and "other," where the West comprises modern individuals and the "other" non-Western dividuals, is deeply problematic, as I explain not only below but also in the next chapter.[77]

Second, the category of the Western individual is highly problematic, especially when it becomes the standard or yardstick for measuring selfhood. We should bear in mind that the term *individual* has undergone fundamental changes in the course of history. Thus, references to the individual person are not particularly illuminating. A good example of this point can be found in comparing ancient Greek and modern ideas of selfhood. As we discussed earlier in this chapter, the dominance of individuality and "I"-centered self-consciousness as the main point of reference for defining personal identity in modern Western thought is radically different with what appears to be the case in ancient Greek thought.[78] Louis Dumont has, in fact, traced the origins of the concept of individuality as the bounding condition of selfhood to the work of the early Christian thinkers and, in particular, St. Thomas Aquinas. As he observes:

> Something of modern individualism is present with the first Christians and in the surrounding world, but that is not exactly individualism as we know it. Actually, the old form and the new are separated by a transformation so radical and so complex that it took at least seventeen centuries of Christian history to be completed, if indeed it is not still continuing in our times.[79]

Last, divisible or indivisible, notions of self in anthropology are essentially perceived as social constructs. Such a constructed self, the product of society or culture, even when associated with specific socio-material practices, lacks an explicit grounding in human biology and the material world. This creates two problems. First, it reiterates the nature–culture dichotomy we have been discussing earlier in this book. Second, anthropological conceptions of dividual personhood overlook the important role played by material objects, practices, and environments in the people-making processes,[80] especially outside the sphere of traditional gift exchange, where to give a gift is to give a piece of oneself (inalienable object)—as in Marcel Mauss's seminal work on the Māori concept of *Hau* ("the spirit of the gift" that forces the recipient to reciprocate).[81] The need to pay more attention to issues of materiality has also been underscored in Willerslev's discussion of Yukaghir's perspectivist

mimetic empathy as a decisively corporal and tangible quality—stressing the practical side of Yukaghir animism and personhood.[82]

7.10 Enactive In/Dividuation

Notwithstanding these problems and critiques, I suggest that the notion of the dividual is still valuable and applicable for comparative analytical purposes. However, its value is not as a means of differentiating modern Western individuals from premodern non-Western dividuals. Rather, its value lies in offering an alternative lens for understanding the role of relatedness in the making of both modern and premodern subjectivities. The verbs *to dividuate* or *to individuate* could be used to express this universal sense of relatedness that characterizes human subjectivity as a situated process. Bird-David was the first to use these terms in the context of her examination of Nayaka's modes of relatedness discussed previously:

> When I individuate a human being I am conscious of her "in herself" (as a single separate entity); when I dividuate her I am conscious of how she relates with me. This is not to say that I am conscious of the relationship with her "in itself," as a thing. Rather, I am conscious of the *relatedness with* my interlocutor *as I engage with her*, attentive to what she does in relation to what I do, to how she talks and listens to me as I talk and listen to her, to what happens simultaneously and mutually to me, to her, to *us*.[83]

Drawing on this relational ecological conceptualization, it can be argued that instead of seeing dividuals and individuals as corresponding to real people characterized by diametrically opposed modes of being, we should be viewing the states of "individuality" and "dividuality" as dialectical possibilities of a single mode of self-becoming—that is, to argue that dividuality and individuality, instead of opposing each other, interact and coexist in various gradations and forms (minimal and narrative), co-constituting what we may call a process of *enactive in/dividuation*. On this construal, the dividual–individual distinction no longer refers to a dichotomy but rather to a unity along a continuum (figure 7.1; I will return to exemplify this point in chapter 8).

It should be noted that the process of enactive in/dividuation, besides being linked with Bird-David's notion of dividuation and the verb *to dividuate*, is also connected to Gilbert Simondon's conceptualization of technical objects and the individual–milieu couple.[84] The major assumption of Simondon's philosophy is that the process individuation is biologically inseparable

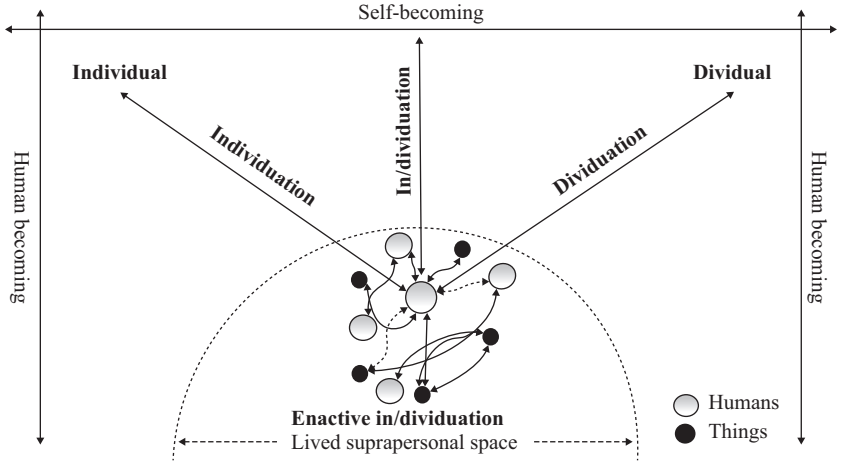

Figure 7.1
Enactive in/dividuation. Self constitution, seen as a process of enactive in/dividuation, occupies a shifting position in the lived suprapersonal space. This shifting position (i.e., SPP) is the dynamical product of the local entanglement between two processes: dividuation and individuation. What is important to emphasize is that the states of dividuality and individuality coexist as inseparable dialectical moments and should not be seen as separate antithetical kinds of self-becoming. Dividuality and individuality have no independent existence; they become constituted and can only exist as a mixture (i.e., the process of enactive in/dividuation). It is also important to note that the terms *individuation* and *in/dividuation* have different meanings. *Individuation* denotes the conventional form of subjectivation by which autonomous differentiated selfhood is created. *In/dividuation* denotes the self-bounding processes by which the dependent situated selfhood is enacted. The predicate *enactive* indicates the grounding of in/dividuation on situated action and the primacy of material engagement.

but ontologically prior to the individual (or, I will add, to the dividual). The individual cannot be used as the point of initiation for understanding the process of individuation. Rather, it is from the point of view of individuation that the individual can be understood.[85] The anthropologist Kåre Stokholm Poulsgaard,[86] in the context of his extensive ethnography with architects and engineers using digital computational design, coined the term *enactive individuation*, combining Simondon's philosophy of individuation[87] and Stiegler's philosophy of technics[88] with the enactive approach[89] to describe how individual and milieu "emerge simultaneously from the tension inherent in individuation" by means of creative thinging. The archaeologist Chris

Fowler, advancing a similar relational view of self, has been addressing this tension between individual and dividual aspects of personhood, proposing a multidimensional (rather than a single-spectrum) approach[90] according to which a series of dimensions may intersect with one another in varied ways. Each of these possible dimensions is characterized as a tension or gradation between two terms (e.g., indivisible and divisible, inalienable and alienable, fractal and monadic, holistic and analytic, fixed and mutable, singular and plural, permeable and impermeable, focused and distributed, independent and interdependent, autonomous and embedded, individualist and collectivist, human and more-than-human) but with no presumed a priori relationship between any one of these tensions and any others. Comparing different spectra allows for greater flexibility and a fuller appreciation of "how different factors may articulate with one another in the generation of personhood in different cases and situations."[91] Thus, the familiar mode of subjectivity we have come to associate with the notion of the Western buffered individual, typical of the disenchanted modern world, or with its most recent protean (after Proteus, the Greek sea god of many forms),[92] reinventive,[93] and quantified[94] manifestations in the contemporary infosphere[95] (see detailed discussion of these terms in chapter 11) is as real and historically situated as, for instance, the porous subjectivity[96] typical of the enchanted premodern world. These rather general characterizations are essentially abstractions created to describe historically emerging trends and types of selfhood. In reality, they are self-oscillations generated by the frictional forces of the perpetual tension between indivisible and divisible, permeable and impermeable aspects of self-becoming. The exact dimensions and ratio of these tensions may differ both within and across communities of practice. Still, the tensions are always there, having an important creative role to play in terms of (a) how different varieties of self become enacted, mediated, and distributed (or not) in time and space, and (b) where self-boundaries lie, how they become constituted, and when they shift.

The in/dividual person, then, emerges as the product of this dialectical tension between the dividual and individual aspects of self that can be found to exist in all cultures, albeit in different ratios, degrees of transparency, and ontological status.[97] Irrespective of whether this changing self can be best described, in particular historical situations and contexts of action, as individual or dividual, it remains, nonetheless, a compound of particular parts, relations, and materials that constitute its suprapersonal environment.

Selfhood, independently of whether it manifests in Western, Amerindian, or Melanesian contexts, is essentially the product of a self-bounding process that comprises both dividual and individual attributes. The same logic can be adopted when it comes to understanding basic self-disorders—that is, anomalous self-experiences associated with pre-reflective bodily or minimal self, such as those we see in the case of the schizophrenia spectrum.[98]

In short and returning to our postponed question about the differences that matter, here is a simple rule of thumb for discovering them: reject—or in any case question and destabilize—the modernist representational constraints imposed on human subjectivity, and focus instead on understanding the enactive basis and situated character of relatedness in different modes of human becoming.

7.11 Self-Oriented Ontologies: A Note on Method

Two major issues emerge from our previous discussion, which could form a suitable basis for productive dialogue between anthropology, philosophy, and the cognitive sciences. The first issue concerns the ontological standing of the various relational and inherently non-modern anthropological conceptualizations of self, and the second relates to the possible contribution that such perspectival, in/dividual, or partible understandings can make to the science of self and our understanding of human becoming.

As I explained, such an objective demands that we move a step further than merely recognizing the undisputable anthropological fact that conceptualizations of self vary cross-culturally, often quite sharply. It no longer suffices to claim, like Clifford Geertz did more than three decades ago, that for Java, Bali, and Morocco, the idea of selfhood "differs markedly not only from our own but, no less dramatically and no less instructively, from one to the other."[99] What should we do then?

The work of the anthropologist Maurice Bloch on the cultural construction of self, or what he refers as the "blob," offers a useful point of reference in this connection. He argues that in its current form, the anthropological study of the cultural construction of self has very little to offer to facilitate dialogue with philosophy and the cognitive sciences.

As we discussed, the epistemic divide between anthropology, philosophy, and cognitive science, largely the product of the capitalist modernist ideology, has created a number of problems that need to be overcome. For

one thing, it implies the existence of various independent layers of selfhood that can be studied separately. For another, it implicitly reiterates a problematic assumption about the ontological primacy of the bodily self. Indeed, it is implicit in the ethnographic case studies we discussed that, compared to the observed variability of the relational objectifications of "me-ness" and "mine-ness," the bodily grounding of first-person subjectivity—what we may call "I-ness"—is arguably less sensitive, if not totally immune, to cross-cultural variations. As a result, it is also perceived as potentially a more powerful and stable locus for grounding the self, even if it is less interesting from an anthropological perspective. Does this also mean that only the minimal bodily self is real and matters?

One major problem is that within the anthropological study of self, there has been little or no attempt to understand, relate, and distinguish the different levels of self-experience. According to Bloch, "Few things have more hindered dialogue between social and cognitive sciences than proper consideration of what level we are dealing with and of the significance of the relation between these levels."[100] But what are these different levels alluded to here? Bloch differentiates between three general levels. The level of the core self (comprising ownership and agency), the level of the minimal self (comprising the sense of continuity in time and the ability for mental time travel), and the level of the narrative self (linked primarily with autobiographical memory). In the first two levels, the word *sense* is used "in a particularly thin way implying no reflexive awareness whatsoever."[101] It is only the third level of narrative self that "significantly involves reflexive interaction with others."[102]

Clearly, the above distinctions correspond, or in any case are compatible, with the basic philosophical distinction between a minimal and a narrative self we discussed in chapter 6. Can it be argued, then, that differentiating between those two basic levels of self-experience is a useful analytical strategy for trying to understand what is it that the perspectivist knowledge of what it is like to be a Nayaka or a Yanesha can contribute to the broader question about the modes of human self-becoming?

One obstacle here concerns the mentioned opposition between nature and culture, which has, as a consequence, the commonly perceived discontinuity between the minimal self and the social or cultural self. As we discussed, the former type of self is perceived as the pre-reflective product of bodily and processes, whereas the latter is the reflective product of enculturation,

life history, and personal narrative. On this construal, the minimal self is universal and can become the object of reductive scientific analysis (which implies it can be usefully studied in isolation from its context). In contrast, the narrative self is contextual, sensitive to cross-cultural variation, and thus potentially open and better suited to sociohistorical interpretation and ethnographic description. Those conventional separatist trends essentially imply that the biological and social aspects of self exist, and thus can be studied, independently of one another.

In this book, I argue against that view. There are no different layers of selfhood that exist as separated entities. Instead, there is an interactive continuum of self-becoming (i.e., enactive in/dividuation) that cuts across these conventional divides and analytical scales. This continuity of self-experience is something that Bloch also explicitly recognizes as unifying the core minimal and narrative levels proposed.[103] The major challenge facing us, then, concerns the ways we go about conceptualizing the possible links that will allow the integration of the different levels. This integration, I argue, is essential if anthropology is to contribute to the question of self in any important sense. But in order for this integration to take place, a number of basic assumptions about how self is conceptualized in psychology, philosophy, and neuroscience must change. Although Bloch has successfully highlighted the need to recognize the complexity and continuity between the different levels of the "blob," he is not offering any systematic proposal about how his can be actually accomplished.

I suggest that one good strategy for meeting those challenges and bridging the different levels of the human self-system (minimal and narrative, bodily and symbolic) is to focus on the middle ground of material engagement and enactive in/dividuation. In the following chapters, I set out to provide the outline of such a framework, developing the notions of self-bounding and the situated person perspective.

III Poetics of Self-Becoming

In the previous chapters, I attempted a critical examination of some major analytical distinctions in philosophy and cognitive science, which I juxtaposed against a more complex perspectival understanding of the distinction between self and other from the anthropology focusing especially on the notion of the dividual person. The aim of this juxtaposition has been threefold: (a) to expose the variability of the modes of self-becoming, within or outside Western epistemology; (b) to get rid of some of the unnecessary modernist intellectual baggage associated with the notion of self—for instance, questioning the authority of basic divides such as subject and object, and nature and culture; and (c) to set a relational basis for bridging anthropological and philosophical conceptualizations, moving beyond the individual–dividual distinction and focusing on the process of enactive in/dividuation.

Continuing and expanding this line of thinking, part III develops and exemplifies the notions of self-bounding (chapter 8) and the situated person perspective (chapter 9). Neologisms can be accused of adding unnecessary complexity. However, they provide an escape route from inherited, established terminologies, which often distort the phenomenon we seek to understand and become a real obstacle to our inquiry. Language and the concepts we choose are both an impediment and the medium for expressing and objectifying our thoughts. The notions of self-bounding and the SPP will allow us to escape the separatist and locational logic of thinking about the self in terms of interiorities and exteriorities and adopt a more productive relational logic of connectedness and becoming that will help us to study the self as process. In this way, the problem of self will be reconfigured, from one occupied with self-knowledge from within and formulated in the language of representation to one occupied with self-becoming, in between,

and formulated in the enactive language of material engagement. This enactive vocabulary will allow us to capture the process ontology of participation (to be contrasted to the substance ontology of representation) and rhizomic structure[1] (to be contrasted with hierarchical tree-like structures) that characterize the multiplicity of self-constitution in the chiasmatic[2] (intertwined) domain of human becoming where the subject and the object (touching and touched) cross.

A major argument of this book is that there is no self as enduring substance apart from the actual self-bounding experiences and practices that constitute self-becoming in human life and deep history. My contention is that the making of the human self (self-becoming) cannot be accounted for independently either by looking at how the self is recognized and experienced from within (i.e., from a first-person perspective) or from the outside (i.e., from a third-person perspective). Instead, we must look at the lived self-bounding space in-between. This part of the book maps out a path into that in-between or middle space of material engagement where the self is enacted across and in-between rather than merely within.

8 Self-Bounding

8.1 A Selfbound Mode of Becoming

As pointed out in chapter 1, I coin the term *selfbound* to articulate the mode of becoming constrained by the awareness that experiential occurrences are personal—that is, they are bound to a living body in a self-specifying sense, a sense that matters to the constitution of self-identity. This self-specifying awareness, the product of self-bounding, is a distinctive characteristic of the modes of becoming we call *human*. As we discussed, no other animal, or form of organized matter, can be argued to be aware of itself as a living occurrence in such a self-bounding way—which is why I suggested that human self-becoming presents us with an anomaly in the evolutionary continuity of consciousness (see also chapters 1 and 3).

It is common, especially in the modern world, to identify and designate those bounding living occurrences as selves or persons and try to posit them (when the necessary linguistic means are available) through the use of personal and possessive pronouns such as "I," "me," and "mine." It is also customary to think of the human body, which enacts our unique sensorimotor experiential perspective on the world, as the locus of self—that is, to think that we *are* a body and that we *have* a body and to see the self as something located *within* that body, or to describe this intimate association between the self and the body (especially the brain) as an identity. Indeed, under normal conditions, human subjective experience of the lived body (*Leib*) is perceived as being coextensive with the organic body (*Körper*). The borders of the lived body and the physical body spatially correspond.[1]

Contrary to this view, the main argument of this chapter is that human subjectivity, as the product of enactive in/dividuation, cannot be enclosed

inside those bodily boundaries. Self is in the periphery: where the body meets the world—the border enacted across and in between rather than only within. At the intersection of brains, bodies, and things, the subject–object relation is transformed from a force of opposition to a force of unification. Subjectivity is no longer the general characteristic of human subjects; subjectivity now becomes the local emergent property of actual self-bounding occasions.[2] These self-bounding occasions are not subjective (in the phenomenal sense of the body-as-subject, experiencing the world from a first-person perspective) or objective (in the representational sense of the body-as-object, as can be seen from a third-person perspective) but rather situated.

I will be dealing with the concept of human situatedness and the exact meaning of terms such as *situation* and *situated body* separately in chapter 9. Suffice it here to say that the notion of the situated body can be understood in two major senses. According to the first sense, a situated body is *more* than a body and thus a prosthetic body. According to the second sense, a situated body is *less* than a body and thus an incomplete body. Below, I set out to explore what that *more* and *less* actually entail, focusing on issues of self-extension, incorporation, and ownership. There is an ontological disparity or tension here between continuity and change, identity and transformation, individuation and multiplicity. This chapter seeks to understand the material bases of this creative tension that characterize the relationship between human profound embodiment and self-bounding.

The image of self that I want to bring forth is that of a self that is located neither inside nor outside the brain/body but instead is constantly enacted in between brains, bodies, and things—and thus irreducible to any of these three elements taken in isolation. Self is extensive and entangled with the material world. This does not mean that you start with a core biological self, inside the body, which you then extend to meet the world outside the body. On the contrary, it means that you begin with an experiential continuum comprising feelings and prehensions, which you than restrict and objectify by means of self-bounding and enactive in/dividuation. I use the term *prehension* following Whitehead's definition—that is, "the general way in which the occasion of experience can include, as part of its own essence, any other entity."[3] The notion of the extended self should not be understood as denoting some independent layer (social, cultural, or technological) added to the periphery of some internal biological basic self (bodily or neuronal). The extended self is rooted and inextricably coupled with the supposedly

immune compartments of the bodily self. It should be seen neither as an external layer of socio-materiality—what anthropologists would call a *second skin* or *social skin*[4]—nor as simply the emergent product of some higher narrative, conceptual, or representational self-dimension (recall our discussion at the end of chapter 7).

The book's thesis is that because the human body is situated and incomplete, the human subjectivity grounded in it, or related to it (reflectively or pre-reflectively), must be relational and extensive. Even though the self is, by nature, grounded and inextricably bound up with the body, it also escapes the natural confines of any single body or brain. The body matters for the self because of the way it moves and engages the world and not for what it represents or contains on the inside. This conception differs—given its emphasis on material engagement—from many enactive conceptualizations in philosophy and neuroscience, which posit the bodily self as something "primarily given to us as 'source' or 'power' for action, i.e., as the variety of motor potentialities that define the horizon of the world in which we live."[5] However, it is not incompatible with them.

A more careful reading of some findings concerning the effects of things on the functional anatomy and structure of the human brain might help us expose some basic aspects of the hidden biosocial anatomy of extended selfhood. For instance, as I discuss below, studies of visuo-tactile interactions exploring the effects of the temporary or permanent incorporation of inanimate objects into the body schema[6] point out interesting possible points of intersection between the neural and the socio-material dimensions of self-becoming. In the following, I try to expose some important aspects of this intersection that can help us understand self-becoming and its constitution as an extended and situated phenomenon.

8.2 The Cognitive Archaeology of Peripersonal Space

Many, if not all, the issues we have been discussing depend on our understanding of self-boundaries, raising questions about the processes by which they become constituted as well as their rigidity or flexibility. To that end, some basic articulation of the lived action space around the body can be useful. I will show in this chapter that the topology of these boundaries, as well as the mereology (from the Greek *meros* for "part")[7] of their bordering components, are locally unstable and reconfigurable, extending beyond

the pre-reflectively experienced lived body. As we discussed in chapter 6, the claim that self-consciousness is embodied does not mean that the self is inside a body or is reducible to the brain. Rather, human self-becoming is a dynamical state of profound embodiment characterized by the permeability and plasticity of the self–world boundary.[8] The self is enactively in/dividuated in-the world. The ontological implications of such a conceptualization are more radical than one might think because it changes the geography of self-location as well as the significance of lived space in the debate over the nature of selfhood.

A common way to map the neuronal geography of the situated body is by adopting the established spatial coordinates of personal, peripersonal, and extrapersonal space. The three notions refer to the space occupied by the body itself (personal), the near space that immediately surrounds the body within the hand-reaching distance (peripersonal), and the far space that surrounds the body outside the hand-reaching distance (extrapersonal).[9] Neurophysiological studies with humans[10] and animals (e.g., macaque monkeys)[11] provide evidence that the use of objects and tools exert strong plastic effects on the neuronal topography of peripersonal space. Many studies have shown a neural remapping of space and dissociation between near and far spaces associated with the use of tools and objects.[12] A parallel trend in the relevant literature has been studying how tool use alters the body schema—that is, what is modified in the somatosensory representation of intrinsic properties of the body morphology.[13] The idea that tools and material things can be part of our bodies, incorporated somehow into our body schema, is an old and pervasive one. As Henry Head and Gordon Holmes famously remarked in one of the earliest formulations of this idea, "A woman's power of localisation may extend to the feather in her hat."[14] There is now an accumulating body of neuroscientific evidence showing that the body schema can be extended to include objects (e.g., clothes, ornaments, and tools) that bear a systematic relation to the body itself,[15] as well as many studies highlighting different spatiotemporal aspects and interpretations of the plasticity of the boundaries of peripersonal space.[16] However, the lack of conceptual clarity about (a) the agency of things as enactive signs in lived peripersonal space, (b) the ontology of bodily prostheses, and (c) the phenomenology of incorporation does not allow for a more coherent holistic interpretation of these experimental results. What those studies, in spite their differences, demonstrate and help us clarify is that the notion of the malleable extended body, far from being

just an anthropological curiosity or a bit of speculative folk psychology based on introspective claims, can now be seen to "have some correspondence to neurobiological reality"[17] supported by empirical experimental research. A wide range of findings clearly demonstrate that things can be literally parts of our bodies. Sometimes, their incorporation is partial or transient, contingent on their actual association with the body,[18] but it can also take the form of a more permanent prosthesis.[19]

Notwithstanding those developments, an important problem remains. The majority of these studies, committed to a neuro-centric approach to the human body and its extensions, end up conceptualizing the shifting boundaries of personal space (near or far) solely from within—that is, within the representational regimes of neural stimulation. No doubt, everyone recognizes that the effected changes in the neural geography are happening as a consequence of material engagement practices that take place inside the world. However, it is their neural representation in the brain rather than their actual material instantiation in the world that matters. Whatever the changes induced to the boundaries of peripersonal space, these are changes situated firmly inside the head. What else can they be? I will return to answer that question below. First, note how the traditional drawback of the representational idiom—namely, mistaking the properties of the extended system for the properties of the individual[20]—resurfaces. Let's be clear on what this mistake, which can take different forms, implies for the study of self-boundaries in general and peripersonal space in particular. I suggest that the following shortcoming should be underlined: the neural-representational idiom distorts and misrepresents the ontological ingredients of action (neural, bodily, social, and material) as well as their causal role in the remapping of the bodily space. To explain, there is nothing problematic about knowing what the brain does to anticipate, attend, and accommodate the changing modes of material engagement—for instance, before, during, or after the use of a tool. On the contrary, the more we learn about the neural side of mediated action and material engagement, the more the chances to understand their neural correlates and indexes—through traceable and potentially measurable changes in neural matter. The problem is, nonetheless, that the representational idiom allows for only one *real* side or dimension of activity—*real* in the sense that linear sequences of material cause and effect are real—usually the one localized inside the brain where, in fact, there are many continuous and complementary dimensions of activity that *really* matter. These continuous

and complementary dimensions of activity are situated and thus transactional (see discussion in chapter 1). They do not have sides or belong to specific experiential domains and thus are not necessarily realized inside or outside our heads. Rather, they are spread and distributed along a multiplicity of neural, bodily, social, and material components.

There are two important messages here that relate to our previous discussion of tools and bodily prostheses. The first message is that the effects of the use of tools or other bodily extensions are not limited to what is represented or otherwise indexed and measured in the brain through relevant patterns of neural activation (or deactivation). The second message is that what is indexed and measured in the brain has no a priori causal or ontological significance over those enactive signs or material indexes of activity that are not represented in the brain. Bear in mind that what cannot be traced and measured inside the brain does not mean that it cannot be traced, observed, described, or measured inside activity.[21]

I am not denying that, for instance, one way to investigate the sense of body ownership is to manipulate the conditions of embodiment for an object to be experienced as one's own (e.g., via the Rubber Hand Illusion we discussed in chapter 6), or that sensory stimulation in near-body space may activate areas in the brain involved in the production of bodily movement. What I wish to deny, nonetheless, is that the associated patterns of neural activation have any special significance or authority in understanding the meaning of action or the ownership of that action. A large portion of our troubles with grounding self in action and the material world boils down to this entrenched opposition between the mental and the material. In real life, the brain does not translate and process external stimuli recorded as a set of egocentric Euclidean spatial coordinates. Rather, brain and body working together jointly engage the nearby object as an action possibility. The question is not how our brains represent the space around us.[22] Instead, it is a question of bodily action within the lived space[23] of material engagement.

8.3 The Plasticity of Human Lived Space

How are we then to understand the meaning of bodily extensions and prostheses? What is it that changes or extends if not a neural representation of the relevant space? As mentioned, the prevalent way to map that space is to adopt the distinction between personal space, peripersonal space, and

extrapersonal space, referring to what is beyond and within the reach of our limbs. However, what is needed in order to explore those questions is somehow to bridge the ontological gap between the neural representations of the space near the body and the actual physical space near the body. For this to happen, the conventional way of mapping those spaces and the associated narrow understanding of embodiment that supports and is used to specify the neural mechanisms that might underlie those spaces must change.

I propose a shift of attention away from the current focus on the effects of object absorption in our neural representation of personal and peripersonal space and toward a study of the plasticity of human lived space "in the wild"—that is, where the affordances of the hand meet the affordances of the tool.[24] An alternative way of interpreting the neurophysiological data is to approach peripersonal space as a dynamical space irreducible to its neural representation. From a material engagement perspective, all major locales of bodily/mental action—that is, personal space, reachable (peripersonal) space around us, as well as the more distant (extrapersonal) space beyond our immediate reach—provide distinctive opportunities for interaction with aspects of their environment.

The main idea here is one of constitutive coingredience of people and place, where *place* denotes lived personal space (or suprapersonal space), as positioned within and across the conventional distinctions of personal, peripersonal, and extrapersonal. I am borrowing the term *constitutive coingredience* from the phenomenologist Edward Casey,[25] who uses it to describe the relationship between self and place: "Each is essential to the being of the other. In effect, there is no place without self and no self without place." The phenomenological concept of the lived space, which can be traced back to Kurt Lewin's topological or field psychology,[26] expresses also this idea of co-constitution of brains, bodies, and things very well. According to psychiatrist Thomas Fuchs, the notion of the lived space refers to the space where a person pre-reflectively lives, acts, and experiences—the totality of its situational affordances.[27] This lived space, as the definition implies, is inherently dynamical and social. At the same time, it is inseparably connected with movement and development in the course of life. In that sense, the introduction of a new tool, material mediation, or bodily prostheses should be seen, in the first instance, as a specific psychodynamic deformation of the established lived space. The lived space is curved around the tool and creates a new horizon of creative, existential, or simply functional possibilities.

The designation *suprapersonal* space aims to describe this largely uncharted part of self-geography where the perpetual negotiation, construction, and reorganization of self-boundaries is happening. Within this "enactive landscape,"[28] the tool, more than a mere extension in the body schema, changes our perception of available opportunities for action, our conception of what we can do, and thus our general conception and judgment of agency. In addition to being within reach or not, things oscillate between the Heideggerian states of "readiness-to-hand" or withdrawal (when we experience them as part of an action and we are not conscious of them as separate objects) and "presence-at-hand" or accessibility (when we become aware of them as distinct, separate objects).[29] Giacomo Rizzolatti and Corrado Sinigaglia, expressing the dynamic nature of the boundary that separates peripersonal from extrapersonal space, describe objects as "hypotheses of action."[30] They argue that objects and tools in near space present as dynamic opportunities of skillful embodied action. We may call that the *enactive potential* of things. A combination of enactive cognitive science and material engagement theory can help us transform those spaces from fields of representation to dynamic hylonoetic fields of action.

Although prostheses and tools, objects and artifacts, may seem clearly separate, indeed separable, from the physical anatomical body, they often, nonetheless, co-constitute the lived world inhabited and experienced by and through that body. Things and material environments constitute the ecology that sets our bodies in motion. Thus, what we call *things* are, in many significant ways, inseparable parts of the human lived body. Action makes little sense outside this changing landscape of affordances and skilled intentionality.[31] Within this material ecology, our bodies are not static and fixed. Rather, their boundaries are in constant negotiation, responding to the changing boundaries of their lived suprapersonal space of material engagement. I will return to explore that further in chapter 10, focusing on how early stone tools and bodily adornments are incorporated into a dynamic, metaplastic field of activity that transforms the boundaries and experience of our selves.

8.4 Is It Me or Is It Mine?

Our discussion so far has focused primarily on clarifying what it is that allows for an object or tool to be experienced as part of a body and what that implies for self-boundaries. Two further interesting questions in this context concern

(a) the possible differences in the ways objects or tools come to be experienced as body parts, and (b) what happens when things move along personal, peripersonal, and extrapersonal space or when those spaces collide—for instance, in the case of digital environments.[32] I will deal with the latter question in chapter 11, where the issue of digital self and self-tracking will be discussed. Here, I focus on the former question regarding the experience of human partibility.

It is useful to note that from the viewpoint of embodiment, a distinction has been proposed between extension and incorporation—that is, between using objects or tools to extend the body and incorporating objects and tools into the body.[33] For examples of incorporation, we could look at cases of successful prosthesis use by amputees or people with congenital limb absence.[34] Philosopher Helena De Preester and neuroscientist Manos Tsakiris[35] propose that only limb prostheses of the latter sort—namely, those characterized by relations of incorporation or completion rather than mere extension—can become part of the body. A tool, although it can also be ready to hand, quasi-transparent, and thus, in some sense, "a knowing body part," is never really incorporated. It is not incorporated because the use of the tool is not changing the feeling of ownership over one's body.[36] What tool use does induce, as we saw in our previous discussion, are changes in motor and sensory capacities—specifically, the neural representation of space.[37] So, one could argue that even though the tool effectively becomes an extension of the hand that wields it, it never becomes one with it; we never feel that we own a tool in the way we own a part of our body.

At a basic level, the distinction between bodily extensions and real body incorporation is useful in that it forces us to look more carefully at the different phenomenal levels or senses of material engagement and their association with body ownership. We can all agree that usually "the feeling of ownership that we have for our bodies clearly does not extend to, for example, the fork we use at dinner."[38] However, this does not mean that objects cannot be owned in a deeper sense, becoming a true part of the body.[39] On the contrary, very often they do. Object ownership becomes a central feature of the plastic nature of our bodily selves. The philosopher Jean-Paul Sartre, contemplating, in his *Being and Nothingness*, the existential significance of the verb *to have* in human life, expresses a similar view. "The totality of my possessions," he writes, "reflects the totality of my being. . . . I am what I have . . . What is mine is myself."[40] This quote from Sartre may seem too far a stretch (for sure,

not all personal possessions have equal significance). Yet, it nicely illustrates the close ties between ownership and the idea of extended self.

One could think of many self–object associations. A childhood toy, a wedding ring, a special gift, or any other personal biographical object with affective and mnemonic significance constitute powerful material anchors for self-identity blends in time.[41] Loss of or separation from such personal material possessions, as when old people move into a nursing home, can be a devastating experience that is often described as a loss of self.[42] There is extensive anthropological and psychological literature[43] highlighting the different aspects of object ownership and the impact they exert on cognition and self-becoming. All things, tools, objects, or prostheses can be, in the relevant context of situated action, real parts of us. By the same token, all things, tools, objects, or prostheses can be mere extensions.[44]

Object ownership constitutes a central dimension of the self-bounding process. Minimal self-identity, as William James reminds us, is expressed by a splitting of the world into those parts unambiguously owned by oneself and those parts that are not.[45] But when should we think of the owned parts as "me" and when as belonging to me (i.e., "mine")? This boundary between "me-ness" and "mine-ness" is not permanent but rather permeable and dynamic. What is it that defines, then, whether a material possession (object or tool) should be experienced or thought of as part of the former rather than the latter—that is, as "me" rather than "mine"?

Clearly, not all possessions will become linked to the self in the same way. Moreover, as we saw in chapter 7, different people will perceive the nature of those links in their own culture-specific ways. The feeling of ownership is generally associated with tangible material things, but it can also be extended to less tangible entities, such as ideas, thoughts, feelings, and dreams. However, although people may vary in their understanding of ownership and the kind of possessions they become attached to, object ownership seems to enjoy a special psychological status and, as such, appears to be a central component in the making of what we call the *extended body* or *self*.[46]As we previously discussed, relevant to the distinction between mere extension and incorporation, the observation that we are what we own seems to be well grounded. Moreover, there is by now a substantial body of experimental work demonstrating the importance of object ownership and belongingness in the making of human identity and the *extended self*.

For instance, we now have sufficient understanding of what happens in the brain when people acquire psychological ownership or the feeling of mineness over a set of objects. We have discussed the sense of bodily ownership in chapter 6 as part of the minimal self. We have seen that the Rubber Hand Illusion provides one possible means of experimentally manipulating embodiment and, in particular, the perceived incorporation of an external object (the prosthetic rubber hand) into one's own body.[47] Synchronous stroking of the real unseen hand and a visible prosthetic rubber hand evokes a sense of body ownership over the latter (rubber hand)—that is, it causes to feel like it is the real hand.[48] We also indicated that the sense of ownership is closely interrelated with the sense of agency (experiencing oneself as being the cause of an action), although it is possible to experience ownership over an action without having the accompanying feeling of agency or control.

Object ownership has also been the subject of extensive neuropsychological research assessing its impact on early development[49] and memory—which revealed a significant memorial advantage for objects owned by the selfcontrasted with not-owned objects.[50] This mnemonic advantage, yielded through the self–object associations forged by ownership, is very similar to that observed in the so-called self-reference effect, denoting the advantage for information encoded about self relative to other people (e.g., a familiar other).[51] Besides memory, object ownership (even transient or imagined) has also been shown to have a range of effects (affective and cognitive)—for instance, the so-called mere ownership effect (a tendency for objects owned but not chosen by the self to be imbued with more value and perceived as more desirable compared with similar objects not owned by the self)[52] and the endowment effect (an ownership effect associated with the tendency of people who own an object to value it more than people who do not).[53]

Personal objects can become coextensive with the body (both the lived body and the physical body). A rather unusual example of such a strong self–object association can be seen in a study by neuroscientist Salvatore Aglioti discussing the relationship between an anosognosic patient,[54] who, after a large right-hemisphere stroke, exhibited total unawareness of her severe left-arm paralysis and her rings. The peculiarity of this case was that the patient, a seventy-three-year-old woman, while able to see and describe the rings she had worn for years and was currently wearing on her left now-disowned

hand, resolutely denied their ownership. Interestingly, when the rings were shifted to her right hand or displayed in front of her, she immediately recognized them as her own and was able to produce a great deal of autobiographical information about them. Indicative of the fact that the denial of ownership of the left-hand rings observed was due to a strong association between them and that hand—rather than on being seen on the disowned hand—was the observation that judgments of ownership were always correct when concerning other personal belongings unrelated to the disowned hand (e.g., a keyholder, pins, earrings, and a comb).[55]

Studies such as these offer valuable neurophysiological evidence and experimental support to our premise that objects and things attached to the body can be seen or treated as parts of the body. Clearly, the observed entanglements between the brain, the body, and things collapse conventional self-boundaries and resonate with our proposal for the extended and situated nature of human self. However, the crucial question remains: How do we understand, more effectively, the nature of this biopsychophysical commingling between people and things? Answering that has proven to be a significant challenge.

8.5 The Spectrum of Enactive In/Dividuation

In recent decades, a combination of findings, both from imaging studies, showing differential brain activation with different tasks, and from clinical studies of selective functional impairment of self-processes in neuropsychological pathologies such as schizophrenia[56] (or the case of asomatognosia we discussed above), have provided new evidence for the neural underpinnings of self-processing. Still, from a material engagement perspective, one may criticize the way that those findings have often been misinterpreted or used to construct unwarranted neuro-centric models of self, as we discussed earlier.

To explain: to argue that a circuit of brain regions are engaged when recognizing different aspects of oneself or that some aspects of basic self-experience may be impaired when those brain regions or their circuits are disrupted is a well-supported neuroscientific fact.[57] However, it is one thing to claim that the brain plays a special role in the creation of the self; it is another quite different thing to claim (implicitly or explicitly) that self resides or becomes constituted in any of these areas of the brain or, indeed, that these regions are engaged exclusively by self-recognition processes. The latter kind of inference

is indicative of how valuable neuroscientific findings about the neural geography and spatiotemporal structure of self-experience often result in a category mistake, as when they are used to answer questions of localization—that is, questions about where in the brain the self is.

The self makes little sense as a property of the brain.[58] No isolated brain, or parts of it, can be conscious of anything let alone of itself as the locus of selfhood. The criticism here is not simply that self-awareness is more likely to emerge from distributed interactions among networks of different brain regions rather than from a specific region. What I argue is that self is less of a unitary entity inside a brain and more of a bounding process inside a hylonoetic field of active exploration and sensorimotor engagement. What we call and identify as self applies to human beings as lived sentient bodies embedded in specific socio-material environments (more on that in chapter 9). No single component can be used to explain the properties of the self-bounding system. The mode of becoming I describe as *selfbound*, although dependent on the brain and body, cannot be realized only by means of bodily or inner neural activity. On the contrary, the meaning of self-bounding is based on the realization that self is a suprapersonal bounding process that allows brains and bodies to develop awareness of their entanglement in the context of human activity. Self-bounding is a tool of relatedness between brains, bodies, and things. Our thinking and feeling is inside the world as much as the world is inside our feeling and thinking.

Brains and bodies are not identical to "us," nor do they contain ourselves. Instead, they provide crucial biological stuff for *making* ourselves. This emergent constructed self would be, no doubt, inseparable from the body's situational affordances for attachment, ownership, objectification, agency, and skilled movement. However, the relationship between self and the body is not one of identity or containment. Rather, it is one of entanglement (transactional constitution) and enskilment (self-knowing by means of doing). The self emerges from the tension and friction produced by these processes in the course of social interaction and material engagement. In this connection, self-bounding can be described as a skill: the art of self-making. Like any other skill, it is simply absurd to assume that a neural assembly is sufficient for its realization. You simply cannot explain skills by attributing them to the brain.

Of course, as I mentioned before, to say that a neuro-centric view of self is wrong does not mean that the brain is not a crucial and necessary component of self-experience. If I argue that self-bounding cannot be reduced to

neural activity, it is because the term is introduced to describe the process by which self-related brain activity (in the form of either regional activation or neural networks) becomes organized and attuned (synchronized or entrained) with other bodily, socio-material processes in the course of human in/dividuation. By the same token, the absence of a clear and consistent neural signature by no means implies that the self is not real or does not exist. It simply means that the self is more than a brain.

Self is not a fixed object with a specific spatiotemporal location (neural or extra-neural) but rather an ongoing process of self-becoming inside the dynamic field of human cognitive and social life. The plastic psychomaterial spatiality of this ever-changing dynamic field makes it possible for human consciousness to become expressed in various ways (both dividual and individual). Self-bounding is responsible for the permeability or rigidity of self-boundaries needed in different situations in order for humans to travel among the changing spatiotemporal domains of life retaining a basic sense of identity and continuity. This demands both the bounding and un-bounding, engaging and disengaging human and nonhuman elements as well as the aggregation of those elements into suprapersonal collectives.

Self is not a *something*, but it is not a *nothing* either. Rather, it is a *many*, an arrangement of experiences and materials in the dynamical sense of an assemblage.[59] Self-bounding is what makes the creation of such an assemblage possible. This assemblage is not purely organismic in the restricted sense of somatic operational closure (advocated by autopoietic theory), nor is it something that one could easily decompose and recompose for analytical or experimental purposes. In assembling a self, the whole is not just greater than the sum of its parts; it also creates them through extrasomatic deviation and creative evolution—as when the tools we create change the boundaries of peripersonal space. Human becoming is metaplastic: self-bounding is a dynamical, ever-evolving process by which self becomes co-constituted with a specific milieu or material environment.

Does this mean that self can be an illusion, even if self-bounding is real? The answer is yes and no. Yes, there is no self as a transcendental totality or substance that humans are conscious *of*. Unlike other things that come into consciousness, self has no independent existence—there cannot be self without consciousness. However, self is not the same as consciousness. Rather, it is a temporal assemblage or gathering of self-related processes, events, or things that make up self-consciousness—that is, self-bounding. Self-consciousness

and self-bounding are relational terms but never completely coincide with each other. In reality, there can only be partial self-consciousness expressed through situated acts of self-bounding. Being fundamentally a process of becoming, self-consciousness is always incomplete. There can never be complete self-knowledge. Self-bounding as a basic mode of self-knowledge operates through perpetual self-semiosis grounded in enactive signification (see chapter 2) that provides the basis for the emergence of self-consciousness—for example, the ability to represent one's own states as one's own. Self-bounding is what anchors and grounds human consciousness in the world; it creates a sense of ownership over one's body and other material objects and affects what is recognized as "me." Self-bounding is not associated with the object or the subject of consciousness. Rather, it is associated with the "of." It is the process that generates the conditions of possibility for human objectification and subjectification or what we call enactive in/dividuation (recall our discussion in chapter 7).

To describe humans as selfbound is not to say that they are closed bounded entities. Rather, it refers to their capacity for self-designation through bounding processes that spread in different directions and spatiotemporal locales. Self-bounding is as much about the separation of self and other, or self and the world, as it is about the building of multimodal connections and lines of interaction/transaction between them. Importantly, as stated in chapter 1, it is the bounding of consciousness in self-becoming that allows the unbounding of human thought and imagination. *Bounding* refers to the totality of enactive processes used in setting the limits, constraints, or boundaries of human in/dividuation.

The term *enactive in/dividuation*, far from serving to demarcate a particular location or domain of self (e.g., mental, neural, or bodily) as opposed to another (e.g., narrative, social, or cultural), denotes the multiplicity of self-bounding that is characteristic of human becoming. Enactive in/dividuation pertains equally to all these domains of human experience, seeing none as more fundamental. On this construal, dividuality is no longer opposed to or contrasted with individuality. Rather, the two concepts unite to describe the constituents of self-becoming (the same can be argued for indivisibility, partibility, and/or permeability).[60] Naturally, self-bounding ontologies differ, often remarkably, and are matted from the interweaving of different materials (human and other-than-human). Nonetheless, the process of self-bounding provides a self-perpetuating unifying compound structure of

near-universal distribution (by establishing the conditions of comparability) that can be used as the basis for a comparative anthropology of the in/dividual self. What that essentially means is that self-bounding can take a variety of forms, relations, gradations, and combinations between dividuality and individuality in different historical situations or developmental contexts.[61] People are STRANGE: we perpetually modify ourselves, the material environment, as well as the relation between ourselves and the environment.

In particular, according to the model of self-bounding proposed here, the usual antinomies of dividuality–individuality, subject–object, minimal–narrative, pre-reflective–reflective, and so on are now reorganized and recognized as the impossible ends of a continuous spectrum (figure 8.1). In their pure form, those imaginary extremes have no actuality; they only exist as

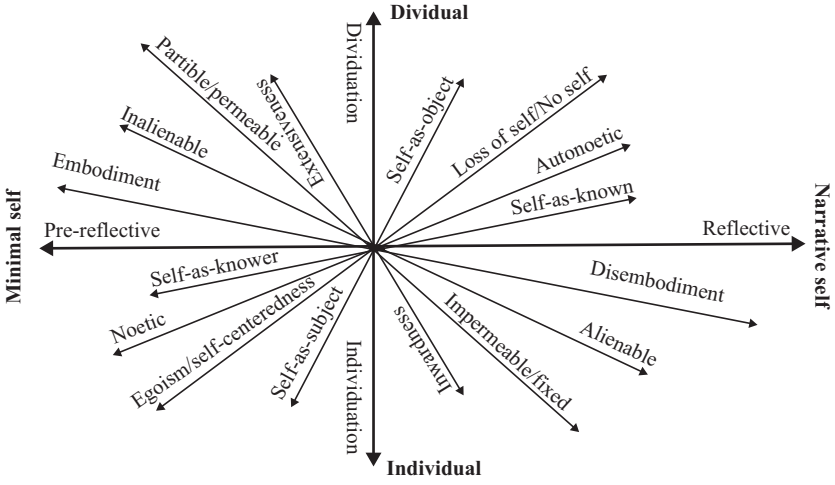

Figure 8.1

Spectrum of enactive in/dividuation. Self-consciousness is not an all-or-nothing phenomenon. Rather, it has various aspects and gradations. Humans are continually remaking self-boundaries, producing difference while retaining a decentralized identity grounded in the history of material entanglements that makes it up. Self-becoming is a continuum where oppositions such as subject and object or individuality and dividuality do not exist as absolute distinctions but rather as the possible ends of a multidimensional spectrum. In their pure form, those endpoints have no actuality; they only exist as abstractions of our own making. The real self is in the ontogenetic process of enactive in/dividuation that marks our shifting location and situation along this multidimensional spectrum of consciousness. The dimensions identified in the spectrum depicted here indicate only some of the possibilities of exploratory self-becoming.

abstractions of our own making. Persons rarely, if ever, conform to these poles in practice.[62] Rather, they emerge from the tension between them. Our exact position on this continuum (i.e., the situated person perspective), varies and depends. Self-bounding is the process that connects but also determines the duration and intensity of our saccades and points of fixation on this continuum of self-consciousness. The self is the imaginary line (in the real sense of enactive signification)[63] that connects our saccades and points of fixation, marking/bounding our shifting location on this continuum of consciousness (in time and space). The metaphor of the knot, employed by Tim Ingold to illustrate how lifelines tie themselves with other things and happenings, can be of some use here: "In a world where things are continually coming into being through processes of growth and movement—that is, in a world of life—knotting is the fundamental principle of coherence."[64] An analogy between knotting and self-bounding can be drawn relevant to self-coherence.

Through the process of self-bounding, we become aware of our intimate self–other relations, which can take the form of links or leakages, of bindings or boundaries. As I mentioned in the first chapter, and as I will now move on to fully discuss in the next chapter, this perspectival quality of self-bounding should not be confused for the familiar preconceptual first-person perspective of the body-as-subject. It also differs both from the social second-person perspective, denoting the ability to take on others' perspectives (the perspective that is characterized by an "I"–"you" relation) and from the objectivist third-person perspective[65] of the body-as-object. Instead, the perspectival quality of the self-bounding process manifests in the form of the SPP. The major difference is the following: the meaning of *perspective* in the SPP is no longer fixed and directional—a position from where "I" perceive the world. Rather, the meaning of *perspective* is suprapersonal, transactional,[66] and chiasmatic[67]—a point of overlap, crossing, intersection, participation, fusion, and exchange of perspectival points (both inside and outside).

Our bodies are inside ourselves as much as ourselves are inside our bodies. The world is inside ourselves as much as ourselves are inside the world. Others are inside of ourselves just as much as we ourselves are inside others. Interiors and exteriors are relevant distinctions like the experience of one hand touching the other.[68] When it comes to human self-boundaries, there is no real or single way to demarcate the inside from the outside. Our boundaries

our shifting in response to our situated actions. The body matters for self not as an envelope but as an active, moving, and sentient perspective point for engaging the world. Most of the self-related phenomena we experience or interpret as interior or exterior happenings are topologically indeterminate products of our situated bodies in the lived suprapersonal space. In the following chapter, I will be focusing on the significance and exact meaning of human situatedness and the SPP.

9 The Situated Person Perspective

In the previous chapter, I proposed self-bounding by means of enactive in/dividuation as the process by which human bodies become specific and different—that is, they become selves or persons. This process of self-specification cannot be accounted for merely by the fact that the human body has long evolved a basic capacity for pre-reflective consciousness coupled with self-reflection and personal narrative. Self is not the kind of phenomenon that can be found inside or outside bodies. Rather, I argue that self is an in-between process mostly visible or tractable at sites of joint activity and resistance. These are sites of perpetual construction, interaction, and intra-action that produce friction and tension. Friction and tension, in turn, produces differences. These differences—for instance, between our sense of agency and our sense of body ownership (we may have a feeling of agency without any explicit judgment of agency or a sense of ownership without a sense of agency)[1]—can be experienced in any of the conventional divisions (personal, peripersonal, or extrapersonal). Differences can also be experienced as suprapersonal and intra-agentic—for instance, our interactions with human and nonhuman others (e.g., attachments, personal objects, and interfaces). Self-bounding is the way the human body assembles those differences as they occur across domains of experience. The experience of self-bounding is more than just a being in the world; it is also being *there* and being *with*. Obviously, such a decentralized (locationally uncommitted) conceptualization changes the geography and mereology of self. Self-boundaries are shifting (stabilized or destabilized) in response to action and the affordances of specific material environments. As I have already pointed out, and will discuss more fully in this chapter, a material environment is not what surrounds the person "out there"—passively enveloping or actively

mediating the body. Rather, material environment denotes the hylonoetic field where brains, bodies, and things are intra-actively produced during the process of enactive in/dividuation.

The body should not be seen as the organ that delimits and contains the self-bounding process. Quite the contrary, the body is transformed, actively participates, and eventually becomes inseparable from it. The primary role of the body is not to demarcate the organismic boundaries of the self. Rather, the body is what provides the self with the ability to move, act, and engage with the world. Whatever the exact nature of the relationship between self and the body, this is by no means confined to, or contained within, the interior of our bodies. On the contrary, I argue that self is never just a body. The book's predicament is that the human lived sentient body is, by definition, situated. It follows that any kind of self—attached, grown, grounded, or related to this body—must be extensive. The notion of the situated body has a double meaning: it means more than a body, and thus a prosthetic body, but it also means less than a body, and thus an incomplete body. Building on the arguments of the previous chapter relevant to the notions of self-bounding and enactive in/dividuation, this chapter seeks to explore what that *more* and *less* actually entail for the ways we understand the situated ontology of self-boundaries.

I start with some basic clarifications about the meaning of *situatedness*—what it means to say of a body or a self that is situated.

9.1 On the Meaning of Situatedness

At a minimal level, one could suggest that x is situated in y if x (or aspects of it) cannot be defined (ontologically speaking) independently of y. In other words, y plays a constitutive role in x being what it is. Situated phenomena (organisms, experiences, and actions) can only become what they are in relation to particular circumstances (their situation).[2] That is, they are dependent and contingent to their situational affordances and occurrences. So, at a basic level, situatedness can be approached as an expression of relatedness. The challenge for us, in this chapter, becomes one of understanding the operation of this relational domain with specific connection to the self-specifying awareness associated with the self-bounding process.[3] In this connection, I suggest that relationality (in its full meaning) can only be

captured from the perspective of a process ontology that prioritizes becoming over being or, in our case, the process of in/dividuation (self-becoming) over the individual. Needless to say, describing the different aspects of self as relational should not lead to an obscuring of their differences.

Take for instance the pattern theory of self[4] proposed by Shaun Gallagher. According to that theory, self is a cluster concept constituted by a complex and sufficient pattern of certain experiential, affective, intersubjective, cognitive, narrative, extended, and situated aspects. These aspects—none of which exist on their own or are necessary and sufficient to any particular self—may be related across certain dimensions of self-becoming. To argue that some or all of those aspects are situated is to argue that they are context-dependent and specific (in otherness or togetherness)—which means that different selves instantiate in their becoming (enactive in/dividuation) different patterns and that these patterns may change over time in response to their changing environments.

There are different types of context dependency and different meanings of specificity. For example, given a particular situation in which a given aspect *x* occurs (e.g., the "mine-ness" or agency of one's body and movement), one could differentiate between (a) contextual factors (CF; when changes in CF are causing change in aspect *x*), (b) enabling conditions (EC; if the absence of EC prevents *x* from occurring), and (c) constitutive elements (CE; if CE is part of the processes that brings forth *x*).[5] Based on the above differentiation and drawing on the criteria established by Dorothée Legrand and Perrine Ruby, one could seek to distinguish the self-related features from those features that are self-specific in the strict sense of being exclusive and constitutive to self-becoming.[6]

So, any attempt to devise an approach that is attuned to the specificities of self-becoming must first address the question of what exactly the aspect(s) of self are that we seek to understand and in what situation. In particular, what are the elements of the situation that matter, exactly in what ways do they matter, and in relation to which specific aspect of the self? Last, through what forces, processes, relations and mediations does this *mattering* manifest or become realized in different temporal scales?

Pursuing this line of research brings us back to the issue of the plastic and permeable boundaries of the human lived suprapersonal space (the material environment). The question about the different types and meanings of

interaction (e.g., causal, synchronous/asynchronous, interaction as dialogue or entrainment, reciprocal, transactional) that we briefly examined in chapter 1 is also relevant.

9.2 Being Situated in the World

The question of what it means to be situated in an environment is often misunderstood. There is confusion over the boundaries and relational dynamics of the situated person. This is mainly because, as mentioned above, the environment is misconstrued as something external, spatial, and fixed—that part of the world that surrounds the person situated in it. I argue, instead, that material environments and persons have a different transactional meaning. They are transactional because they are made not of fixed properties but instead of a set of relations and situational affordances (local action possibilities). It is this relatedness of the environment (as organism dependent) that gives meaning to the condition of human situatedness. Here, I follow John Dewey's conceptualization of situation as constituted by the organism-environment.[7] When we say that the human brain or body are situated, we do not just mean that the brain is *in* the body and that the body is *in* the world as if we describe their respective physical positioning in space. Rather, what we mean is that brain and body are constitutively intertwined with their environment, which also implies that the brain is in the body (the brain's environment) as much as the body is in the brain (the body's environment). Of course, brain and body can only exist as a union, which is, in turn, situated in its own socio-material environment relevant to the situational affordances for action and interaction.

In other words, the way humans (brain, body, and environment) are situated in the world is not reducible to occupying an objective position in the geography of surrounding space out there.[8] The predicate *situated* is not an indication of relevant position—for instance, that A is inside B—but of the complex interactions between A and B. To call A *situated* means that A is dependent on aspects of B and on the types of transactions between A and B. It also means that A and B are both situated and act as situations relevant to each other. The situated and the situation participate intrinsically in each other's existence.

As discussed (also in chapter 1), the meaning of situation in the context of MET is relational and process based (emphasizing modes of becoming rather

than *being*). On this formulation, the mentioned constitutive intertwinement of brain, body, and material environment (where brain, body, society, and matter meet and exchange properties) is described through notions of transaction (as defined from the pragmatist point of view by Dewey)[9] or intra-action (as defined from the agential realist perspective of Karen Barad[10]). The key difference expressed with these terms, and which applies from both evolutionary and developmental points of view, is that the entities to be related (bodies and things) and the boundaries that will be used to distinguish and define those entities can only emerge *after* the interaction—that is, they do not predate their entanglement.

Minds, bodies, brains, things, and environments are not isolated substances but rather entangled processes. When we speak of self as extended and situated, we denote more than merely a process whereby a fully formed internal self is externalized into or causally interacts with the world. Rather, we refer to an active diachronic participation and co-constitution of internal and external parts by means of enactive in/dividuation. To be situated is both to be part of something external and to allow something external to be part of you. This participatory relation permeates all modes of human existence (past or present) and applies both from an evolutionary and an ontogenetic (developmental) perspective. The situation surrounds and includes[11] as much as it expands and excludes. This brings about again issues of mereology, partibility, and boundaries.

9.3 On the Different Meanings of *In*

To say that the brain is in the head is not the same as to say that the brain is in the body or in the world. Nor do the previous statements have the same meaning when we say that the world or the body is in the brain. Situatedness embodies a complex dynamic topology and multi-temporality irreducible to any hypostasized abstraction of itself represented in one's brain. To declare that my thinking and my body are situated, as I am writing my thoughts down using my computer, is also to accept that my thoughts are in my brain as much as they are in my fingers pressing the keys of my laptop or in the laptop itself.[12] Those different elements (neural and extra-neural, personal and suprapersonal) are parts of my experience of thinking; they constitute my thinging. However, the meaning of *in* in each of those elements is different.

Understanding the different meanings that *in* has in different situations is challenging but necessary. Take, for instance, the widely used notions of embodiment and the embodied self that we examined in chapter 6. Is the meaning of embodied self that the self is in the body or in some part of it (e.g., the brain)? Or is it that the body is in the self? If we argue for the latter (i.e., that the body is in the self), is it because the body, like the self, is represented in the brain? Or is the body in the self because movement and activity is essentially what selves are made of?

The body situates the self by means of material engagement. This is also where the traditional phenomenological insistence on the ontological purity and priority of the first-person perspective breaks down. There is no autonomous subjectivity but rather a flow of energies within and between varieties of heterogeneous materials (organic and inorganic). Seen from the viewpoint of material engagement, the primacy of the 1PP gives way to the primacy of the SPP (figure 9.1). What is the difference between the two?

In contrast to the Cartesian positioning of the 1PP, the situated self is not tied to a particular position in space and time. There is no single position in space (self-location) or privileged point of view from where "I" perceive the world. Instead, the SPP signifies the ability of human consciousness to take the perspective of the "other" (human and nonhuman) as well as to create new in-between (transactional and suprapersonal) perspectives for experiencing the self and the world. The notion of self-bounding denotes the

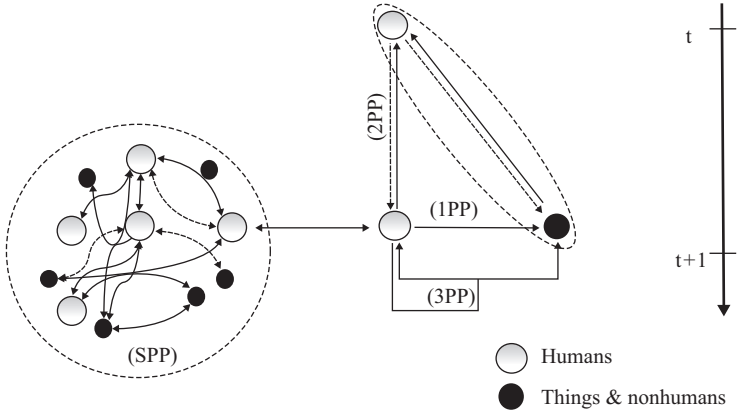

Figure 9.1
The situated person perspective.

processes that hold this decentralized multiplicity of perspectives together through the use of material anchors and material signs (self-semiosis; see discussion of tools in chapters 8 and 10). In that sense, the SPP, on the one hand, extends the meaning of the embodied second-person perspective to include the nonhuman and, on the other hand, overcomes the duality or opposition between the 1PP and the 3PP.

It should be made clear, as also pointed out in chapter 1, that the meaning of the social upon which the notion of the SPP is grounded is a post-humanist one as found, for instance, in Bruno Latour's actor–network theory.[13] Such a view already incorporates things and the material environment as *actants*—Latour's term to describe "something that acts or to which activity is granted by others."[14] Accepting that the social is made of human and nonhuman actants has the consequence that the meaning of intersubjectivity must also change. Enactive in/dividuation is incompatible with classical views of the 2PP, which are based on a representational and rather spectatorial understanding of others' mental states (as in theory of mind).[15] However, symmetrical and post-humanist theories of the social are compatible with interactive and enactive conceptualizations of the 2PP, focusing on the expressive bodily behavior, inter-bodily resonance, and participatory sensemaking.[16] It is in the latter enactive and participatory sense that I argue that the SPP extends the meaning of the embodied 2PP from the domain of pure interpersonal situations to that of intrapersonal transactional situations. In other words, the shift is from human interactions to intra-actions where individuals do not preexist or define the process of their in/dividuation.

Self-consciousness is perspectival in that it is always experienced with or through some bodily part, or other prosthetic tool or artifact, or else from the particular point of view that this bodily part or artifact affords. This particular point of view is never static but rather changes with time and action. As a consequence, it is inadequate to describe self-consciousness as a fixed condition we come to develop at some stage in human development or evolution. Rather, it is the kind of situated awareness that is primarily sensed or felt through the world. The reason I say that this condition of situatedness cannot be described adequately from the 1PP is because the implied purity and fixity of personal space cannot properly accommodate the suprapersonal co-constitution of experience with the local material conditions and possibilities of enactive in/dividuation.

To illustrate that, I will use the example of a potter—that is, the example of a body/person situated in the lived activity space of pottery making.

9.4 A Potter's Body

Think of the bodily self of a potter, patiently working with clay, learning and developing the skills of the craft (figure 9.2). No doubt, such a body, like any other body, enacts a unique developmental life history. It assembles through time its own unique collection of self-bounding events that will allow it to become the specific body it is. There are, of course, important physiological and anatomical similarities that all human bodies share as members of the same species, as there are also habits and skills that bodies growing and participating in the same communities of practice often share. But for our purpose in this chapter, which is to understand the ontology of human situatedness and the topology of the SPP, I want to focus on exactly how the human body becomes different—that is, how it becomes in/dividuated as a potter's body. The question I want ask, in other words, is what it means to say of a human body that it is the body of a potter.

Figure 9.2
A situated body.

Presumably, the differentiating feature of the life history of the potter must be found in the specific ways (developmental, historical, social, or technical) that this body opens up to and become affected by the physical and psychoactive properties of clay (understood as situational affordances). Equally important are the ways those properties become embedded and temporally aligned in the patterns and rhythms of bodily movement and coordination. The potter's body must learn what clay is and does and how it responds to technical or chemical treatment. Furthermore, the potter's body must be able to relate to the properties of this material, as well as enact and discover its affordances in ways that other human bodies cannot. Unlike other human bodies with no special connection to the art of potting, the potter's body will come to know, with practice and effort, how to touch and feel the clay. Being a potter's body, it must be able to reliably, and in different conditions, identify, anticipate, and predict what kind of actions clay invites or allows and use them to negotiate—in the lived space of material imagination—the production of a certain form.[17] This is a dynamical process that involves a temporal alliance and co-emergence of very specific set of physical skills, materials, gestures, action sequences, and interoceptive and exteroceptive sensations. The potter's body responds and contributes to this process in a unique way that builds on prior experiences, technics, and memories.

If we take this process of dynamic enskilment and creative material engagement to be indicative of what we mean by a situated body or person, then it follows that such a body can never be just a body in the conventional generic way people think of individual bodies as static and fixed. The potter's body is not just the physical body, which is usually thought of and studied as just another object extended in space. The potter's body is the product of the lived or experiential body (*Leib*) comprising the totality of possibilities for movement and action (cf. Husserl's "I can"). Not only is the potter's body a lived body that cannot be reduced to a mere body as object (*Körper*), but it is also more than a body. A set of skills, muscular memories, and kinesthetic experiences are organically attached to it because of its position in a specific situation—for instance, a certain tradition of pottery making or a specific creative task that demands a specific set of techniques. The potter's body participates in the craft of pottery—that is, in the skills, tools, and materials associated with this practice. The skills and materials of pottery participate in the potter's body and ways of thinging.

Figure 9.3
The material environment is an inseparable part of the potter's situatedness.

The notion of situatedness captures the totality of bodily affective dispositions and changes (muscular, neural, and hormonal) associated with the ways the potter moves and assembles organs, muscles, limbs, and joints to engage the affordances of clay. The above changes and movements can only become realized within a relevant material environment. Embedded in the structure (plastic or rigid) of this material environment is an action-readiness potential that affords enactive discovery and, in that sense, constitutes an inseparable part of the potter's situatedness.

A common mistake is to see the material elements of practice (e.g., the wheel or the clay) as passive external influences operating from the outside on the potter's body (figure 9.3). In contrast to this separatist view, the meaning of situatedness advocated here is grounded in the assumption that the relevant aspects of the material environment become incorporated into the body actively operating inside and through the body. I do not mean that in the discontinuous representational sense but rather in the continuous enactive sense. It is not the world that is represented on the inside. Rather, it the body that is extended outside, seeking sources of agency and new paths of self-identification. Thus, the totality of material mediations and sensitizations has

to be brought back in the description of action and the topology of personal space. As mentioned, from a material engagement perspective, the usual phenomenological primacy of the first-person perspective and the directionality imposed by conventional notions of intentionality now give way to a decentralized situated person perspective. I argue that only by looking at this transactional suprapersonal environment that permits and constrains movement (bodily and neural) can we ever understand how, for instance, the expert positioning of the potter's body or the fingers' confident grip on the wet clay come to life. These are all self-bounding events. They assemble self-related experiences and bodily knowledge enacted in the potter's neural pathways, moving muscles, and creative gestures. They integrate the history of haptic engagements and tactile explorations with the potter's use of the relevant environment as material memory.[18] The potter's self emerges as a temporal alignment of biological and non-biological elements comprising the totality of the relevant affective perturbations actualized in the specific occasion of making. This continuous, albeit heterogeneous, ensemble of action also implies that the potter's body actualizes the affordances of clay as much as clay actualizes the affordances of the human body.[19]

This constitutive intertwining of mind with matter in the lived suprapersonal space also explains how energies (action potentials) are being transformed into agencies (capacities for action). Among the varieties of emergent agencies, those realized by the lived situated body can also develop awareness—that is, the sense of agency we examined in chapter 6. But this awareness of agency, characteristic of human bodies, is largely an illusion. There is no agent apart from the action. Agency is not a permanent feature or property that someone (human or nonhuman) has independently of situated action but rather the emergent product of material engagement seen in our example of pottery making as a creative tension of form and flow. What we call an agent refers to an ontological moment, a temporal property, not to a fixed state of affairs.[20] Indeed, the classical mistake is to perceive the clay as inanimate and passive when, in fact, it is the source of the potter's agency and a psychoactive path of self-identification.

Accepting the unity of agency, embodiment, and mediated action, we can now turn our attention to authorship and causality of the doing, trying to identify agentive forces behind the accurate positioning and movement of the potter's hand on the surface of clay. It follows from our discussion that the common idea of the isolated human agent that acts upon the inert world

must be rejected as a starting point for explaining human creative action and agency. Yet, our question of agency is not to be confused with the feeling or sense of agency that, most probably, the potter would admit to.

The self-bounding process by which a human body becomes the body of a potter is messy and leaky. As a consequence of that, it cannot be accurately delimited and restricted by the narrow temporal boundaries of a given observer. It is, therefore, not surprising to say that the purity of action is lost due to an ongoing promulgation and propagation of the origin of the event. What is designated by the word *situation* includes this multi-temporal relational whole: the situation becomes part of the embodied thinking process—that is, the situation drawn into the feedback and feed-forward cycles of the interaction between potter and clay.

This is embodiment in the radical sense of the word. The point is not just to recognize the corporeal and material basis of the human body but also to expand that basis beyond the organismic boundaries of the skin. Entangled and interweaved with the skilled practice of throwing and shaping, the potter's self cannot be rigidly or independently defined. The creative process that shapes the clay also shapes the potter. The potter's "I," far from being immune to the psychoactive influence of the clay, allows it to determine the brain's hemodynamic response or, following the energetic path of least resistance, to do the thinking. There is nothing mystical about this idea, especially if one considers the energetic demands of our brains.

The classical image of a preformed organic body moving to produce a preformed idea in the shape of a pot breaks down. Quite the contrary, a common prerequisite for the successful orchestration of creative skilled action is the loss of self: the collapse of the boundary between potter and clay. This non-pathological un-bounding of self allows creative consciousness to freely explore and blend with various ingredients that can act or be acted upon. The potter's hand responds, corresponds, anticipates, discovers, and mimics the affordances of clay. When that happens, the affordances of clay inhabit the potter's body as much as the potter's intentions inhabit the clay. The changes in the position, posture, and movements of the potter's body are co-constituted with the changes in the form of the clay. This is how skill develops. The affordances of clay incorporated through practice in the potter's body construct anticipations and protentions of bodily movements. This kind of mutual incorporation[21] may seem strange, but this is mainly because social cognition lacks a sense of vital materiality. Yet, this is exactly the kind

of mutual engagement that we often observe in the case of skillful mediated activity, albeit not *between* two humans but *in between* humans and things. As is the case with social encounters where human participants coordinate their movements, adjusting posture, and alter the speed, direction, and intonation of their utterances to coordinate their sensemaking,[22] the potter's perception–action loops and movements are dynamically coupled and resonate with the affordances and physical qualities of the material at hand, as if maker and material, potter and clay, can participate in each other's sensemaking.

To conclude: situatedness is not something optional (one condition or possibility among others) or external to the organism (like a changing context or the use of a new scaffold or tool); situation is or becomes part of the very nature of the organism. I argue that the human self, like the human body, can never not be situated, which also means that situatedness is what unites the modes of human becoming. Moreover, what differentiates human situatedness from the situatedness of other organisms is that, in the case of humans, adaptation gives way to creative evolution (see chapter 4): humans are creative thingers, able to change and transform their environment or situation and, through that, the conditions and possibilities of their own becoming.

As mentioned, inherent in the transactional logic of self-bounding is that the interaction takes ontological precedence over the person. As we saw in the example of pottery making, ontologically speaking, the throwing of clay precedes and bounds the potter's self, and as we shall discuss in the following chapter, stone toolmaking and tool using, precedes and bounds the tool user's self. Tool use brings forth the tool user, not the other way around. More importantly, it provides a SPP—specifically, a tool–user perspective that cannot be simply reduced to some generic first-person phenomenal subjectivity.

IV Ecologies of Self-Becoming

In my book *How Things Shape the Mind*,[1] I argue that the story of human becoming—especially the part that relates to our ways of thinking—has been written in a manner that often undermines the active role played by things and material culture. This does not mean that anyone ever conceived of, or that it is possible to conceive of, human cognitive life and evolution without reference to the material environment—quite the contrary. A variety of objects, tools, materials, and techniques have been associated with human cognitive evolution from the very start. The problem, rather, is that the role given to this rich and complex material world in the human drama has been peripheral and external to the cognitive realm proper. Things are present, but somehow they do not really matter. They are an absent presence.

Reacting against that view, I have argued that if, adopting the material engagement approach, we look at the evidence for human cognitive becoming free from our modern internalist presumptions about what a mind is and does, we could be in for some interesting discoveries. For instance, we will probably come to recognize that all major transformations and variations in human cognitive life can be explained better as relational changes in our ways of thinking with and through the material world rather than as hidden genetic changes or mutations effected by natural selection, which may have enhanced the representational power of our brains. Of course, changes (functional and anatomical) in the organization, the overall shape, and the size of our brains did happen and continue to do so. The structure of our brain's networks, their neural pathways, and their patterns of connectivity change continuously throughout the deep time history and ontogeny of our species. But those changes cannot be accounted for by separately evolved genetic algorithms; they cannot even be seen as isolated internal mental events

because they could have never occurred outside the extended developmental process of a specific umwelt or lifeworld (past, present, or future). All major transformations in human intelligence emerge in the realm of action: where bodies (especially the hands) are moving, interacting with other bodies, and creatively engaging with the material world. As I explained in chapters 2, 4, and 5, our plastic minds and bodies are not the predetermined decontextualized products of biological evolution. Rather, working together, in concert with other bodies and available materials, they developed a creative habit for crossing established boundaries (physiological, social, cognitive, or technological), actively seeking new ways to engage with the material world.

What we did with stone in the Pleistocene or with clay and metal in the Holocene we do with plastic and silicon in the Anthropocene. There is nothing inherently progressive, linear, predetermined, or unnatural about this process of human becoming. The "landscape of affordances"[2] is constantly changing with new techniques and materials, but the primacy of material engagement remain unaltered. It is this constitutive openness of our minds and bodies to the socio-material environment in which we find ourselves that, as I argue in this book, we need to focus upon and try to understand better.

In part III, by introducing and developing the notions of self-bounding, enactive in/dividuation, and the situated person perspective, I tried to provide a theoretical framework that can be used for capturing this peculiar sense in which our ways of being and engaging the world co-constitute ourselves. Against this theoretical background, the question for cognitive archaeology is: Where do we look for indexes of the self-bounding process in the material remains of the past (both present past and past present)? Four domains of self-becoming carry increased analytical potential: (a) agency (the sense that I am the one who is the initiator or source of the action), (b) ownership or "mine-ness" (the sense that I am the one who is undergoing an experience), (c) self–other distinction, and (d) the plasticity of self-boundaries. We will see how these four domains of self-becoming, expressed in different practices and skills, provide the material foundation for grounding the basic self and its intrapersonal social dimension.[3] They also provide the foundation, later on, for the development of the reflective/narrative dimensions of self associated with storytelling and the emergence of language.[4]

No doubt, the possible material traits of the above experiential domains are not always easy to identify or isolate. In part IV of this book, I focus on three iconic modes of bodily prostheses that can be associated both with the embodiment and disembodiment of self, and which thus can facilitate the observation and comparative analysis of the proposed domains: tool-making and tool using, personal decoration, and digital in/dividuation.

10 Tools for the Self and the Body: The Prehistory of "Me"

In this chapter, I explore aspects of self-bounding in two of the earliest forms of human bodily prosthesis: stone toolmaking and personal or body decoration. These practices, well attested and studied archaeologically, mark or have been associated with significant changes and debates in human evolution relevant to issues of skill, sociality, language, and the emergence of symbolic thinking. Here, I shall be looking at them from the point of view of self-becoming.

In the case of lithic artifacts, I will be focusing on the practices of *percussion* and *knapping*—although most of what I will be arguing applies or can be explored more broadly in the case of *tooling*.[1] Percussion denotes the controlled action of using a stone to strike the surface of another stone (the core).[2] Knapping is the use of percussive actions for the removal of sharp-edged flakes. Percussive knapping demands fine-motor skills. It is the most basic technique of stone toolmaking, attributed to the earliest hominin tools as well as to a range of tools used by nonhuman primates.

In the case of bodily decoration, I will be looking at early ornaments in the form of perforated shell beads, taking as my main example those recovered from Middle Stone Age (MSA) layers of Blombos Cave in South Africa (seventy-five thousand years ago).[3] Shell beads, as evidence of early body ornamentation, have played a major role in the debate of modern human symbolic behavior and the emergence of language. For the purposes of this chapter, I will be examining the possible agency of those artifacts in the development of an intra-subjective sense of self. Specifically, I will be looking at the role played by body ornamentation in the gradual liberation of self-experience from the primacy of the bodily "I" so that it becomes inseparable and dependent on the perspective of others.

The practices of knapping and body decoration, each in their own way, constitute an ecology of selfhood—what we called in the previous chapter a situated person perspective. This chapter's aim is to try to explain and compare the different possibilities of self-bounding that these practices (as modes of enactive in/dividuation and creative thinging) provide for self-exploration, self-recognition, and self-objectification. The objective is to select from the available evidence the kind of information that can be seen as diagnostic of self-semiosis. Self-semiosis denotes specific forms of enactive signification[4] associated with self-bounding. It is reasonable to assume that different organisms may have access to, or engage with, different enactive material signs in the course of their life history. It is also reasonable to expect that organisms who engage more frequently in processes of material semiosis (meaning making) of the kind that manifest or embody self-semiosis are more likely to develop some form of self-experience or capacity for self-awareness compared to those who do not. Of course, the quality, complexity, and self-specificity of the different kinds of self-semiosis need to be taken into consideration before any valid inferences can be drawn from the archaeological record.

Despite their important differences, both percussive knapping and body decoration provide two diachronic examples of self-semiosis as techniques of self-extension and effective modes of self-bounding. In particular, this chapter will try to show that stone tools and shell beads:

- embody multimodal possibilities for self-related action and interaction (e.g., self-exploration, self-objectification, self-identification)
- disrupt ordinary experience of being in the world by introducing new modes of engaging and thus experiencing the world
- create new bodily habits
- expand the horizon of present action possibilities (affordances) mediating and enacting new physical and sensory engagement with the world
- extend and transform established bodily boundaries
- objectify new modes of suprapersonal intention and attention
- generate sensations and feelings of agency and ownership

An important consideration, as we set out to explore those possibilities, is to establish how they relate to the different types of evidence found in the archaeological record. Both a stone tool and a perforated shell bead are material signs rich in self-semiosis. They can be linked, nonetheless, with different aspects of continuity or identity of self over time. To examine those

differences and to understand their impact on self-becoming, we need to establish a relational and comparative foundation. This will help us to identify and isolate relevant traits and material indexes that count as self-specific, as well as to link different material practices with different forms of self-knowledge (minimal or narrative).

Variation is to be expected, even within a single category of evidence. For instance, the actions taken to control the shape of a flake through direct hard-hammer percussion at least 2.6–2.5 million years ago (or perhaps by 3.3 million years ago[5]), and those involved in compound adhesive manufacture using heat-treated glues seventy thousand years ago or earlier,[6] provide different affordances[7] for attentive engagement and personal continuity. As the level of skill, standardization, and technical sophistication increased in more advanced toolmaking, so too did the demands for effective visuomotor coordination, hierarchical temporal organization, and planning of action. These are all constraints that provide new opportunities for grounding self in action, self-objectification, and conceptualizations of agency. Besides the required complex manual skills and perceptual coordination abilities, a level of foresight and forward planning was also involved in stone knapping. The development of more complex technologies would have provided opportunities to expand the length of time that hominids could project themselves into the past and future. The case of composite-tool manufacture using compound adhesive in Africa[8] is indicative of those gradual changes. The ability to bring together, combine, and irreversibly transform disparate raw materials, often from distant separate sources, incorporates elements of recursion, abstraction, and imagination. A new sense of bodily control and personal continuity is implicated in the making of compound heat-treated glues. The irreversible transformation of materials demands and constructs continuity of self in time.

Another important consideration, in this context, is whether those practices should be understood merely as ways of gaining access to innate aspects of self-experience that already exist, awaiting for conscious attention, or, in contrast, if those new aspects of self-experience are the emergent products of those practices. For reasons I explain below, I am inclined toward the latter possibility, which implies that the self might be conceived as a kind of ontogenetic invention conditioned and dependent on the appropriate sociomaterial ecology to develop. This means that an evolved self-system does not seem to be a precondition for any of these creative behaviors—at least in the broad and basic sense that we share with other species. I will argue,

however, that the obligatory and habitual[9] use of such tools for the body allowed humans to achieve levels of self-referential thinking that otherwise would be difficult or even impossible to reach.

This chapter's working hypothesis is that the embodied practices of knapping and body decoration, each in their own ways, constitute material environments capable of lifting the self from the here and now of ordinary experience and transforming the phenomenological self-as-subject to a social self-as-object. Different lithic production technics and modes of personal ornamentation allowed early humans to discover new ways of experiencing the body, its capabilities, and its relation to the world as it converses and interacts with different materials within a changing field of affordances (interactive possibilities). That is, they provide ecologies of selfhood that create new opportunities for enactive in/dividuation. The underlying assumption is that combined adaptations in the local ecologies of selfhood (creative and prosthetic) may have provided the necessary transactive material scaffolding (situated person perspective) where self–other distinctions can be made, self-boundaries can be transformed, and new forms of agency and ownership can be (pre-reflectively) experienced and, in some cases, also (reflectively) conceptualized.

I will start my exposition with knapping. I want to explore how knapping, as an externally directed attention-demanding task, may have facilitated self-exploration and the emergence of the experience of being an agent. Before we do that, a small detour to the evolution of bipedality is needed in order to remind ourselves of the important changes that the upright posture has effected on the human body, especially the hand. We should bear in mind that the hand is the part of the body that humans engage the most (also visually). It modulates perception and human–world interaction. The hand has played, and continues to play, a unique ontogenetic role in realizing human agentive capacities supporting a huge variety of manual skills and self-related experiences and activities. Importantly, the hand is the most creative part of the human body and the principle interface of the entanglement between early humans and their material environment.

10.1 The Freeing of Hand

The development of bipedal posture among the early hominins and the so-called freeing of hand that allowed it to become the ultimate bodily tool—either for toolmaking and using or for food gathering[10]—has been the

subject of ongoing discussion and controversy. Here, I am concerned only with the possible links between the bipedal posture and the bioenergetics of self-becoming. I suggest that one can see in the synergy of gesture and tool, which undeniably coevolved with the process of habitual bipedalism, one of the earliest forms of self-bounding.

On the one hand, the liberation of hand that came with the upright position changed the relation of the body to the external world, and on the other hand, it turned, probably for the first time, consciousness upon itself, awakening the intuition "that I *am* this body."[11] It is "the possession of a full-blown hand," Raymond Tallis points out in his *Michelangelo's Finger*, "that gives us an explicitly instrumental relationship to our body, a sense that we are agents and that our bodies are the means by which we bring things about."[12] It was not just the upright position. The hand has several unique features, most importantly the full opposability of the thumb to other fingers, that enabled the development of a sense of our own bodies as tools. A further consequence of full opposability is that there is now more touching of finger by finger in ordinary manipulation.[13] This *meta-fingering*, as Tallis calls it, "raises self awareness of the hand,"[14] making it an explicit tool with which to engage the material world as a relational affective nexus of forces, causes, and agencies to act on and interact with.

Full opposability and meta-fingering, taken in conjunction with the upright position, transform the relationship between the hand and the remainder of the body to one of explicit instrumentality. The body is using the hand for *handling*. Once the hand emerges as a proto-tool, this experience of instrumentality can also be projected to the outside world of material events and artifacts. As a result, the experience of using one's own body to enact and achieve entertained goals (sense of agency) or the sense that the world can be operated on indirectly through manipulating causes of desired effects[15]—for instance, using a stone to strike another—also emerge. The ecology of the hand is critical. However, I want to argue that this early existential intuition of sustained self-consciousness and agency delivered by the liberated hand would have never reached the level of self-consciousness we observe in the case of humans without the active mediation of material culture and, in particular, early toolmaking and tool-using activities. What, then, is it that tools do for self and the body? And what, if anything, is special about them?

10.2 Percussive Selves

It is well recognized that the emergence of intentionally modified stone tools around 2.5–2.6 million years ago in Africa (at Gona and Lokalalei)[16]—perhaps much earlier, given the new evidence for stone tool–assisted consumption of animal tissues before 3.39 million years ago at Dikika, Ethiopia,[17] and West Turkana, Kenya[18]—marks a significant step in human evolution.[19] Starting with the earliest simple Oldowan (Mode 1) stone industries and moving to the more standardized Acheulean (Mode 2) technologies that emerged around 1.7–1.5 million years ago, then to the Levallois (Mode 3), and finally to the blade-based microlithic technologies of the Upper Paleolithic (Mode 4–5), a chief archaeological concern has been to understand what the observed morphological changes actually mean for human evolution.[20] The combined study of typologies, operational reduction sequences (*chaîne opératoires*), raw material procurement patterns, and perceived degree of technological competency has been the major focus of analysis.

A progression of technical developments leading gradually to higher levels of technological sophistication and cognitive complexity has long been the dominant view. New discoveries and approaches, however, have cast doubt on the idea of a linear evolutionary trend in lithic production being too simplistic and, in many cases, underscoring the variability of lithic assemblages.[21] For instance, in the last twenty years, new interpretations of early technologies seems to contradict previous views on the alleged simplicity of the early Oldowan lithic assemblages and argue that they display knowledge of the mechanisms of *conchoidal fracture*[22] and the basic principles of stone knapping.[23] Beyond the understanding of the volumetric manual concepts required to exploit the properties of the stone, most of the flake production sites also provide evidence for preferential selection of raw materials. Suitable rocks and cobbles were selected from raw material sources and transported to the production sites by the Oldowan knappers.[24]

The observed changes in the complexity of stone toolmaking technics raise important questions about the coevolving bodily skills and their neural substrates.[25] Understanding if the observed diversity and changes in the material forms can be associated with different aspects of human cognitive or social development has been a fruitful area of study in the archaeology of toolmaking and skill. Differences in the modes of technical action of toolmakers can be studied by looking at reduction choices and action sequences,

as well as by comparing the ways hominin knappers displayed sequential planning and an understanding of core geometry and properties of stone.[26] Anthropological studies and actualistic[27] replicative experiments (behavioral and neuroimaging) conducted with modern stone knappers with different skill levels indicate that competency and expertise in making stone artifacts requires extended learning and highly skilled bodies.[28] Skilled bodies come about through commitment to practice and attentive material engagement, which can only occur with an appropriate social environment that supports learning and skill acquisition.[29]

There are two important questions for this chapter. The first is whether the observed diversity in lithic assemblages and toolmaking techniques also reflects a different degree of self-consciousness. The second is what kind of self-knowledge is required or produced by stone knapping.

10.3 Self and the Technical Abilities of Early Knappers

Think of the early toolmaker from the Olduvai Gorge in Africa preparing a sharp-edged chopping tool. The production of Oldowan stone flakes represents one of the earliest and most basic forms of creative thinging. It essentially consists of an elementary hand movement by which sharp stone flakes are struck from a cobble (the stone core) through direct percussion with another stone (a hammerstone) typically held in the hand. It sounds simple. However, the complexity of percussive movement is greater than one might think. Successful striking actions demand bodily coordination, control of manual grips, and fine perceptual–motor skills.[30] The Oldowan hominin repertoire of stone-flaking techniques is an exercise in the coordination, precision, and timing of action and bodily movement. It is also an actualization of intent. We should not be thinking of this actualization as the externalization of preconceived intentional states through a preordered operational sequence of technical gestures. Knapping movements are always situated; they occur in context and are inseparable from their material environment. They are also sentient movements that remember their past—leaving their traces on the rock's surface—and project into their future—anticipating and predicting the position of the next strike, as well as imagining the sharpness of a cutting edge they aim to produce.[31]

If we are to understand the meaning of intentionality in early human toolmaking and tool using, then understanding the different kinds of operative

intentionality involved (e.g., intentions prior to flaking and enactive intentions in flaking) and their possible links with processes of attentive and predictive material engagement is important. Such an understanding is inseparable from the temporal structure of the knapping experience. By temporal structure, I refer specifically to the phenomenological integration of past, present, and future into an "intentional arc"[32] consisting of a retentional, presentational, and protentional function of the experience of knapping.[33] Knapping is often presented and modeled as a linear operational sequence (the unfolding of a predetermined action script), but from a material engagement perspective, it is better understood as a dynamical, multi-temporal (nonlinear), and distributed process of thinging.[34] The flaking act is both the cause and the consequence of the flaking intention.

Searching for a productive way to formulate the archaeological question of what is causing and what it means to produce an intention to knap stone, it helps to ponder on the following philosophical question that Ludwig Wittgenstein asks in his *Philosophical Investigations* (1958)[35]: "What is left over if I subtract the fact that my arm goes up from the fact that I raise my arm?" Let me rephrase that question relevant to the knapping act: What is left over if we subtract the movement of the striking hand of the knapper from the fact that the knapper is flaking a stone? As phrased, the question involves an attributional aspect—the "I" of "I did that"—and a motoric or associative aspect—the "did" aspect of "I did that."[36] The former aspect—namely, the "I" component or the attributional side of agency—relates to self-recognition. It relates, in other words, to the ability of the knapper to make explicit judgments about whether he/she or another agent was responsible for a given action, such as the flaking of stone. The second "did" aspect of "I did that" focuses on the nature of the temporal associations between the act of flaking and the effect of flaking, and considers how they produce an experience of agency in the knapper. It is generally agreed by most neuroscientific accounts that, in addition to the expected neural activation in the motor areas of the brain, intentional action also involves "a distinctive conscious experience that 'I' am the author of the action."[37] Should we then assume, as is often the case, that the toolmaker would be able to entertain a basic sense of self that can be described in statements such as "This is 'my' hand that is holding that piece of stone," "It is 'me' who is thinking about how to go about making this tool," or "'I' am the one who is having this thought."

This kind of basic self-identification is certainly within the capabilities of the modern knappers that participate in experimental (imaging or actualistic) studies—although those agency attributions are judgmental and may fluctuate in the course of activity. However, we should not assume—at least not from a cognitive archaeology perspective—that this basic capacity for conscious self-recognition in the context of toolmaking was also present from the start. For one thing, modern knappers possess fully developed capacity for language and the necessary vocabulary to express in narrative form different aspects of their self-experience (e.g., the sense of agency and ownership over their actions). But language was not part of the cognitive capabilities of early knappers. Notwithstanding the issues with language, both introspective phenomenological evidence from our personal experience and the use of ethnographic analogues can be potentially misleading and thus should not be projected onto the past. Although all humans now are capable of having—under normal conditions—a clear sense of authorship and ownership over their actions, this basic self-experience is grounded in a set of evolved capacities and ontogenetically constructed background knowledge of what is it like to be an agent. But in the early contexts of human prehistory, this strong background sense of agency was probably lacking. The sense of agency that we now take for granted as a basic feature of everyday human experience could only have existed as a situated awareness of in/dividual actions.

One important question here is whether some kind of minimal self-knowledge is required to be able to have an intention to knap stone or, conversely, whether self-knowledge may be produced as a result of the knapping activity. I suggest that toolmaking and tool using, at least at the level observed in early prehistory, do not require self-awareness. The reason I propose that the origins of self-experience can be intertwined with percussion is not because I think that flake making (the ability to consciously control the shape of a flake) demands or presupposes the existence of a self-aware individual maker capable of entertaining intentions, exerting executive control and attention. Rather, I propose that self-experience and percussion are entangled because percussion instantiates a hylonoetic field that enables the transformation of unbounded energies (neural, bodily, material) into self-bounded agencies. This transformation is made possible through the production of material form (e.g., an edge or a cutting tool). In other words, I suggest that a basic self (consisting of a sense of agency and body ownership) is not

a requirement for knapping. Rather, it should be seen as the product of the knapping process or, in any case, as something experienced during acts of knapping.

We should not think of the process of making as one where a preformed subjectivity projects and imposes form and meaning on matter. Rather, stone toolmaking is better described as the relational and sensuous prosthetic becoming by which early humans learned to attend to and transform their world.

To understand that, we need to understand better the phenomenology of knapping. I mean that both in the descriptive sense and in the explanatory sense of the term *phenomenology*. That is not easy. Every attempt to give a direct description of the knapping experience or to identify and compare pre-reflective experiential invariants that constitute the structure of the described knapping experience can only be partial and situated. Still, there is some value to it.

As a simple example, we can try to focus on the experience of supporting and orienting the core stone with the nondominant hand to receive the strike from the hammerstone held in the dominant hand.[38] With each strike, the knapper discovers and understands the effectivities of his/her own bodily activity, which can now be objectified through the temporal structure and affordances of flaking. For instance, as the grip stiffness of the hand holding the core peaks around the time of hammerstone impact, so too does the sense of agency and the sense of bodily ownership. The knapper, of course, has no explicit understanding about how to apply the force in the right location and direction on the core's surface. Yet, the moment the fingers begin to touch, feel, and explore the surface of the stone, a remarkable and invariable source of information for oneself as an agent (someone acting upon the world) becomes available to him/her: It is his/her hand that undertakes the movement (actively or passively). Whatever the cause behind the angle of the stretching arm, or the grip aperture, it is his/her arm that is stretching and his/her fingers that are touching the stone. What this small yet significant piece of information tells the knapper, is that he/she (specifically his/her body) is the invariant source of the series of movements responsible for the flake produced.

Applying the principles of MET and the logic of self-bounding, the underlying hypothesis is that the knapper first thinks *through* and *with* the stone before being able to think *about* the stone as a conscious and reflectively

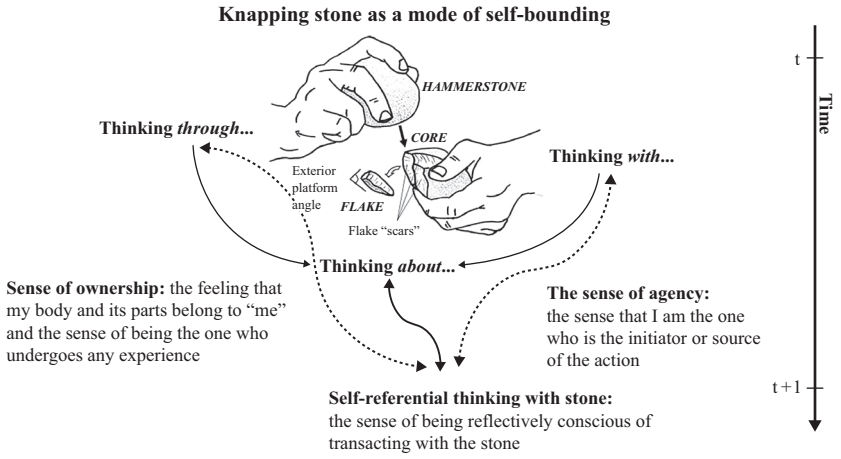

Figure 10.1
Stone knapping and self-exploration. The practice of knapping stone provided the tangible physical space for self-exploration through the experience of making. The attentive and creative engagement between hand and tool facilitated the emergence of minimal self-knowledge (sense of agency and ownership of the subjectively felt and objectively seen body). Toolmaking opens up a new pathway into the consciousness of action: from pre-reflective consciousness *in* action (enactive intentionality) to conscious awareness *of* action. From a MET perspective, the underlying hypothesis is that the knapper first thinks through and with the stone before being able to think about the stone as a conscious and reflectively aware agent. In other words, the situated person perspective (the knapper's thinging) provides the cognitive ecology needed for enactive in/dividuation.

aware agent. In other words, the situated person perspective (the knapper's thinging) provides the cognitive ecology needed for enactive in/dividuation (figure 10.1).

Meanwhile, with time and practice, the accumulated embodied knowledge allows the knapper to predict the consequences of a strike given to a core. That way, the knapper acquires a feeling of control over its bodily movement. It makes good sense to hypothesize that there must be a strong link between the ability to predict and control the shape of a flake (successfully or not) and the sense of agency. What is important to repeat here is that when I say that, in making tools, hominins also learn to imagine and predict the future consequences of their actions, no priority of mentality over physicality is implied. On the contrary, if humans have developed the ability to anticipate, predict, or even see in their mind's eye (visual imagination) what

they could accomplish in action, this is because they first have repeatedly accomplished in action (without any need of mental representation) what is to be thought about with the power of imagination.

From an archaeological perspective, there is no reason to assume that an internal brain-bound approach to self-related cognition offers the natural starting point for understanding the processes involved in building up self-consciousness. The predictions I discuss here are situated. They denote the kind of predictive engagement we discussed in chapter 2, referring to a dynamical adjustment or attunement by which the organism (brain and body) actively responds and interacts with the changing socio-material environment. In short, the situated knapper (brain and body) pre-reflectively anticipates the shape of a flake in a multi-temporal manner that combines protention, attention, and intention. This process, although not incompatible, should not be confused or reduced to the kind of neuro-centric predictive coding associated with internal Bayesian models and prediction error minimization.[39]

What allows the early toolmakers to project in time and think about themselves into the future (as with Neisser's extended self that we examined in chapter 6) is as much the product of neural-based anticipation (realized in the head) as it is of extra-neural material imagination (realized in the world on the stone's surface). Within such multimodal processes of creative material engagement, it is especially hard to maintain the old distinctions between the domains of perception, cognition, and action. Similarly, there are no fixed agentive roles in this process. The same difficulty applies for the boundaries between personal and peripersonal space. Those must change too to accommodate the incorporation of tools.

10.4 The Stick and the Blind

Reflection on the proclivity for bodily extension that we see in the case of toolmaking brings to mind the famous question of the blind person with the stick raised, among others, by Maurice Merleau-Ponty[40] and Gregory Bateson[41]: Where do we draw, and on what basis can we draw, a delimiting line between the blind person and the rest of the world? At the tip of the stick? At the handle of the stick? At some point halfway up the stick? This example has been adapted and employed in the context of material engagement theory as a working hypothesis concerning the centrality of material

mediation in human becoming (hence the state of incompleteness we discussed in chapter 5).[42]

The transactional character of the relation between the blind person and the stick provides a diachronic point of reference for conceptualizing the role of prostheses in human becoming. Especially in the case of toolmaking and tool using, the metaphor of the blind person and the stick raises a powerful challenge against the legitimacy of the traditional bodily boundaries and helps us to redraw the line that separates brains, bodies, and things. The objective of this challenge is not to abolish boundaries altogether but rather to question the authority of fixed boundaries and assist us in rediscovering their border-like ontology. Boundaries, as the sociologist Richard Sennett[43] proposes using an example from natural ecology, are like cell walls. Borders, in contrast, resemble the cell membrane. A boundary is simply an edge where things end; a border, by contrast, is a site of exchange—both intra- and interaction. I suggest that the sharp edge of a cutting tool has border-like qualities. It is not a boundary in the sense of an end but instead a point of intra-action and perturbatory mediation. A simple flake has the potential to alter relationships between humans and between humans and their environments. In fact, even the debris of stone flaking left in the environment can be seen as a recourse for niche construction.[44] The analogy I am making here with the blind person and the stick can be understood in a double sense: first, in terms of the shifting boundaries and prosthetic osmosis between the hand and the tool, and second, and more specifically related to toolmaking, in terms of the exploratory anticipation and material imagination enacted during knapping. In particular, each flaking act, like the tapping with the stick, enacts a possible way forward. Flaking stone brings forth the exploratory movement that will produce the edge of the tool; tapping with the stick brings forth the exploratory movement that will allow the blind to travel from point A to point B.

The main point of this analogy is to underscore that through making and using tools, the human species—much like the blind person in Merleau-Ponty's example—transformed the agencies of matter into pathways of movement, perception, and action. Intelligence begins with movement.[45] Evolutionarily speaking, moving was thinking. This is especially true in the case of toolmaking, where this elementary ability for movement acquired consciousness, direction, and meaning.[46] It is the cognitive life of that movement as it gradually turned into skill and *tectonoetic* consciousness[47]

(through the diverse choreography of its component gestures) that we need to understand.

10.5 Knapping Self-Recognition and the Analogy of the Mirror

In this connection, another useful analogy can be drawn between stone knapping and the mirror self-recognition task we described in chapter 3. As we saw then, and will further discuss later on in this chapter, humans, and many other animals, are able to make use of the mirror to explore their own body. It remains debatable to what extent, for which animals, and under what conditions the self-exploratory behavior we see in the case of the mirror mark test provides evidence of conscious self-recognition.[48] Yet, there is little doubt that the power of the mirror as an instrument of self-recognition—associated with active or passive self-semiosis—lies in the way humans, apes, or other animals can use it to inspect areas of their body not visible without its aid, or to inspect their body movement in their mirror image (e.g., moving back and forth in front of the mirror).

I suggest that knapping can also be seen as a kind of multimodal mirroring in which the affordances of the stone are used like a mirror to inspect, feel, and gain experiential access (or, in some cases, awareness) to aspects of their bodily selves that usually remain tacit and inaccessible.[49] More simply, what I am proposing is that the stone-knapping task enacts a hylonoetic field in which those hidden bodily aspects or patterns of the minimal self can be directly felt and perceived. The minimal self, as an experiencing body, is rarely becoming itself the object of perception or experience. This is what changes in the context of toolmaking: absent aspects of the experience of being and having a body become present. To make a connection also with the analogy of the blind person with the stick from our previous section, what the stick affords for perception and action (i.e., seeing the world by touch and extending consciousness to peripersonal space), toolmaking affords for agency and ownership (i.e., identifying the knapper as the source and initiator of action and the knapper's hand as owned). Toolmaking makes it possible to view and experience the body in ways not ordinarily possible from one's unmediated subjective/personal standpoint.

Let's take a closer look at how this might be happening.

10.6 Binding Effects: Self-Objectification Through Tool-Use Learning

In the previous sections, I examined some basic interactive principles by which early knappers engage with stone to produce a cutting edge. The basic sensorimotor dynamics that support those interactive principles of percussive stone flaking, although very similar to those present in ordinary perceptual and action learning, present certain characteristics, or action-affordances, not otherwise available under ordinary conditions.

In particular, as discussed, stone flaking requires hand-eye coordination and the ability to control movement (kinetic energy and the angle of blow). The kinesthetic synergy between the hammerstone-wielding hand (usually the right) and the hand holding the core (usually the left) during the knapping process objectifies a dense causal coupling that produces phenomenological tension and friction at the level of pre-reflective self-consciousness. The dense causal coupling between the knapper's intention, attention, perception, and anticipation of action—as manifest, for instance, in the movements of the striking arm in response to the changing shape of the core as flake removal is progressing—is a particularly effective source of self-specifying information.[50] This largely perceptual specification of self is entangled with the tactility of making. Haptic perception and active touch are critical parameters of the toolmaking tasks. Indeed, when it comes to the question of how our sense of agency and body ownership arise, it is touch that offers the most powerful sensory input. Tactility and the human hand play an important role in realizing our agentic capacities during visuospatial integration and hand-eye-tool coordination.[51]

At a basic level, knapping provides information specifying the self as distinct from the world—as in Neisser's ecological self (discussed in chapter 6)—on the basis of the demands it places on one's direction of hand movement and control of posture. Through the process of knapping, the knapper acquires a new understanding of the complex ways the body can be responsive to one's will and attribute the source of action to oneself. Through time, toolmakers notice the consequences of their actions and learn how to effectively situate their body and use their hands and available resources in order to maintain desired effects. They learn to touch by seeing and to see by touching. The stone-flaking task becomes a major source of information about the hominin body and its potential uses, boundaries, and limits. Seeing

and feeling their hands and bodies—also *with* their hands and bodies—as they navigate within the constraints of the flaking task, the knappers begin to specify themselves as active agents in the world. Moreover, learning to anticipate the outcomes of their actions, they also develop the ability to think about the future and to imagine themselves in the future. At the same time, learning new skills, they also learn about learning.

In a basic sense, the knapping of stone is the prehistoric equivalent of self-tracking (see chapter 11). The fractured surface of the stone furnishes the knapper with a visuo-tactile indexical trace of his/her own bodily action. The stone's surface offers a constantly available perceptual record of the knapper's past sequence of action. This kind of self-tracking is not available or possible to obtain from unmediated bodily movement through the usual proprioceptive and kinesthetic sources. Given the importance that the ability to recognize one's own past actions has in self-recognition, the ability of the tool to operate as a perceptually accessible memory trace should be underlined. The emergence of self typically refers to the understanding of one's own permanence and identity in time, and it may well be that initially (during early toolmaking), it was not the self but rather the tool that persisted over time. The knapper's self is remembered as part of the toolmaking process. The knapping process, blending material memory and anticipation, fulfils a double role in self-becoming. It provides (a) a mode of temporal extension on a par with Neisser's extended self (the sense of oneself as existing over time; see chapter 6)[52] and (b) a stable material anchor for grounding self in action that permits situated and task-specific self-identification and reflection over time.

It should be noted in this connection that any given action may bring about (or fail to produce) a specific change or outcome. A common characteristic of toolmaking is that it can go well or terribly wrong. In the former case, there is a sense of gratification and confidence derived from observing the anticipated results of their own activity; in the latter case, probably the opposite. Materials fail us and tools break. Accidents and errors are an inevitable part of any making process.[53] These errors played an important role in self-becoming, adding friction and resistance to the flow of action and allowing the self to be momentarily objectified and experienced as standing opposed the stream of consciousness. A tool that no longer functions effectively becomes obtrusive. To put it in Heideggerian vocabulary, what was previously concealed from view and "ready-to-hand" now becomes "present-at-hand."[54]

The dynamical parameters that specify the topology of the stone-knapping task (e.g., point of percussion, angle of blow, and exterior platform angle) specify also the topology of self-location (personal, peripersonal, or extrapersonal). The tool, as we also examined in chapter 8, becomes an extension of the hand and of the senses. This extended hand can be not only perceived (from the outside) but also felt from the inside. The unity of the hand and the tool has effected a radical change in the spatiotemporal geography and phenomenology of the minimal self, which is now distributed (physically and perceptually) among personal, peripersonal, and extrapersonal space. This distribution, characteristic of the situated person perspective, has some potentially important consequences for the in/dividuation of our bodily selves.

These consequences can be understood at two basic and related levels of self-bounding: causal binding and intentional binding. I start with the former.

10.6.1 Causal Binding

At a first level, knapping affords the knapper a quite different apprehension of its body's capacities, unity, and boundaries. Toolmaking brings forth a new kind of mediated self–other distinction and "we" intentionality (i.e., enactive intention in mediated action),[55] which allow the temporal binding and time bending (compression) needed for the conceptualization of causal relations.

In particular, the knapper's ability to feel and to learn how the stone responds to one's action provides a direct source of self-specifying information about (a) what causes action to occur or have the effects that it does and (b) how the path from cause to effect is experienced through time. The flow of kinematic information available through the behavioral sequence of toolmaking and its result (the tool) can now be translated as a causal relationship. That is, it can be seen as goal-directed intentional movements performed by an agent. In the early stages of toolmaking, this is more of a feeling or sense than an explicit conceptual understanding. But, as discussed, in time and through accumulated experience, this tacit phenomenal knowledge can also be used to predict and make sense of future causal events.

To understand better, and to provide some context of the evolutionary significance of this, a small detour to consider causality from a broader comparative perspective is needed. Take, for instance, the example of a chimpanzee cracking a nut, which can be interpreted as a precursor of stone flaking.

Comparative experiments have shown that chimpanzees are able to choose a hammer adapted to the hardness of the nut before the actual commencement of the nut-cracking activity.[56] This indicates that they are able to understand the basic functional properties of the nut-cracking task and may be capable of anticipatory behavior. The element of anticipation can be extended to the striking action, since some chimpanzees seem capable of modulating the force (kinetic energy) of the strikes given to a nut before taking the kernel out. All that can lead us to hypothesize that the chimpanzee engaged in nut cracking "has some 'understanding' of the existence of a breaking point that should not be passed over."[57] But although chimpanzees can learn to select the right stone and initiate a sequence of strikes to crack open a nut, apparently they lack any explicit understanding of causality. Even if they can effect a forceful strike, make sense of a trap, or learn to manipulate sticks and stones to obtain food rewards (associative learning), they do not have concepts of causes or forces. Unlike human understanding of the causal relationship between the tool and the action goals, apes do not understand the relation between their acts and the outcomes ensuing from their actions in causal or intentional terms. The available comparative evidence suggests that there is a critical difference between the ways that human and nonhuman animals think about causal relations.[58]

The tool selectivity, to use another example, which enables the New Caledonian crow to get food out of a pipe using small sticks[59] is certainly impressive but not compared to the way one-year-old human babies are able to learn that their own movements can cause motion: "If a ribbon is tied to the baby's foot and the other end tied to a mobile, they rapidly learn to kick and so make the mobile turn; a week later they will remember how to do it."[60] Despite the often-remarkable abilities of nonhuman animals to use tools, there seems to be a discontinuity with human understanding of causal relations in that they do not understand unobservable causal properties and are incapable of grasping the analogical similarity between perceptually disparate but functionally equivalent tasks.[61] To borrow an example by the developmental biologist Lewis Wolpert, "an ape seeing the wind blowing and shaking a branch till the fruit falls would never learn from this to shake the branch to get the fruit."[62]

However, it is not entirely clear to what extent a developed sense of bodily awareness can account for the distinctive understanding of causality in humans. This discontinuity may also explain the inability of nonhuman

animals to develop a sense of agency proper, which, as discussed previously, is codependent with causality and intentionality. The question becomes even more interesting if we consider that chimpanzees and other animals may present a number of features indicative of a core self-system and even pass the mirror test, but they never make the passage to the reflective, conceptual, or autonoetic stages of selfhood. Is this symptomatic of their lack of language or inability for metaphoric projections?[63] Whatever the precise reasons, there seems to be little doubt that although other species of tool-using primates sometimes exhibit a basic understanding of some functional properties of tools (spontaneously or only after training), humans appear unique in their capacity to infer the causal relationships involved in tool actions between tool use and the results obtained with it.

The ability to perceive oneself as a causal agent is crucial for developing a sense of agency proper and thus should not be taken for granted. Research in developmental psychology indicates that, for infants, the basic function of an action is to bring about some particular change of state in the world. Tool use is a particularly efficient way to reach such a teleological understanding. Tool use and manufacture is the way to learn about causality and the consequences of action par excellence.[64] By eighteen months of age, children are able to use a rake as a tool to pull a toy out of reach toward them.[65] Whereas by two to three years of age, they seem to have developed a concept of force, which enables them to "know that a moving object—a ball—can make another move on impact."[66] Similarly, one could hypothesize that it is through experimentation in toolmaking (as also with other forms of creative material engagement) that early humans—much like infants today—discovered their own agentive causal efficacy. The experience of causality combined with enactive intentionality brings about a new perspective on the agency of the body as the source of action. One possible way that this can be understood is through a phenomenon known as the *intentional binding effect*. This brings us to the second level of self-bounding I mentioned above.

10.6.2 Intentional and Temporal Binding

Intentional binding relates to the perceptual and temporal attraction of voluntary action. It refers to a compression of time (in terms of perceived duration) between an action and an ensuing sensory effect. The experienced temporal interval between an intentional action and its effect is shorter than that experienced in involuntary movement. Evidence of this intentional

binding effect integrating awareness of events occurring in voluntary action can be found in a series of experiments that have been using Benjamin Libet's clock methodology[67] to explore the relationship between intentional action and subjective time.[68] In particular, what these studies have shown is that subjects judged the perceived onset of a voluntary movement—but not of an involuntary or passive one—as occurring later and the sensory consequences as occurring earlier than was actually the case. The perceived duration, in other words, of the interval between an action and an ensuing sensory effect was shorter than that experienced in involuntary movement. In short, "voluntary actions and their effects are attracted together across time."[69]

Why is that compression of the temporal interval between the intention to act and its external sensory consequences on the world important for our discussion of self-bounding in early toolmaking? I want to underline two major observations. The first observation is that intentional binding does not occur with passive movements; it only occurs in the case of active and mediated intentional actions. As such, it can provide a major source and stimulus for the experience of agency in situated activity. In fact, in experimental settings, intentional binding is considered to be an implicit measure of the conscious experience of agency.[70] The second observation is that intentional binding is also modulated by prior causal beliefs. Experimental studies have shown that binding effects for a tone triggered by the participants' actions were significantly larger when participants were convinced that their actions triggered the tone compared to when they were convinced that the confederate's action triggered the tone. Causal belief seems to be another essential precondition—together with the voluntary intentional character of action—for the emergence of intentional binding.[71]

What does this tell us about the experience of agency and causality in the context of toolmaking and tool using?

Consider again the example of Oldowan flake production (figure 10.2). A stone core (A) is struck with a hammerstone (B) in order to detach sharp stone flakes (C). According to the intentional binding effect, there is a perceived compression in time of the interval between the percussive action (B) and the effected flaking of stone (C). That is, the perceptual consequences of those actions (e.g., actual flakes or flake scars left on cobbles) are temporally attracted toward the knapping action itself. Why is that compression of the temporality of knapping important?

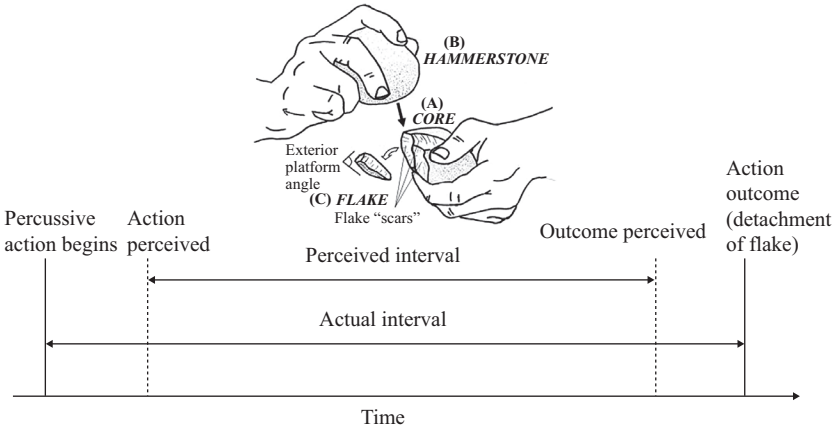

Figure 10.2
The intentional binding paradigm applied to the example of Oldowan flake production.

Before we try to answer that question, it is important to remember that our main concern here is not with the knapper's ability to generate an action sequence (i.e., flaking the stone in order to reach the intentional goal). Rather, the issue we are centrally concerned has to do primarily with the knapper's ability to experience of oneself as the one who is initiating and controlling their own flaking actions—that is, to experience agency. The question we are seeking to clarify is how the knapper's experience or sense of agency came about. We are interested to understanding what it is that the temporal binding between the flaking actions and their effects can tell us about this process. As discussed, experimental evidence supports a link between intentional binding and sense of agency. However, the exact nature of that link is yet to be fully understood. I also said that that both intentionality and causality need to be present for temporal binding to occur. The question remains: What is it exactly that the observed temporal attraction in the perceived times of actions and effects can contribute to the knapper's phenomenal understanding of the relation between the intention to flake a stone and its external sensory (auditory, somatic, and visual) consequences on the raw material?

I suggest that a possible way to answer that question is the following. During knapping, predictions of action consequences are dynamically coupled with bodily-based proprioceptive information about the stone. Knapping and

the practice of toolmaking necessitate extreme coordination and synchronization between self-performed movements and their visual consequences. As a result of the intentional binding effect, asynchronous active (intentional) movements would be perceived as more synchronous than they really are. During that process, the knapper's awareness of the intentional flaking of a block of raw material is shifted toward the subsequent sensory effects (audio, visual, or tactile), whereas the awareness of the effects is shifted toward the flaking act, and the two are temporally bound together in a new form of conscious awareness (i.e., tectonoetic awareness). My proposal is that a minimal form of self-bounding takes place as a result of this synchronicity. This binding of the knapper's actions and their effects occurs pre-attentively and actively contributes to the generation of a coherent sense or feeling of agency.

The early contexts of toolmaking provided the cognitive ecology in which the sense of agency could have developed. The equivalent experience in developmental time can be seen in natural or experimental scenarios where a child presses the key of a toy, and a sound or light is produced. In those instances, the child is experiencing a lesson in agency and causality. With every key press, children learn to use their body as a tool to produce a specific desired effect in the world. Through that, they also develop awareness of their own causal efficacy. In a broadly comparable sense, the making of stone tools by early humans provides new unique set of possibilities for engaging with self-exploratory activities. In such contexts of enactive intentionality and creative material engagement, hominins were offered opportunities to learn and discover not simply the affordances of materials and environments but also the relational power to act of their own bodies. Elementary components of the knapping process, from the exploration of the relative rigidity of a support surface or the strength of a fine-grained stone to the fracture mechanics of stone flaking, entail learning about the knapper's bodily capacities for action as well as about the consequences of those actions.

I now turn to discuss personal decoration.

10.7 Personal Decoration and Self–Other Distinction

Early body decoration is the second major domain for our analysis in this chapter. The body's surface, seen as "a cultural palette for decoration and modification,"[72] has long been subject to anthropological and archaeological attention relevant to issues of cultural inscription and the symbolic

construction of personal identity. Body decoration is also generally accepted as one of the earliest archaeological expressions of modern cognitive abilities.[73] The discovery of personal ornaments—for instance, the seventy-five-thousand-year-old *Nassarius kraussianus* shell beads recovered at the Blombos Cave in South Africa[74] or the eighty-two-thousand-year-old *Nassarius gibbosulus* shell beads from Grotte des Pigeons in Morocco[75]—led to controversies about whether these objects also provide some of the earliest unambiguous markers of symbolically mediated behavior and, by implication, of language.[76] What exactly does this recognition of shell beads as symbols imply?

Take, for instance, the case of the shell beads from the Blombos Cave. There are usually three major questions associated with the Blombos shells: first, we have the question of their date; second, we have the question of intentionality and artifactuality; and finally, we have the question of their representational or symbolic status. Concerning the first two questions, there seems to be little doubt that the shells come from around seventy-five thousand years ago and that human agency is responsible for their collection and transformation into beads. Taphonomic, morphometric, and microscopic analysis[77] as well as comparison with modern and experimentally modified shells provide strong indications of human agency and involvement in the shells' collection, perforation, and use as beads. However, the third question, concerning their possible symbolic function, remains hotly debated. Although an emerging archaeological consensus recognizes these artifacts as indexes of symbolic behavior, there are problems with this interpretation. It can be argued that simply to prove the artificiality of a perforated shell, and maybe also its function as a personal ornament, does not necessarily make it a symbol—at least not in the arbitrary, representational sense that is often associated with them and which could substantiate a claim for the presence of fully developed symbolic language.[78]

What does it mean, then, to say that shell beads were purposely made to be used as ornaments? Some archaeologists prefer to answer those questions by reference to the degree of cognitive (specifically representational) and social complexity that the use of shells as personal ornaments implied. Drawing on comparative cross-cultural analysis of personal ornamentation, they suggest that one could see in the type, arrangement, association, location on the body, size, number, or color of beadwork symbolic codes or the ability to communicate explicit social messages.[79]

My approach in this chapter is different. Instead of tackling directly the question about whether the inhabitants of Blombos Cave possessed symbolic capacity, I want to use the Blombos beads to look at a more basic and largely unexplored dimension of these artifacts. In particular, what I am hoping to show here is that early body ornamentation should be understood at first instance not as the symbolic inscription or representation of the self–other distinction on the body but instead as a possible technique for the construction of such a distinction. The relationship, or distinction between self and other, is not merely symbolized but rather actively emerges through the ornament. From a material engagement perspective, it is not the potential information content or the possible symbolic use of the beads that matters most. What matters is primarily the change in inter- and intrapersonal dynamics that the ornament as a new technology of meaning brings with it. Shell beads are not embodiments of ideas in any explicit representational way. They simply embody a particular point of view that brings about a particular sense of bodily self-awareness.

10.8 Finding Oneself in the Mirror

To draw out this dimension of early body decoration, we need to disentangle from the referential logic that dominates archaeological thinking about beads as symbols. A simple way of doing that is by using again the analogy with the mirror self-recognition task. All it takes is a small shift in perspective. Instead of seeing the Blombos bead as a symbol, I propose that we see the shell bead as the equivalent of a Post-it sticker placed on a child's forehead prior to his/her exposure in a mirror self-recognition experiment.[80] In experiments of this kind, the child, depending on age, discovers the sticker in the mirror and reaches to touch or remove it. This type of behavior is taken by many developmental psychologists as a major cognitive landmark indexing the emergence of a conceptual self.[81] I propose that the perforated Paleolithic shell bead indexes a similar landmark, only with one important difference: it does not simply reflect a passage to self-awareness, it also brings forth, or at least actively contributes to, this passage. That is, it becomes a material sign for enactive in/dividuation.

To avoid unnecessary terminological confusion among the different levels of self-awareness and types of self-knowledge that can be associated with

self-experience in this context, I shall be structuring my approach adopting and adapting the simple distinction between *noetic* awareness and *autonoetic* awareness[82] that we briefly discussed in chapter 1. In particular, by noetic awareness, I refer to the basic sense of oneself as acting in and on the environment at a time according to one's first-person perspective. Autonoetic awareness refers to the sense of oneself as a unique individual persisting over time, able not only to interact with objects and others according to one's 1PP but also to reflect on one's perspective. Accepting the above basic distinction, the question I want to explore is how practices of early body adornment, seen as modes of self-bounding indicative of explicit self-recognition and objectification, can help us understand the developmental passage from noetic to autonoetic awareness from a long-term archaeological perspective.

From a developmental perspective, we should note that the basic noetic sense of bodily awareness can be demonstrated immediately after birth in infants.[83] Moreover, our nearest primate relatives present a number of features indicative of such a proto-self system.[84] But similar to what we discussed in relation to causal relations or the capacity for exact numerical thinking,[85] other primates never make the passage to the reflective, conceptual, or autonoetic stages of selfhood. The question that confronts us, then, is how humans moved beyond this basic level of self. In other words, how did humans reach this point of autonoetic self-actualization where the self is recognized and experienced not only from within—that is, from a 1PP—but also from a third-person perspective? Most researchers dealing with developmental questions of this sort—from either an ontogenetic or phylogenetic perspective—would see language as playing the key role.[86] Without underestimating the importance of language, especially in ontogeny, it can be argued that from a long-term archaeological perspective, the above premise cannot easily account for the development of self-referential thinking in those early contexts where such verbal competence with personal pronouns probably did not yet exist or was underdeveloped. In other words, the question for archaeology is not about how you learn to associate the words "I," "me," and "mine" with personal identity and ownership but rather about how you experience and conceive personal identity when you lack the verbal capacity and words to express it. Despite the evident association between language and the narrative autobiographical self, language lacks in itself the necessary stability that would have made possible the transition to explicit

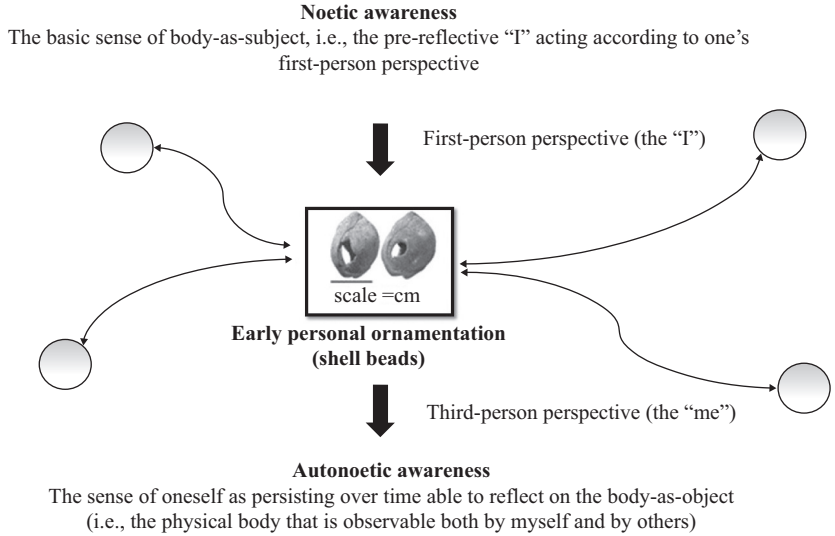

Figure 10.3
Early personal decoration and self-experience. Early body decoration frees minimal self-experience from the temporal simultaneity and spatial coincidence of the subjective body so it can now be entangled with the perspective of the "other." It brings about a shift of attention from the first-person point view to the way bodies are perceived by the perspective of the "other." In that sense, personal ornamentation can be associated with the developmental transition from the first-person perspective (the "I") to the third-person perspective (the "me").

self-consciousness. I suggest that the world of material things offers the missing link in those cases, providing an unlimited recourse for self-bounding and enactive signification in human self-becoming.

Thus, returning to the case of personal decoration and the example of the shell beads, I propose they should be understood along the lines of this enactive logic. To illustrate that, a connection can be drawn with the analogy of the blind person with the stick: the bead is for the early human self-system as the stick is for the blind person's perceptual system. The bead, like the stick, is effecting an extended reorganization in the cognitive ecology that makes possible the bringing forth of a new type of self-knowledge (i.e., autonoetic awareness; figure 10.3). This should not be understood to imply that only shell beads or body decoration could have played that role. As we examined, tool use and manufacture had already made important contributions to the emergence of human intentionality and the sense of agency and body ownership (which

are essential for the development of human self-awareness). The proposal is, nonetheless, that early body decoration brings some additional epistemic qualities that we don't see—at least not to the same degree—in the case of tool use and manufacture. These special epistemic qualities emanate primarily from the ability of the beads, as material things attached to the body, to transform the phenomenological self-as-subject to a social self-as-object—that is, to make visible and tangible what is inherently silent and transparent (i.e., the basic noetic self). This may have played an important role in the emergence of the human autonoetic ability to be reflectively conscious of one's own perspective on the world rather than simply being aware of the world.

10.9 Epistemic and Affective Qualities of Body Decoration

Beads, as any other form of body decoration, are always *for* someone; they involve an experiencer (individual or collective). Furthermore, in their capacity as portable and visible material-enactive signs attached to specific bodies, they objectify personal ownership (the sense of mineness)—probably more than any other artifact in early human prehistory. More importantly, from a situated person perspective, they can be associated with a new perspectival sense of belonging, raising important questions concerning the relation between self and other.

More specifically, the use of the shell bead provides a nonlinguistic reflexive pronoun referring back to the body concerned. It offers a new way of pointing to the body in question. The bead attached to the body plays a role analogous to that of possessive prefixing terms and personal pronouns—that is, it acts as a predicate of oneself. The bead provides a material anchor for a process that recognizes, relates, and separates self and other. One way to analyze this process is in the form of conceptual blending[87] between a sense of belonging and a sense of possession, which will allow further emergent mappings implying a self–other relation/differentiation, the sense of being a part of as well as a sense of mutual co-presence. Personal ornaments can also be argued to afford exchange and thus partibility. I see this exchange not as part of an abstract communicative symbolic code but rather as a performative process enacted as a bodily gesture. This bodily gesture is not indicative of symbolic capacity or of mentalizing (reading each other's minds).[88] Instead, it is a form of affective and mediated participatory sensemaking.[89]

In particular, as we discussed, an ornament may be seen as an extension of the body and thus as a part of the self. The key element or property here is not symbolism but rather attachment. To describe these relations of attachment such as body decoration and ornamentation—paint, tattooing, piercing, and other modifications—anthropologists have often used the term *second skin*.[90] In this sense, the shell bead attached to the body becomes a visible, corporeal extension of the skin and thus of the human body. The anthropologist Alfred Gell in his work on tattooing in Polynesia gives us a good example of this process. He describes tattooing as an exteriorization of the interior "which is simultaneously the interiorisation of the exterior."[91] With tattooing, Gell wrote, "The body multiplies; additional organs and subsidiary selves are created."[92] Adding this brief anthropological note to our discussion, I want to highlight two things: first, that there is clearly a relationship between self and the surface of the body that differs in different cultural contexts; and second, that the social skin crosscuts the conventional body image/body schema distinctions and thus should not be reduced to some symbolic or inscriptive disembodied realm. The actual modification of the body through cutting, piercing, painting, or tattooing is not the equivalent of some post-structural textual inscription. The bodily ornament, like a tool, can be seen as an extension of the body: a bodily gesture and a part of the self.

10.10 Bodily Decoration as Gesture

Earlier in this chapter, I described stone toolmaking as a prosthetic gesture. Given the appropriate ecology, it can also be described as a creative gesture. Extending this gestural metaphor to the case of personal decoration, I propose it presents a different kind of prosthetic gesture—what we describe as a *pointing gesture*. Early personal decoration on a par with pointing enacts a sense of one's body as a visible object in another's sensory field. Of course, in the case of bodily decoration, it is not simply the hand that is gesturing but rather the whole body or whatever parts of that body one chooses to emphasize. The decorated body, as one that points, must be aware not only that it is visible by others but also that it is visible in a specific altered way that others must be able to understand. Decoration, then, offers a new enactive means by which the bodily self gestures toward the "other." In that sense, the shell bead provides a bodily technique for revealing or disclosing the self. This function is not symbolic or representational but inherently enactive

or presentational: the ornament acts as an artificial fingering. It becomes a device for enactive discovery and of self–other differentiation by pointing out the self and the "other." Seen as a pointing gesture, bodily decoration provides an early example of the distinctively human form of consciousness that Tallis calls *indexical awareness*. As he explains, "This is a form of awareness that, as it were, points to itself, or points to its own source. The awareness points back to the one who is aware. I am a touched toucher, a seen seer. In short, I am present to *myself* in the field of things that are present to me."[93] The bead, attached to the body, becomes a visible, corporeal extension of the skin and modification of that body. At the same time, seen as a dual entity that both touches the body and faces outward toward the "other," the shell bead can be described as an artificial skin capable of reshaping the body to which it becomes attached (extending peripersonal space). More simply, body decoration is capable of freeing the self from the first-person perspective so that it can now be consciously enchained into its social surrounding. However, I suggest that this social enchainment should not be understood as a form of symbolic communication of group membership, drawing parallels with the function of personal decoration in recent human societies. In the early contexts of human prehistory, the presence of reflexive self-awareness and self–other distinction should not be taken for granted. Early body ornamentation such as what we see at Blombos Cave should not be seen as existing for representing the self–other distinction. Rather, we should be seeing the self–other distinction as enacted through the ornament. The shell bead is important for what it does, not for what it *means*.

I do not wish to question the basic intuition that the presence of personal decoration indicates the developing awareness that humans live in a world of other minds (human and nonhuman) and that they think of their selves with others in mind.[94] I simply want to emphasize the enactive and constitutive role that bodily ornamentation may have played in that process. More simply, instead of seeing early ornaments as existing for decorating the self, we should be seeing the self as emerging through skillful involvement in social interaction actively mediated by the ornament. The development of self–other awareness is partly constituted by the affective capacity of the ornament. The shell bead attached to the body does more than merely symbolize group identity or personal identity as part of a group. Rather, it provides the actual material means for such a togetherness to be performed, incorporated, and inscribed in a manner that uninscribed bodies can hardly

attain. In short, beads and bodies unite, and together, they bring about a new performative understanding of togetherness and of "we" or joint intentionality. Here, we should not be thinking about the concept of "we" intentionality or shared intentionality as something that simply happens between individuals—for instance, in the sense proposed by Michael Tomasello.[95] The role of beads is not simply to allow intention sharing between humans as they engage in new collaborative activities of joint attention and cooperative communication. Rather, my argument is that the beads expand the meaning of "we" intentionality, also highlighting how materiality actively participates in the emergence of intention sharing (especially in those early contexts of human evolution). In other words, the meaning of "we" intentionality applies both in the case of interactions between people and in the case of transactions between people and things (in this case, shell beads).[96]

The emergence of an explicit self–other distinction presupposes that, in some minimal sense, the "other" is revealed through bodily presence and movement. This bodily mode of presentation also reveals a form of subjectivity that is capable of mental acts and states (thoughts, emotions). It is especially this shared understanding that the ornament enhances and accentuates toward understanding others' perspectives. However, the way to interpret that is not as a kind of inferential simulation process associated with theory of mind but rather in the enactive and ecological sense of direct perception. Social cognition and the intersubjective sense of self as dependent on the perspective of others is more than a passive mentalizing of the "other." Personal decoration seen as an enactive technique of the self and medium of self-bounding does not just enable a social understanding *about* the "other." Rather, it can provoke an experience or feeling of connectedness *with* the "other." However, this social understanding presupposes nothing more than a pragmatic ability or nonverbal know-how of acting together and forming appropriate relations in specific situations.

10.11 Conclusion

Many times in this book, I have argued that material things, due to their potency as enactive signs for the expression and grounding of experience, play a critical role in the multisensory integration and attunement between basic self-experiences that may happen at different timescales. In this chapter,

focusing on two diachronic and cross-cultural material practices (i.e., stone tool use and manufacture and body decoration), I have tried to explore the role these practices played in the emergence of self-recognition. I have argued that both practices, knapping and body decoration, each in their own ways, have actively participated in human enactive in/dividuation by reaching deep into the supposedly immune compartments of self-experience and embodiment.

Specifically, my argument with respect to knapping has been that it provides the right kind of ecology for the emergence of a basic sense of minimal self (comprising sense of agency and body ownership), whereas personal ornamentation can be associated with the developmental transition from the first-person perspective (the "I") to the third-person perspective (the "me"). The former relates to the phenomenological distinctions associated with the pre-reflective aspects of human bodily experience (see the discussion in chapter 6). The latter relates to the phenomenological distinction between the body-as-subject or *Leib* (i.e., the pre-reflective "I") and the body-as-object or *Körper* (i.e., the physical body that is observable both by me and by others).[97]

The creation and use of even the simplest handheld stone tool, or personal ornament, embodies a rich landscape of affordances,[98] allowing new bodily capabilities and possibilities of enactive intentionality and participatory intersubjectivity[99] to be realized. This applies whether we consider these objects (tools or ornaments) as extensions, assimilated into the body schema, or as powerful means for objectifying or inscribing the body. The body that uses and incorporates that tool or ornament is a different kind of body than the body that does not. It is a different body because the range of experiences and possibilities of what it can or cannot do has changed.

To explain that better, an analogy can be drawn with the operation described in phenomenology as *epoché* (Greek for "cessation"). *Epoché* is used in this context (most famously by Husserl) to describe the methodical disengagement, bracketing of, or suspension from the world of our common experience in the conduct of phenomenological research.[100] The basic idea is that introducing a methodological rupture in our everyday habits of experiencing and knowing the world, as it is given to us because of our *situation*, helps us escape the experiential familiarity and taken-for-grantedness that blinds us to our own perpetual transformation and self-becoming. For the phenomenologist, such a suspension or reduction—from the Latin *reducere*

for "to lead back"—is needed in order to understand the invariable patterns or structures of subjectivity and its relation to the world.

The analogy I propose is that the practices of knapping and bodily decoration may have effected a similar kind of suspension or *epoché* by disrupting the ordinary ways and established habits of experiencing the body and the world. This suspension allowed our ancestors to gain access to new aspects of their bodily self and their relationship with their surrounding world and the things or tools themselves that would have been otherwise impossible to achieve through their normal unmediated perception of reality.

In the case of knapping, the intimate relation between hand and tool provided the tangible physical space not just for creative material engagement and experimentation but also, importantly, for a deeper phenomenological exploration of the actual experience of making. What I mean is that by learning how to make and use a tool, the knapper also learns new ways of experiencing him/herself. This type of self-related and self-motivated creative material engagement provides a new pathway into the consciousness of action: from pre-reflective consciousness *in* action (enactive intentionality) to conscious awareness *of* action. This consciousness of action is inseparable from feelings of ownership and agency that, in turn, provide the bodily foundation of self-consciousness. In short, toolmaking offers an activity space where the sense of ownership—the sense that I am the one who is undergoing an experience—and the sense of agency—the sense that I am the one who is the initiator or source of the action—meet and together constitute the experience of the minimal self.

A similar kind of suspension of the natural (unmediated) attitude toward the body can also be seen in the case of personal decoration. *Epoché* here consists in the shift of attention from the way bodies appear, from the subjective first-person viewpoint to the way they are constituted by the perspective of the "other"—that is, the body as it is being observed by others. Bodily decoration is liberating the self from the here and now of ordinary experience—that is, from the temporal simultaneity and spatial coincidence of the subjective body—so that it can now be entangled with the perspective of the "other."

In short, just as the stone-knapping task establishes the conditions of possibility for the exercise of agency, so too does bodily ornamentation provide a new powerful mode of enactive signification capable of bringing forth a new conception of intersubjectivity and perspective taking. Both practices offer a novel affective means for relating to the world and for

perceiving oneself and the "other." The self-experiences associated with those practices, being objectified and distributed through material culture (tools or ornaments), acquire phenomenal thickness and grounding that we don't see during normal (unmediated) voluntary bodily action.

As the manipulative complexity of technologies increase—in terms of demands for grasping precision and better control of complex action sequences—so too does the opportunity for the discovery of new forms of agentive experience and consciousness. For instance, by learning to combine and manipulate the properties of plant gum and ochre in order to create compound glues used to fix stone segments to shafts,[101] early humans also learned to attend and experience the technical process in a new more conscious way. New modes of attentive material engagement bring about new modes of consciousness (bodily and social). The development of new techniques and modes of engagement enacts new complicated pathways that crisscross the boundaries of personal, peripersonal, and extrapersonal space. In the next chapter, we will explore some contemporary manifestations of those ever-evolving transformations of human self-becoming.

11 Digital Selves

11.1 Digital Subjectivities

Our concern in this book has been to understand how the self is constituted in human becoming. We have been looking at the suprapersonal lived space between human bodies as well as at the engagement between human bodies and material objects. I have used some early but diachronic examples of self-bounding and enactive in/dividuation to describe the making of self-consciousness from a situated person perspective. In the previous chapter, we saw how early toolmaking and personal decoration provided a new material ecology for getting in touch with different aspects of the experience of being and having a body—and through that with the minimal aspects of oneself. In this chapter, I want to give the question of self-becoming a contemporary twist, asking how the self can be understood in the modern virtual environments dominated by new information and communication technologies.[1] Digital environments and media are hard to define. From a cognitive archaeology perspective, they signify a change from a mode of engagement based on the movement and exchange of atoms to one that is primarily based on the movement of digital bits. The aim of this transformation, one would hope, is to effectively combine "the forces of sensory richness and machine intelligence."[2] However, this objective is yet to be realized.

In this chapter, I shall be using the term *digital self*[3] to refer to those aspects of human consciousness constructed or performed as we engage with or immerse inside this new virtual lifeworld. I have described self-bounding as a situated process of self-designation and in/dividuation by means of material engagement. What I call *digital self* is the most recent manifestation of that process. It seeks to capture the varieties of self-bounding that are possible

inside an environment pervaded by ubiquitous computing, algorithms, and portable gadgetry that allow us to record, store, and access an ever-expanding range of information about our daily lives. It makes good sense to hypothesize that the ubiquity of digital hyperconnectivity—the condition in which everyone is (potentially) connected to everyone, to a growing array of sensor-embedded Internet of Things, and to a vast amounts of digital data, everywhere and all the time[4]—must have a profound transformative effect on the ways self is experienced and constructed. Those transformations can be studied by looking at the actual practices that emerge in this new digital environment relevant to self-objectification, self-quantification, self-production, and self-regulation/surveillance.[5]

The neologism *onlife* has been coined by the philosopher of information Luciano Floridi[6] to denote the new prominent characteristic of human experience to be inseparably online and offline. This does not mean that we cannot separate the online from the offline aspects of our lives. What it means is that within the current hyperconnected reality, this separation can only be partial. Contemporary human life and experience in the infosphere[7] is never entirely online or offline. Rather, it is always a mixture of both. This new hybrid state of being has tremendous implications for who we are—our sense of self and agency—and how we relate to each other and the world.

The sociologist Sherry Turkle sees, in this merging of the online and the offline aspects of human lives, the making of a new type of *tethered self*:

> We are tethered to our "always-on/always-on-us" communication devices and the people and things we reach through them: people, web pages, voice mail, games, artificial intelligences. . . . These very different objects achieve a certain sameness because of the way we reach them. Animate and inanimate, they live for us through our tethering devices, always ready to-mind and hand. The self now attached to its devices, occupies a liminal space between the physical real and its lives on the screen.[8]

This kind of virtual tethered self brings about new ways of inhabiting our own bodies through a simultaneous reembodiment—a prosthetic consummation—and a disembodiment, which Turkle describes as a disappearance of the body: our new semi-virtual bodies are increasingly "fading away, bleeding out onto the Net."[9] This dual quality, and inevitable tension, between embodiment and disembodiment that characterize the meaning of self-extension in the modern infosphere also suggest a noticeable difference of digital self-bounding. Digital technologies "allow us to be effectively present

when our bodies are not."[10] I will return to explain this point in a later section. Suffice for now to say that maybe for the first time in the history of human consciousness, prostheses are no longer acts of embodying but rather acts of disembodying. With digital extension, self is abducted outside the protective boundary of peripersonal space.

In this chapter, I attempt to underline some distinctive spatiotemporal characteristics of the phenomenon of the digital self, focusing especially on issues of disembodiment, materiality, reinvention, connectivity, boundaries, and the meaning of the social. First, I will explore the meaning of digital materiality. Then, I will examine how self-tracking technologies, and other digital techniques of the self, work in subtle ways to transform self-bounding into a virtual and increasingly commercial form of algorithmic self-specification. Last, I will explore how digital hyperconnectivity affects human time consciousness, people's relationship to place, and the speeding up of social life. I will look at some new possible varieties of self that can be associated with this process. The underlying question to keep in mind, and which I return to discuss at the end, is how the recognition of the human predisposition to reconfigure our bodies by changing our material environments and modes of engagement—the recognition that people are STRANGE—help us to understand better some of the contemporary challenges associated with the use of new technological mediations in digital culture and AI.

11.2 Digital Ontologies and Materialities

I begin with something more basic. What is that thing we call the *digital*? How can it be understood within the framework of material engagement? In one sense, the digital as a virtual entity strikes us as something non-material—a space of ambiguous physicality. In another sense, the way we come to know and engage with the digital is always by means of an interface that is always material and tangible. Whether it is a screen, a touchpad, or a keyboard, the way we interact with the digital world is through some form of physical mediation or interface.[11] Now, whenever there is material mediation, there is also performance. Mediation and performance bring about resistance and skill. Resistance and skill are the two basic ontological ingredients by which things come to matter.[12] That is how reality becomes constituted.

I do not believe that our new digital or algorithmic lifeworlds should be described as unreal or immaterial. The common false opposition of the

digital and the real has, as a consequence, the misrepresentation and dematerialization of the phenomena referred to by terms such as *digital*, *online*, or *virtual*.[13] If they had not been material, they would not have mattered. I do not mean to say that non-material things do not matter. What I mean is that because the digital matters, it becomes material. In other words, mattering is the condition for materiality and not the opposite. This understanding embodies a process ontology that views materiality as a temporal accomplishment rather than a substance ontology, where materiality is the primary quality of objects and other physical stuff. The way to explore the materiality of our virtual worlds is to approach it as an acquired quality on a par with agency.[14] On this formulation, the reality and materiality of things is not a fixed metaphysical condition but instead depends on how we answer the question about how things matter.[15] To illustrate that, I borrow the example of a smartphone calculator application (app) discussed by Ella Hafermalz and Kai Riemer in the context of their argument for disentangling the notions of materiality and physicality. Would the app qualify, despite its ambiguous relationship to physicality, as material? Defining what a mobile app is—what parts of it count as virtual, material, or real—is not easy.

> Its buttons are made of light and are called into being only by pressing on glass. It just as quickly disappears from view. Does it still "exist" when it lies dormant? The calculator app certainly depends on physical phenomena (such as light and electricity), but does it have the same materiality as a "real calculator," or as pen and paper or an old-fashioned wooden counting device? Intuitively we would say that they differ—that software is somehow different from "real" entities. But is software therefore *less* real? Are the virtual worlds created on the Internet *less real* than the "real world"?[16]

The materiality of the digital is less tangible and thus more difficult to understand and to pin down. But human engagement with the digital world has important effects and affects, which give us a good starting point.

Kåre Poulsgaard and I used the term *digital materiality* to describe the way successive layers of mathematics, code, and software come to mediate enactive perception, and the possibilities of creative material engagement actualized in the context of architectural design.[17] Digital materiality quite literally forms a part of contemporary architectural imagination. It transforms and constitutes the environment from which architects' agency and imagination emerge. To recap the main argument, digital or virtual design is as real as any other design process. This does not mean that there are no important

differences or that virtual space can ever replace physical space. Quite the contrary, as I discuss in the following sections, differences between the analog versions of the digital self—based on a continuity with the lived space of human world interaction—and the virtual versions of digital self—based on a discontinuous mode of algorithmic representational existence—are the source of constant tensions in human performativity. However, whatever the differences between digital and physical tools and our interactions with them, these have nothing to do with their respective ontological status in human life. Digital environments are real material environments offering new opportunities and constraints for action. If there is a distinction to be made from an ontological perspective, this is not about materiality but rather about contiguity: you simply cannot touch or be touched by an app or an algorithm. Instead, what we touch and see are interfaces, icons, and symbols. We may touch the screen but nothing more. What we experience in our contemporary networked societies as a transition from a material world of real action to a nonmaterial world of virtual or digital action is actually the metamorphosis of one form of materiality and performativity to another.

11.3 Digital Human Becoming

Having clarified, somehow, the meaning of digital materiality and established that we need to know more about how the digital infosphere come to matter, we can now turn to highlight what may be new or distinctive about it. To that end, it would be useful to revisit the distinction we made in chapters 1 and 4 between human becoming and becoming human. As we discussed then, the term *human becoming* signifies an open and largely ongoing coevolutionary entanglement of people, materials, and things. And I suggested that this can be contrasted to the linear evolutionary logic of becoming human, which is the term traditionally used to denote the speciation process that produced human beings in the past. The reason I return to this distinction between becoming human and human becoming is because it has important implications for how we understand the potential impact of the digital world on human self-constitution. There are two main perspectives involved. Each of these allows for a different reading of the so-called fourth digital revolution.[18]

For the advocates of the bio-essentialist view (i.e., becoming human), reconfigurations of connectivity, like the one promised or already achieved by new digital media, are seen as having little direct impact to the humanization

process. The assumption is that such changes are always external to the mind/brain and thus epiphenomenal to the hard questions of consciousness and human imagination. Digital technologies might influence human experience and thinking, but they do it indirectly and from a safe distance. Even in those special cases of radical prosthesis—via digital sensors and immersive environments—the assumption is that digital mediation, although potentially able to enhance our basic capacities or modify the content of our experiences, cannot effect any real important or permanent change to them.

If now you are an advocate of the metaplastic view (i.e., human becoming), the rules of engagement are different. On this construal, any serious messing around with the configurations of matter (physical or virtual) equals messing with the configurations and boundaries of human consciousness. The possibility of ongoing becoming suggests that the new actor networks or meshworks produced by the recent human dependency on ubiquitous mobile connectivity are not a condition exterior to our long fixed interior human nature but instead a new transactional force of in/dividuation. What we nowadays call the *infosphere* is but the latest manifestation of the basic principles of "originary technicity"[19] that characterize the modes of human becoming. As argued in chapter 5, the human condition has always been, and remains, incomplete. Our contemporary digital environments are simply the latest addition to the human hylonoetic field, transforming established material habits and creating new assemblages of material forces and energies allowing us to become something new. There is nothing especially revolutionary or inherently progressive about this ongoing transformational process.

At a very basic level, the way digitally mediated activities are recasting the experience of space and time and the phenomenology of the social, lifting the human self out of the here and now of personal experience (first-person perspective), is analogous to the way body decoration, discussed in the previous chapter, lifted early humans from the spatiotemporal simultaneity of bodily experience so that it can be consciously embedded into its social surrounding. The perspective of the "other" is built into the perforation of the shell bead attached to the body, not unlike the digital self-objectifying gaze of the "other." The digital self, like the decorated body, exists primarily at the intra-subjective level. It has agency only insofar as others engage with it.

Of course, there also important differences as well. Digital environments generate and reproduce their own distinctive possibilities (affordances) for the manipulation and representation of information in the form of image,

sound, or text. They create a new intersubjective space through which the self must be rediscovered, disciplined, controlled, performed, or contested. Thus, it is critical that we try to understand better the influence and impact of digital materials and tools upon human consciousness and the self.

11.4 Datafied Consciousness and the Quantified Self

Take for instance the so-called Quantified Self movement.[20] The term *quantified self*[21] has been recently introduced to describe the increased use of digital technology to self-track by collecting mundane data about everyday activities such as the steps we take, the hours we sleep, the calories we eat, the routes we follow, or the people we see. What kind of self-consciousness does this quantified information about the self afford, and what happens with the nonquantifiable aspects of our self-experience?

Before I begin unpacking those questions, I should make it clear that as a strong proponent of the metaplastic conception of human becoming, I believe that self-tracking matters. I also believe that the ease with which the personal use of wearable biosensors, apps, and mobile personal activity trackers[22] are now being positioned in our lives should be a cause of concern. I do not mean to say that there is something inherently wrong with the way self-tracking devices and apps allow us to record and measure a wide range of data about our bodily movements, states, or daily habits. Knowing the number of steps taken, the pulse, respiration, or even sleep patterns can help people to monitor a variety of basic bodily functions and potentially use that knowledge to enhance their personal well-being. There is nothing new or worrying about that. The basic logic of self-tracking is inherent in all forms of self-specification. Think, for instance, of the processes of biofeedback and bodily surveillance that, as we examined in the previous chapter, enabled the Pleistocene knapper to discover agency, ownership, causality, and skill. Common practices, from the pencil lines on the wall that we periodically make to mark the height of children as they grow to keeping a diary[23] to the simple use of a bathroom scale to track our weight,[24] offer good examples of the range of tools and routines people traditionally use for everyday self-monitoring. Human beings take great pleasure at measuring and visualizing all kind of phenomena, including ourselves, and some of our biggest innovations are based on that. Just like previous analogical or representational instruments of self-presentation and visualization (e.g., photography,

portraiture, or the mirror[25]), our new digital media become techniques of the self. Placed against such a comparative context, the Quantified Self movement is simply the most recent manifestation of an old trend in our species' constant struggle to *know thyself*. The difference that makes the difference is that digital self-objectification is now based on quantification by means of codes and algorithms.

Again, without saying that there is anything inherently problematic with algorithmically mediated understandings of self and the body, there are several potential caveats that need to be underlined and which invite reflection on the ways modern self-making relates to this technology. Let's take a closer look at some of them.

One obvious caveat can be found where/when others are doing the self-tracking for us—especially without us knowing that or giving our permission.[26] The marks left or made by our digital lives and movements, unlike other mark-making practices[27] in human becoming, leave an ever-lasting permanent digital trail. These material residues of our digital actions and whereabouts—whether they are visible and publicly accessible or not—can be mined and traced as well as variously interpreted. An inevitable consequence of digital hyperconnectivity and self-datafication is that, potentially, our digital trails can also be tracked and quantified unwillingly not only by other humans—employers, retailers, educators, insurance and advertising agents, governors, and policymakers—but also by nonhuman algorithms deployed, for instance, by online platforms aiming to understand who we are and how we behave (for good or ill). There are important ethical implications here for personal and societal well-being.

These data-tracking technologies are governed by the rules of software algorithms[28] of which most people know very little. Still, by living in an increasingly digitized environment, we gradually become habituated and attuned to it (willingly or unwillingly). As a consequence, we often uncritically adopt and adapt to the algorithmic logic of datafied self-knowledge that this environment embodies, unaware that this logic prescribes, and is able to enforce, a particular understanding or future prediction of what self is and does. There are many reasons for concern here. Before I discuss them, it is important to bear in mind that self-tracking is often being promoted as offering an objective, accessible, and easy to use (via portable digital gadgetry) measure or record of human experiences. That record and the possibilities of self-datafication that it embodies are marketed as capable of revolutionizing

the way in which human bodies can be monitored, trained, managed, and treated—for instance, within health and healthcare, education, sport, and entertainment. In the history of our species, new tools of quantifying and measuring our bodies go hand in hand with new ways of bodily care and control. So, the fast adoption of algorithm-driven technologies of self-tracking as powerful tools to increase efficiency and effectiveness of self-governance is not surprising. What is surprising, and perhaps worrying, nonetheless, is how quickly, and rather uncritically, digital self-datafication is becoming a dominant form of self-designation in all aspects of human life.

Self-tracking technologies, more than just allowing us to record, store, and access an ever-expanding range of information about our daily lives, work in subtle ways to transform the basic human need and predilection for self-knowledge into a phenomenologically thin and increasingly commercial form of self-specification based on datafication[29] (generally defined as the process of rendering actions or attributes into a quantified digital form). The problem lies partly in people's understanding of self-datafication and partly in the way ubiquitous mobile connectivity and pervasive digital self-quantification disrupt creative material engagement and the economy of attention. In particular, most people would understand datafication to imply objective knowledge based on data-intensive logics and data-driven practices that make possible the conversion of qualitative aspects of life into quantified data. In reality, however, the practice of datafying everyday life and experience is constructed, filtered through the algorithmic expression of a computer code. An algorithm,[30] as the sociologist Adrian Mackenzie[31] describes, is not a neutral entity. Rather, it "selects and reinforces one ordering at the expense of others. . . . affect what can be said and done . . . naturalizes who does what to whom by subsuming existing patterns and orderings of cognition, communication and movement."[32] I suspect that what is datafied and measurable may not always be important, and what is important may not always be possible to capture into streams of data. Placing too much trust on self-datafication can blind us to nonmeasurable processes or aspects of our relations to self and others, or conversely, it can lead us to accept recorded information with very little relevance or significance for self-experience as important—using the power of quantification and association. This is where the imminent big data revolution can become a threat.

This brings us to my second point regarding the disruptive impact of self-quantification on the economy of attention. I am not referring to the mere

lack of concentration associated with virtual practices or the changes in the processes by which people identify and memorize information in virtual space. Rather, I am referring to the distribution of attention and capacity for attentive engagement. Attunement is at the heart of all mediation and skilled material practices. It invites attention and deepens our engagement with them. Self-objectification by means of digital visualization and quantification (especially when combined) is a powerful source of self-transformation precisely because of its ability to attune people to the comparative metrics of their digital trails.[33] Think, for instance, of the ways virtual media and environments constantly motivate, enable, and invite comparison of popularity metrics ("likes") based on self-presentation. Those arbitrary metrics and the trends they reveal often attune people to them. That is, they motivate adjustments in people's offline and online behavior as a response to, and in anticipation of, future quantified responses (e.g., "likes"). As a consequence of that, people are often led to make changes that do not promote their personal well-being—that is, to live a life that is good for a human being[34]—but instead only seem to help them engage more effectively with their real or imaginary virtual audiences, with negative effects on their mental health.[35] As the sociologist Richard Brubaker points out, "The relentlessly quantifying ecosystem of social media takes the measure of our digital selves and places that measure in an inescapably comparative—and implicitly competitive—frame."[36] Inside this competitive ecology, self-tracking technologies, together with selfies and other digital techniques of the self, work in subtle ways to transform self-bounding into a quantified algorithmic form of self-specification that is becoming central both to how people are governed and to how they are being encouraged to come to know and care for themselves.[37] The situation here resembles Bateson's schizogenic double bind: the more we interact with our digital selves, the more dependent we become on algorithmic operations and choices. As Brubaker continues, "The algorithms train themselves on our data, and they then train us by feeding us more of what they determine we like. They help us to remain the selves that we have revealed ourselves to be. They map out a space of our own for us to inhabit and discourage us from leaving that comfortable algorithmic home."[38]

This brings us to my final caveat. Inside this onlife world of digitally mediated action and interaction, self-experience is rapidly changing from a situated and irreducibly qualitative phenomenon to something that resembles a purely quantitative algorithmic process: "a technology of *algorithmic*

individualization."[39] This algorithmic process is affecting many aspects of human self-experience (minimal and narrative). The dialectic between memory and forgetting (that connects us to others and to our past selves) is also affected, as can be illustrated by recent controversies over algorithmic memory and the right to be forgotten—exemplified by the famous judgment that the European Court of Justice issued in 2014, holding Google accountable for an "excess of memory."[40]

Algorithm-driven devices and environments mediate what and how people learn about their bodies. Whether this new source of self-knowledge will lead to any significant changes in human self cannot be decided a priori. The fact is, nonetheless, that they have the power to prescribe what the body is and ought to be. By doing so, they also encourage us to take (implicitly and explicitly) the digital world and the principles of its operation as a model of the real world—for instance, to think that human consciousness is made of "representational content," which like the endless streams of "digital content," can be fed to us by personalized neural instead of digital algorithms. This is but a recent version of the old computational/representational fallacy we examined in chapters 2 and 5.

What, in this book, I call *self-consciousness* is not a set of features you can compress into packs of bits through an algorithm and store inside your brain for future use in the way visual images and audio files are digitally compressed for storage, future usage, and circulation. This algorithmic logic or ontology, good and useful as it might be for specifying sequences of things we want to happen in a given way, offers a very poor description of the embodied dynamics and situatedness of human consciousness—although it may well provide the basis for a future kind of artificial consciousness.

11.5 Temporalizing Digital Subjectivity

As pointed out in a previous section, from a deep time archaeological perspective, there is nothing radically new or inherently progressive in the way the digital ecology of the twenty-first century is redefining the ontology and boundaries of human consciousness. Human history is full of large-scale events of a similar transformative kind. Think, for instance, of the development of language and literacy or the emergence of agriculture in different parts of the world. Of course, the pace and timescale of many recent transformations are unlike anything we have seen in the past, and this is something

that we should also take into consideration as we try to understand their emergent configurations (communicative, epistemic, or ontological). So, it is useful to retain a relational comparative stance when we try to evaluate the impact of the modern infosphere[41] on human self.

A common thread that runs through the different dimensions of human self-experience we have covered in this book is that of temporality. As we saw, self-becoming is fundamentally a multi-temporal process of in/dividuation situated at the dynamic interface between present, past, and future. In chapter 10, we discussed the phenomenon of intentional or temporal binding in association with early toolmaking activities (merging the microscale and the macroscale). Here, I want to look at how digital hyperconnectivity, by transforming people's relationship to place and time, allows new varieties of selfhood to emerge, and to examine what those possible versions might be. To contextualize our discussion, I will be focusing on the phenomenon of social acceleration.

The feeling that society accelerates[42] and the associated experience of fast or compressed time has been argued[43] to be a major component of human increased habituation to the rhythms and temporality of the networked digital environments.[44] Digital hyperconnectivity reduces the amount of time it takes for major forms of human interaction to reach completion.[45] Transportation, communication, and the processing of information are now faster. This mode of technological acceleration creates further acceleration of the pace of life and society, which relate to the paradoxical scarcity of free time as well as to a contraction in the amount of time it usually takes for social change to occur. It is reasonable to assume, given what we have argued in the previous chapters about the situated nature of human becoming, that the suggested speeding up of social life would be accompanied by changes in self-experience. Two characteristic examples of such changes—that is, detachment and reinvention—can help us illustrate the multiplicity and, often, antithetical nature of contemporary self-making.[46] I start with the former.

It has been argued that people living in high-speed societies and exposed to hyperstimulated lifestyles of constant transformation become accustomed to the regularity of change and gradually develop a sense of self characterized by a feeling of detachment. Self-transformation becomes mundane, fostering a sense of indifference toward the changing world. People gradually become incapable of sustained attentive material engagement. They become

less sensitive and concerned about the shifts that are taking place in and around them, passively accepting that "perpetual change is a regular feature of the world in which they live."[47] Moreover, and somehow paradoxically, in a high-speed society, the "biographical course of life as a whole loses *its direction*."[48] As a consequence, the experience of time loses its sense of meaning and becomes more like an eventless and aimless drift: time stands still; past and future collapse.[49] The more pronounced social acceleration becomes, the more fixed and unalterable it also appears, causing people to think that social change is no longer possible.[50] This creates the experience of "the stationary self."[51] At the same time, those dislocating and destabilizing effects that living in a high-speed society can have on the temporal structure of lived experience can also be seen as entangled with the ever-increasing globalized trend of self-reinvention practices. The notion of the reinventive self aims to capture this new trend in digital self-becoming. The idiom of reinvention "is one of radical self-experimentation, self-transformation and self-reorganization."[52] Reinvention can be freeing, but it can also be disabling and even, in some cases, pathological.[53]

The above varieties of self are by no means exhaustive. Moreover, the experiences they describe, although intimately associated with the social and technological acceleration due to the recent proliferation of digital systems, should not be understood as inventions of modernity or as discontinuous with what humans have experienced in the past. The process of self-becoming was a heterogeneous and dynamic multiplicity of personal perspectives from the very start. Of course, self-becoming is never the same. There are important differences in the ways in which humans keep on reinventing ourselves[54] as well as on what each reinvention actually means and does for self-becoming.

11.6 Possible Selves

One possible conclusion that can be drawn from our previous discussion of the links between time consciousness and digital subjectivity is that the temporal structure of modern onlife is different (faster) than that of traditional material environments. The rise of self-detachment and self-reinvention is entangled with this acceleration that dramatically reorients people's sense of what they are. The experienced time compression because of digital

hyperconnectivity also entails a heightened sense of anxiety and can lead to the weakening, obliteration, and eventually the loss of self.[55] The implications of all that are more complicated than one may initially think.

On the one hand, for better or worse, a weakened digital self can be seen as a sign of what the psychiatrist Robert Lifton calls modern *proteanism* or *protean self*—after Proteus, the Greek sea god of many forms.[56] The proteanism of digital connectivity provides a new unconstrained semiotic material environment with endless possibilities for self-becoming. One could see the virtual space as an ever-expanded ecology facilitating unlimited self-exploration and self-experimentation—a major step toward a soft, decentralized, malleable, or distributed selfhood. On this construal, the hyperconnectivity of the virtual infosphere—free from the constraints of offline materiality, embodiment, habit, and personal history—empowers and makes possible new forms of self-knowledge.

On the other hand, it can also be argued that the new forms of digital consciousness that emerge are threatening to obscure and transform the meaning and significance of self-bounding in human becoming. The characteristic of digital consciousness is disembodiment. It arises by disembodying human action and imagination from the body and the world. As a consequence of this disembodiment, the digital self can no longer fully participate in the process of in/dividuation (i.e., human becoming). It cannot fully participate because it is lacking phenomenal thickness affection and thus resistance. No doubt, the virtual self is both plastic and multiple. Still, the lack of solid material anchoring coupled with the absence of bodily contiguity and friction limit the power that new digital media can have as tools of self-bounding. Seen as modes of enactive in/dividuation, our digital coalitions and attachments with non-tangible virtual actants do not seem to carry the same psychological force—at least in respect to our sense of agency and bodily ownership—even if, for some people, they may feel "more real than . . . real life."[57] Take, for instance, e-memory.[58] Although limitless and far more reliable than conventional forms of remembering, it does not seem to have the same autobiographical significance in comparison to traditional personal evocative objects.[59] The reason for that has to do with, on the one hand, the reduced affective and emotional value of digital attachments and, on the other hand, their perceived distance from the physical body. The network of information might always be there, accessible and available for you, but

it is never near (as in near peripersonal space). Rather, it exists *nowhere and everywhere*, in the unpredictable vastness of virtual space.

Of course, the selves constructed online remain connected to the offline self of which they form a virtual extension or representation. Still, with time, their ties are increasingly dissolving or becoming thin. As the distinction between online selves and offline selves is becoming blurred, new composite states of digital existence are being routinely created and objectified, but they seem ambiguous and short-lived. Fortunately, as Russell Belk points out, both our physical bodies and tangible possessions continue to play a critical role in our sense of self.[60] In our new struggle to situate (disembody or reembody) ourselves in digital space, our bodily engagement with the material world continues to play a fundamental role. As we discussed earlier, no digital self can ever exist in the absence of real bodies engaging with material interfaces (keyboards and screens) that give them access to the functions of digital media and Internet-connected devices. Digitally mediated activities are dependent on human muscles and bodily skills as much as on disembodied data and algorithm-driven processes. Those new dependencies and digital substitutions have a cost. As our physical bodies increasingly pass the responsibility for some basic everyday skills to their digital counterparts, they experience a loss of agency and delusion of control. The kinetic and kinesthetic "melodies," produced by synchronized skillful embodied action, are silenced or replaced by the cacophony of desynchronized action in virtual space.[61] However, most people, because of the attunement discussed in the previous section, seem unaware that such a de-skilling of self actually occurs. As a result, they uncritically submit to the logic of digital substitution by which an algorithmic re-presentation of the self and the world is treated as being the "real" self and world. This way, digital self-determination—by means of avatar, telepresence, self-tracking, the common construction of social media profiles, or the posting and circulation of selfies—becomes one of the most effective forms of self-alienation in the history of modernity based on the disembodiment and temporal fragmentation of self.

11.7 Discussion

The union of people with technology is at the heart of human becoming.[62] It is inseparably linked with the evolution, life, and well-being of our species.

This union forms a natural process of growth and species self-realization. To ask of any medium of self-bounding (digital or not) if it represents a positive or negative development for human consciousness is meaningless. A more productive approach is to ask whether it leads to a freeing of self or, instead, if it becomes a medium of self-enslavement. These are old and difficult questions that cannot be answered a priori on ontological grounds. Material mediations are situated phenomena that are very often disrupted, misused, and manipulated by socioeconomic historical forces and agencies—for example, increasingly these days, by consumerism and the capitalist alienating pathologies of the market. As a rule of thumb, I would suggest that, especially when evaluating modes of self-bounding that relate to self-governing, it pays to be critical to all things imposed rather than chosen.

I do not believe in utopias or dystopias. I just prefer technologies that afford liberation from those that do not. Of course, by definition, affordance is a relational concept. Technologies can stretch and enhance our minds, but they can also shrink them, blind them, or deprive them of their creative abilities and what Michel Foucault articulated as "critical self-consciousness."[63] Digital technologies and materials, like those before them, embody much that is promising, but they also carry the constant universal threat of unlearning and de-skilling that comes with substitution. Every student of human becoming and technique who is not, and should not, buy into the myth of technological progress knows that there is nothing inevitable, progressive, or directional about the transformation, movement, and form of new materials and things (digital or not). It is an assemblage of historical contingencies rather than evolutionary necessity that makes the Internet of Things, the cloud,[64] or AI look more complex and advanced than the stone tools of the Paleolithic we discussed in chapter 10. No doubt, these are all indexes and signs of human creativity and innovation. But measuring creativity and innovation in the deep time history of our species is far from the straightforward linear evolutionary arrow that people often assume.

One important change about innovation nowadays is that societies no longer decide for it. Rather, they are presented with innovations. Innovation is no longer, nor does it feel like, a participatory social process—that is, the genuine working of a collective intelligence. Rather, it is and feels ready-made—the product of market-driven de-skilled AI that is fast replacing socially driven skilled human–machine collaboration and creative thinging. I do believe there is reasonable cause for concern here. I think, nowadays,

more than ever, we should be becoming increasingly skeptical about the way technical innovation is imposed on people's lives as the latest inevitable or progressive stage of personal or societal development. We should also resist adopting any form of social obligation that is not, in the first instance, presented and, at a second stage, thoroughly negotiated with us as *one* possible mode of self-bounding and opportunity of creative material engagement. Not doing so means that humans are excluded from the creative process that produces their own material environment that shapes the conditions of our present and future becoming. Such a lack of creative friction and enactive participation with the forces of enactive in/dividuation produces a rupture in human cognitive and social life. What should have been the result of collective critical choice and creative material imagination is now provided as a black-boxed product. The part of the world that matters is becoming increasingly disembodied and filled with sources of pseudo-agency and egocentric narcissistic individuality. These tendencies can be contrasted with the primary human need for embodiment and enactive in/dividuality. The new categorical imperative here is not one that promotes creative material engagement in an active participatory sense. Rather, it is an imperative for the uncritical adoption of innovation. In other words, innovation and the creative process are becoming algorithmically commodified for mass consumption. Creative material engagement is increasingly marginalized under the tyranny of smartness. This explains why technical innovation is rarely offered a real opportunity to grow as a personal biographical object into the hylonoetic field. The problem is not that your iPhone, to take one obvious example, does not afford self-bounding (quite the contrary). Rather, the problem is that the iPhone, like any other digital gadgetry, will become obsolete before it gains personal value and autobiographical significance. A related phenomenon can be observed in the way human capacity for attentive material engagement—care for things—and the concomitant need for fixing, repairing, and recycling things are threatened by the marketing forces of consumerism.[65]

As Stiegler observes, our passage into the twenty-first century witnesses the emergence of a new form of capitalism, often referred to as *cognitive capitalism*, which gradually turns human consciousness "into a simple reflex organ: a brain reduced to an ensemble of neurons, such as those controlling the behaviour of a slug. A brain *so stripped of its consciousness* becomes a simple trade value (which, however, never ceases to go down, becoming ever

cheaper—and which will soon be worth nothing) on the audience market."[66] I pledge for the need to reclaim critical self-consciousness in the face of the delusion of virtual connectivity. I argue against connectivity without contagion. We need to recognize the importance of emotional-affective diversity and phenomenological depth and to differentiate active and participatory digital engagement from passive and submissive immersion. This is also where the role of creative thinging becomes prevalent. Material things and the affective actions and memories that they bring about provide anchoring devices for self-bounding. Material culture and technologies extend ourselves in time and space and very often impose their own speed and rhythm onto human action and interaction, but they can also help the self to maintain a basic level of stability and sense of continuity without which change becomes meaningless if not impossible. In that sense, creative material engagement adding "friction" can be used to counteract the destabilizing and dislocating effects of digital hyperconnectivity and social acceleration. The challenge for us, then, is not one of abandoning digital space rather but one of inhabiting digital space in a mindful and self-conscious manner. The way to do so is by promoting the idea of contemplative digital materiality. That would involve, by necessity, a radical reconceptualization of networking thinking as a form of praxis and as a source of resistance and creativity.

12 Epilogue

> We start with atomic parts, but these atomic parts have transitions, passages, "tendencies," which circulate from one to another. These tendencies give rise to *habits*. Isn't this the answer to the question "what are we?" We are habits, nothing but habits—the habit of saying "I."
>
> —Deleuze, p. x[1]

In the modern imagination, to be properly human is to possess a unique individual identity in time and space—that is, a self. As Charles Taylor remarks, not only do we feel ourselves to be firmly located within us, but we also feel that we have selves in the same way that we have heads, legs, arms, or livers: "Distinctions of locale, like inside and outside, seem to be discovered like facts about ourselves, and not relative to the particular way, among other possible ways, we construe ourselves."[2] This conviction persists, despite the modernist preoccupation with proteanism and self-reinvention, which often renders self-identity, as we saw in the previous chapter, disposable and obsolete.

Descriptions of self vary, subject to disciplinary perspective and ontological predisposition. Still, the majority of them would still subscribe to an image of self haunted by the cognitivist homunculus and the old unhelpful subject–object divisions. Take, for instance, what seems to be a widely accepted description of self-consciousness. It consists of four basic distinct experiences: the experience of ownership (owning a body or a body part), the experience of agency (sense of agency for bodily actions), the experience of being in a given spatiotemporal location within the environment, and the experience of taking a first-person perspective on that environment. All these experiences are being construed as body centered and as being

potentially explicable in terms of neural mechanisms located in various brain regions. Even when the self is explicitly recognized as a social intersubjective construct—out there—the same representational language is used to describe how the actual binding happens: as an aggregate of discrete phenomenal and representational states wrapped up inside the brain and enclosed within the skin. This explains why some philosophers and neuroscientists have even denied that self exists or declared it an illusion, thinking that the brain, or a part of it, could provide all we need to solve the "hard problem of consciousness"[3]—that is, how subjectivity can emerge from matter. Indeed, if we define selfhood as the inner essence of a phenomenal ego, then I will probably agree that "nobody has ever been or had a self."[4] But I hope this book convinced you that the self is more than that. It is more than a central cognitive intracranial essence.[5]

This book's main claim is that selves are not what we usually think they are. That is, they are more than an individual "I" inside a body. Our taken-for-granted idea of the delimited biological individual has been subjected to rigorous critique and is been gradually replaced with the idea of a relationally constituted self—in line with recent decentralized trends in enactive-ecological cognitive science, anthropology, and post-humanist philosophy. As a consequence of this shift, self-experience can no longer be characterized simply according to some internal predetermined taxonomy of bodily properties. Self is not an entity or a state of consciousness that exists in a single location; it is not a homunculus inside our heads. What we call "I" or "me" extends further than we usually think. Selves do not just exist as purified interiorities. Instead, they exist as emergent transactional processes unbound by the skull or the body. The brain's responsibility, so far as the "hard problem of consciousness" is concerned, lies not in representing the totality of self-related activity in a consistent global manner but rather in attuning neural dynamics (predictive or not) to bodily activity and the local material environment in a situated manner. The problem will not simply go away by translating it into the language of mental or neural representations asking about how self-consciousness can arise in the brain. I have argued in this book that it is situated lived bodies, not just brains, that bring forth the possibility of self.

The crux of the problem of self lies in the generative continuity between growth and making or nature and culture. This continuity that has proven especially hard for modern thought to conceptualize or even to accept. I

suggested that what makes self-consciousness looks like a paradox is that it is simultaneously made like an artifact and grown like an organism. The epistemological challenge is about finding ways to reconcile the transactional and extensive character of self with its bodily localized features and subjective phenomenology. Meeting this challenge demands that we adopt a method able to penetrate and to map the dynamical territory of material engagement, where brains, bodies, and things conflate, mutually catalyzing and constituting one another. This book has been an attempt to do so by (a) transforming the space and parameters of the problem of self-consciousness as presently defined, moving beyond the mentioned false divides; and (b) reclaiming the self from the perspective of material engagement theory, pointing out a possible way to reformulate the paradox of human consciousness by inviting the reader to think of the concept of self/person not as a noun (the subject of experience or the object of reflection) or as pronoun ("I" or "me") but rather as a verb—specifically, a process of self-becoming or enactive in/dividuation.

In particular, there are two differentiating features that distinguish the approach to the study of self that I have adopted in this book. The first of these is the primacy of process and material engagement. Self is self-becoming—not an essence or an object but rather a process bound up with a situated body and its changing environment. The main thesis of this book is that people are STRANGE—not an unfolding of internal possibilities or the realization of a predetermined genetic potential but rather the developmental ontogenetic product of its situation. That is, humans are metaplastic creatures—creative organisms inextricably intertwined with the plasticity of forms that we make. Instead of relying on genetic inheritance to predetermine the nature and limits of human subjectivity, we construct new things (material environments) that allow us to perpetually re-situate ourselves. In short, human STRANGEness lies in the fact that human becoming is participatory, relational, and prosthetic—not a becoming *of* but a becoming *with* and *through*.

I should note in this connection that the STRANGEness I have been arguing about in this book should not be confused with the *WEIRD*ness proposed by psychologist Joseph Henrich in his *The WEIRDest People in the World*.[6] In the latter case, *WEIRD*ness indicates an epistemic problem that relates to how cognitive science studies (or rather disregards) cognitive variability. In particular, the problem is that major aspects of human psychology, as observed in the case of people living in Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies, differ from that of the rest of the

world. As long as cognitive science continues to study participants mainly (if not exclusively) from WEIRD societies, our knowledge will remain partial, wrongly assuming as universal, natural, or even pathological what is constructed and situated. In this connection, the recognition that people are STRANGE can provide the necessary unifying onto-epistemological foundation for adopting an anti-WEIRD approach in our practices by avoiding the debilitating pitfalls of relativism: if some people are WEIRD all people are STRANGE. This realization provides the conditions of comparability necessary for revealing the astonishing diachronic and cross-cultural variability of human self-becoming. As I discussed in chapter 3, the logic of the classical anthropological question on the unity and diversity of the human mind is reversed. There is no underlying biological stability that ensures the comparability of human variation. Rather, it is because we are STRANGE that a comparable species identity can be formed.

The second differentiating feature of this book has been the emphasis on self-bounding. I invoke the term *self-bounding* to signify the perspectival gathering and temporal grounding of human consciousness in acts of material engagement (thinging acts). The claim I have put forward is that self is less of a unitary experience inside a body and more of a bounding process of active exploration and sensorimotor engagement. The body matters for self not as a delimiting boundary but rather as an active, sensing, and moving perspectival point for engaging the world. We should not be thinking of the self as a bounded entity, delineated and enveloped by the skin. Instead, we should be thinking of the self as a self-bounding process—that is, a situated transactional process by which our bodies gather the world into our consciousness and, at the same time, reach out, ever-extending our consciousness into the world. Self-bounding allows human to experience the unity of time and space from different perspectival points and to travel in it (remembering, anticipating, imagining) without losing their basic sense of identity. Our sense of reality and being in the world depends on that. Self-bounding denotes the unity of knowing (*theoria*), making (*poiesis*), and doing (*praxis*). Self-bounding is the difference that differentiates, both self-demarcating and self-maintaining, and is thus a precondition for self-becoming by means of enactive in/dividuation. Seen that way, self-bounding can be expressed using the metaphor of a knot, signifying a unity in difference or a "growing in making."[7] This is the kind of unity that help us escape the usual dualistic connotations associated with the paradox of self-consciousness. The preconceptual

first-person perspective is replaced with the situated person perspective. There is no single body-centered position from where "I" perceive and interact with the world.

The lines of argument I have considered in this book converge in extending the story of human becoming to the realm of material engagement. The familiar evolutionary story of humanization as speciation and individualization—the realization of a predetermined genetic or innate potential—gives way to one of decentralized anthropoiesis (self-becoming) by way of enactive in/dividuation—the ontogenetic product of the life history and transactions of a situated body. Humans are selfbound creatures fully engaged in the creation of their own lifeworld. This explains the astonishing diachronic and cross-cultural variability of the ways by which the basic feeling of one's own bodily presence in the world can be transformed into objectified self-knowledge—from both an ontogenetic perspective and a phylogenetic perspective.

In the previous chapters, I have attempted a comparative exploration in the varieties of this bounding process by which human beings engage with their self-related environmental milieu. The image of human becoming that so emerges speaks of two kinds of uncertainty about what it means to be human: one about beginnings or origins—what Bernard Stiegler calls an *original lack of origin*[8]—and the other about endings. In this book, I have explored the different scales and manifestations of these uncertainties, looking at phenomena ranging from the stone ecologies of our deep time history to the digital ecologies of our contemporary worlds. I have argued that self is a site of perpetual construction, bounding and unbounding from the body, the "other," and the world according to need and situation. What makes human self-awareness special is its unique transformative potential to become something else while being the same. We create things that, in turn, create us. Don't think of famous artworks or sophisticated technological innovations of past and present societies. My argument is not about the lights and shades of Leonardo da Vinci's *sfumato*.[9] Think instead of the mundane stuff of human life and everyday creative material engagement: a drystone wall, a line of ink, the edge of a stone tool, the rim of a clay vase, the form of a letter, a metal nail, or a brick. These are not passive, inert material stuff that exist outside of us, waiting to serve our intentions, to mediate our actions, and to fulfil our predictions. Things resist human intentions and plans as much as they express them. The generated friction constitutes the very nature of the mind-stuff out of which consciousness and imagination are made. I don't mean

that human consciousness is filled with representations of things in the way a glass is filled with water. The meaning of the phrase "I am conscious of *x*" is better expressed as "I am conscious with *x*." Things often participate and constitute the "of" by which consciousness operates and becomes constituted as a physical capacity. In other words, I argue for consciousness *with* things. Things act as prosthetic gestures or enactive signs, playing a major role in the constitution and perpetual transformation of self-awareness in human beings. What we call *self* is the product of human engagement with available technical mediations—which increasingly these days include digital media and virtual environments. What we call *society* is made up not only of human beings but also of nonhuman actors.

Whether you think of the stone tool technologies of the Pleistocene (see chapter 10) or the information and communication technologies of the Anthropocene (see chapter 11), the message—often hidden behind the dominant progressivist view of human evolution—is the same: humans become by creating new conditions, tools, and possibilities for self-knowledge that, in turn, bring about new existential challenges (and fears) like those that the current pace of technological intervention, consumerism, and hyperconnectivity put on our lives. There is nothing new about that. Technology has always been part of what it is to be human throughout the Pleistocene, Holocene, and the Anthropocene. Human evolution is *creative evolution*. New modes of material engagement are continuously created, altering the temporal structure and rhythms of our being in the world as well as the ways we come to know ourselves in the present, remember our past, and imagine our future. What is changing or increasing, in recent history, is not the potential influence of technology. There is nothing inherently more advanced, complex, or threatening in the present digital phase of ubiquitous computing and AI than was the case in any of the previous major technological transformations in human history.

The difference that matters is related not to the transformative power of the new forms of technical mediation but rather to our awareness of the transformative power they have on us—that is, the awareness of our capacity to change what we are. This awareness also brings about the realization of the incompleteness of our species probably more than in any other period in the human past.[10] In addition, it invites serious reflection on the specific modalities, sensory hierarchies, varieties, and speed (temporality) of our present and future modes of material engagement. Important changes are happening

to the ecology of human consciousness—from both a biological and moral sociopolitical point of view—that demand attention and serious response.[11] Our experience of self as a continuity in space and time is perspectival and inseparable from our material environments. By changing our environment, we change the ways we think, feel, and make sense of ourselves and the world as well as the ways we attend to the world and to one another. What we call *self* is, and has always been, the product of this constant metamorphosis and commingling of mind and matter.

In this book, I have tried to explore this entanglement and to attempt to lay out some of the implications it has for how we understand the modes of human becoming—the way we experience, attend, and make sense of ourselves and the world. Human becoming is a matter of concerned observation, where every change in the material environment potentially matters. The material environment is not a mere spatial surrounding. Rather, it is that part of the environment that becomes a part of us, just as we are a part of it. Given this constitutive intertwining of people and their material environments, retaining and building our capacity for critical self-awareness is as important to human survival as the food we eat and the air we breathe. This ability, no doubt unique in the human species, to question what is often taken for granted about the meaning and possibilities of self also embodies the roots of resistance and the promise of transgression. Ultimately, it is the material environments we build for ourselves that will determine whether technology, as the principle force of enactive in/dividuation, will liberate or enslave us.

Notes

Chapter 1

1. There is an extraordinary range of work from philosophy, life sciences, and cognitive sciences seeking to answer the hard questions of what consciousness is, how consciousness is possible, and what the evolutionary origin of consciousness is. The following works offer a good starting point to this immensely complex field of study: David J. Chalmers, "Facing up to the Problem of Consciousness," *Journal of Consciousness Studies* 2, no. 3 (1995): 3–34; David J. Chalmers, *The Conscious Mind: In Search of a Fundamental Theory*, Philosophy of Mind Series (Oxford: Oxford University Press, 1996); Daniel Dennett, *Consciousness Explained* (London: Penguin, 1993); Simona Ginsburg and Eva Jablonka, *The Evolution of the Sensitive Soul: Learning and the Origins of Consciousness* (Cambridge, MA: MIT Press, 2019); Nicholas Humphrey, *Soul Dust: The Magic of Consciousness* (Princeton, NJ: Princeton University Press, 2011); Nicholas Humphrey, *Sentience: The Invention of Consciousness* (Oxford: Oxford University Press, 2022); Todd E. Feinberg and Jon Mallatt, *The Ancient Origins of Consciousness: How the Brain Created Experience* (Cambridge, MA: MIT Press, 2016); and Gerald M. Edelman, *Wider than the Sky: The Phenomenal Gift of Consciousness* (New Haven, CT: Yale University Press, 2004).

2. Peter Godfrey-Smith, "Individuality, Subjectivity, and Minimal Cognition," *Biology & Philosophy* 31, no. 6 (2016): 775–796.

3. Francisco J. Varela, "Patterns of Life: Intertwining Identity and Cognition," *Brain and Cognition* 34, no. 1 (1997): 72–87, 72.

4. Alfred I. Tauber, "The Immune Self: Theory or Metaphor?," *Immunology Today* 15, no. 3 (1994): 134–136; Thomas Pradeu, *The Limits of the Self: Immunology and Biological Identity* (Oxford: Oxford University Press, 2011); and Thomas Pradeu, *Philosophy of Immunology* (Cambridge: Cambridge University Press, 2020).

5. For a recent discussion of this enactive conception of life and sentience, see Evan Thompson, "Could All Life Be Sentient?," *Journal of Consciousness Studies* 29, no. 3 (2022): 229–265. See also Arthur S. Reber, *The First Minds: Caterpillars, Karyotes, and*

Consciousness (Oxford: Oxford University Press, 2019); Andrew B. Barron and Colin Klein, "What Insects Can Tell Us About the Origins of Consciousness," *Proceedings of the National Academy of Sciences* 113, no. 18 (2016): 4900–4908; Miguel Segundo-Ortin and Paco Calvo, "Plant Sentience? Between Romanticism and Denial: Science," *Animal Sentience* 8, no. 33 (2023): 1–32; and Kristin Andrews, *The Animal Mind: An Introduction to the Philosophy of Animal Cognition* (Abingdon: Routledge, 2020).

6. Panpsychism is the view that mind or consciousness is the very stuff of which reality and the world is made. For a survey, see David Skrbina, *Panpsychism in the West* (Cambridge, MA: MIT Press, 2017); and Godehard Bruntrup and Ludwig Jaskolla, eds., *Panpsychism: Contemporary Perspectives* (Oxford: Oxford University Press, 2016). For an archaeological perspective, see also Chris Gosden and Mark Pollard, "Is the Universe Sentient? What Implications Might This Have for Archaeology?," in *Far from Equilibrium: An Archaeology of Energy, Life and Humanity: A Response to the Archaeology of John C. Barrett*, ed. M. Boyd and R. Doonan (Oxford: Oxbow, 2021), 313–326.

7. Marshall Sahlins, "What Kinship Is (Part Two)," *Journal of the Royal Anthropological Institute* 17, no. 2 (2011): 227–242, 227.

8. I adopt the term from the philosopher Evan Thompson. As he points out, "the crucial ingredient that takes us from a self-specifying system to a full-fledged I-making system is that of being 'self-designating' system. A self-designating system is one that can designate itself as a self. This means it can attend to its changing experiential states and conceive of itself as the subject of those states"; Evan Thompson, *Waking, Dreaming, Being: Self and Consciousness in Neuroscience, Meditation, and Philosophy* (New York: Columbia University Press, 2014), 344.

9. The concept of autopoiesis as self-production is grounded in the enactive tradition initiated by Humberto R. Maturana and Francisco J. Varela in *Autopoiesis and Cognition: The Realization of the Living* (Boston: D. Reidel, 1980) [originally published in Chile 1972]. For enactivism, see also Francisco J. Varela, E. Thompson, and E. Rosch, *The Embodied Mind: Cognitive Science and Human Experience* (Cambridge, MA: MIT Press, 1991); Evan Thompson, *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Cambridge, MA: Harvard University Press, 2007); and Shaun Gallagher, *Enactivist Interventions: Rethinking the Mind* (Oxford: Oxford University Press, 2017).

10. The terms *noetic* and *autonoetic* (from the Greek *αὐτο* [*auto*] for "self"-awareness) were initially proposed by Endel Tulving in his *Elements of Episodic Memory* (Oxford: Oxford University Press, 1983). In particular, noetic awareness refers to the basic sense of oneself as acting in and on the environment at a time according to one's 1PP. Autonoetic awareness broadly refers to the sense of oneself as a unique individual persisting over time, able not only to interact with objects and others according to one's 1PP but also to reflect on one's perspective. Noetic consciousness is knowing; autonoetic consciousness is self-knowing.

11. This capacity to own experience resembles what is referred in phenomenology as mineness of experience. As Dan Zahavi observes, "the quality of mineness" denotes "the fact that the experiences are characterized by a first-personal giveness that it immediately reveals them as one's own"; Dan Zahavi, *Subjectivity and Selfhood: Investigating the First-Person Perspective* (Cambridge, MA: MIT Press, 2005), 124. Many phenomenologists argue that mineness is an essential structure of all experience. However, the sense of ownership that I claim in this book is associated with self-bounding, relates but is also different from this phenomenological sense of mineness, as it requires concern for existence and memory capacities that are not a necessary part of all experiencing life-forms.

12. James R. Anderson and Gordon G. Gallup, "Mirror Self-Recognition: A Review and Critique of Attempts to Promote and Engineer Self-Recognition in Primates," *Primates* 56, no. 4 (2015): 317–326.

13. Jacob Von Uexküll has been an early twentieth-century pioneer in the study of animal ethology. In his book *A Foray into the Worlds of Animals and Humans*, originally published in 1934, Uexküll argues that all livings beings are constituted as distinctive subjects through their specific ways of perceiving their *Umwelten*: every living organism "spins out, like the spider's threads, its relations to certain qualities of things and weaves them into a solid web, which carries its existence"; Jakob von Uexküll, *A Foray into the Worlds of Animals and Humans with a Theory of Meaning* (Minneapolis: University of Minnesota Press, 2010 [1934]), 53. For a useful review of the potential that the concept of *umwelt* has for anthropology, see Sara Asu Schroer, "Jakob von Uexküll: The Concept of Umwelt and Its Potentials for an Anthropology Beyond the Human," *Ethnos* 86, no. 1 (2021): 132–152.

14. Edmund Husserl, *The Phenomenology of Internal Time-Consciousness* (Bloomington: Indiana University Press, 1964), 178. See also Dan Zahavi, *Exploring the Self* (Amsterdam: John Benjamins, 2000).

15. Lambros Malafouris, *How Things Shape the Mind: A Theory of Material Engagement* (Cambridge, MA: MIT Press, 2013).

16. Gregory Bateson, "The Cybernetics of 'Self': A Theory of Alcoholism," *Psychiatry* 34, no. 1 (1971): 1–18, 5.

17. Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007), 185.

18. See relevant discussion from Richard Levins and Richard C. Lewontin, *The Dialectical Biologist* (Cambridge, MA: Harvard University Press, 1985), introduction.

19. Alfred North Whitehead, *Process and Reality, an Essay in Cosmology*, Gifford Lectures of 1927–1928; corrected edition ed. D. Griffin and D. Sherburne (New York: Free Press, 1978 [1929]), 23.

20. Whitehead, *Process and Reality*, 222.

21. Maurice Merleau-Ponty, *Phenomenology of Perception*, trans. C. Smith (London: Routledge & Kegan Paul, 1962 [1945]), 407.

22. Christopher Witmore, "Anthropoiesis Revisited," in *Oxford Handbook of Cognitive Archaeology*, ed. Karenleigh A. Overmann, Thomas Wynn, and Frederick L. Coolidge (Oxford: Oxford University Press, 2024), 1215–-1233.

23. In recent decades, the field of cognitive archaeology has witnessed rapid development, with new sophisticated approaches and methodologies. See Colin Renfrew, *Prehistory: The Making of the Human Mind* (New York: Random House, 2008); Carl Knappett, *Thinking Through Material Culture* (Philadelphia: University of Pennsylvania Press, 2005); Nicole Boivin, *Material Cultures, Material Minds the Impact of Things on Human Thought, Society, and Evolution* (Cambridge: Cambridge University Press, 2008); Colin Renfrew, Chris Frith, and Lambros Malafouris, "Introduction. The Sapient Mind: Archaeology Meets Neuroscience," *Philosophical Transactions of the Royal Society B* 363, no. 1499 (2008): 1935–1938; Colin Renfrew and Ezra B. W. Zubrow, *The Ancient Mind: Elements of Cognitive Archaeology*, New Directions in Archaeology (Cambridge: Cambridge University Press, 1994); Thomas Grant Wynn and Frederick Lawrence Coolidge, eds., *Cognitive Models in Palaeolithic Archaeology* (Oxford: Oxford University Press, 2017); Thomas Wynn, Karenleigh A. Overmann, and Lambros Malafouris, "4E Cognition in the Lower Palaeolithic," *Adaptive Behavior* 29, no. 2 (2020): 99–106; Karenleigh A. Overmann and Frederick L. Coolidge, eds., *Squeezing Minds from Stones: Cognitive Archaeology and the Evolution of the Human Mind* (Oxford: Oxford University Press, 2019); and Thomas Wynn, Karenleigh Overmann, and Frederick Coolidge, eds., *Oxford Handbook of Cognitive Archaeology* (Oxford: Oxford University Press, 2024).

24. Lambros Malafouris, "Making Hands and Tools: Steps to a Process Archaeology of Mind," *World Archaeology* 53, no.1 (2021): 38–55; Lambros Malafouris, Chris Gosden, and Amy Bogaard, "Process Archaeology," *World Archaeology* 53, no. 1 (2022): 1–14; and Chris Gosden and Lambros Malafouris, "Process Archaeology (P-Arch)," *World Archaeology* 47, no. 5 (2015): 701–717.

25. Lambros Malafouris, "Thinking as 'Thinging': Psychology with Things," *Current Directions in Psychological Science* 29, no. 1 (2019): 3–8.

26. Beulah Amsterdam, "Mirror Self-image Reactions Before Age Two," *Developmental Psychobiology* 5, no. 4 (1972): 297–305; Gordon Gallup, "Self-Recognition: Research Strategies and Experimental Design," in *Self-Awareness in Animals and Humans: Developmental Perspectives*, ed. Sue Taylor Parker, Robert W. Mitchell, and Maria L. Boccia (Cambridge: Cambridge University Press, 1994), 35–50; and Gordon G. Gallup, James R. Anderson, and Steven M. Platek, "Self-Recognition," in *The Oxford Handbook of the Self*, ed. Shaun Gallagher (Oxford: Oxford University Press, 2011), 1–55, 15–16.

27. Malafouris, *How Things Shape the Mind*, 90, 118.

28. Levins and Lewontin, *The Dialectical Biologist*, 98.

29. John Dewey, *Logic: The Theory of Inquiry* (New York: H. Holt and Company, 1938); John Dewey, *Experience and Education* (New York: Macmillan, 1938); and John Dewey and Arthur Fisher Bentley, *Knowing and the Known* (Boston: Beacon Press, 1949).

30. Dewey, *Logic*, 67. See also discussion in Shaun Gallagher, "Pragmatic Interventions into Enactive and Extended Conceptions of Cognition," *Philosophical Issues* 24, no. 1 (2014): 110–126, 115–116.

31. As Dewey reminds us when we speak of the situatedness to denote the experience of an organism in an environment, "The meaning of the word 'in' is different from its meaning when it is said that pennies are 'in' a pocket or paint is 'in' a can. . . . The conceptions of situation and of interaction are inseparable from each other"; Dewey, *Experience and Education*, 43.

32. In particular, whereas the term *interaction* usually denotes a causal interconnection, the term *transaction* (or trans-actional) will be used "where systems of description and naming are employed to deal with aspects and phases of action, without final attribution to 'elements' or other presumptively detachable or independent 'entities,' 'essences,' or 'realities,' and without isolation of presumptively detachable 'relations' from such detachable 'elements'"; Dewey and Bentley, *Knowing and the Known*, 108.

33. Tim Ingold, *Imagining for Real: Essays on Creation, Attention and Correspondence* (Abingdon: Routledge, 2021).

34. Janet Hoskins, *Biographical Objects: How Things Tell the Stories of People's Lives* (New York: Routledge, 1998).

35. Edwin Hutchins, "How a Cockpit Remembers Its Speeds," *Cognitive Science* 19, no. 3 (2010): 265–288.

36. Aleksandr Romanovich Luria, *The Working Brain: An Introduction to Neuropsychology* (Harmondsworth: Penguin, 1973).

37. Tom Cochrane, "Expression and Extended Cognition," *Journal of Aesthetics and Art Criticism* 66, no. 4 (2008): 329–340.

38. Bruno Latour, "On Actor–Network Theory: A Few Clarifications," *Soziale Welt* 47, no. 4 (1996): 369–381; Bruno Latour, *Pandora's Hope: An Essay on the Reality of Science Studies* (Cambridge, MA: Harvard University Press, 1999); and Bruno Latour, *Reassembling the Social: An Introduction to Actor–Network-Theory* (Oxford: Oxford University Press, 2005).

39. As Janet Hoskins admits, quite to her surprise, she soon realized that she "could not collect the histories of objects and the life histories of persons separately. People and the things they valued were so complexly intertwined they could not be disentangled." Traditional "person-centered" ethnography had "to be rethought as one

that uses objects as metaphors to elicit an indirect account of personal experience"; Hoskins, *Biographical Objects*, 2.

40. Bernard Stiegler, *Technics and Time: The Fault of Epimentheus*, vol. 1 (Stanford, CA: Stanford University Press, 1998), 140.

41. Stiegler also coins the term *epiphylogenetic memory* to denote the mode of tertiary memory by which past epigenetic process come to be accumulated within the spatiotemporal organization of material environments; Stiegler, *Technics and Time*.

42. Robert Boyd and Peter J. Richerson, *Culture and the Evolutionary Process* (Chicago: University of Chicago Press, 1985); Peter J. Richerson and Robert Boyd, *Not by Genes Alone: How Culture Transformed Human Evolution* (Chicago: University of Chicago Press, 2005); Alex Mesoudi, *Cultural Evolution: How Darwinian Theory Can Explain Human Culture and Synthesize the Social Sciences* (Chicago: University of Chicago Press, 2011); Nicole Creanza, Oren Kolodny, and Marcus W. Feldman, "Cultural Evolutionary Theory: How Culture Evolves and Why It Matters," *Proceedings of the National Academy of Sciences* 114, no. 30 (2017): 7782–7789.

43. As the anthropologist Gisli Palsson observes, this "commonsense modern view of the body as a natural, physical object eventually dressed up in culture is not only a historical product, it is also seriously flawed and incomplete in that a universal 'natural' body does not preexist the 'social' body"; Gisli Palsson, "Nature, Concepts of," in *The International Encyclopedia of Anthropology*, ed. Hilary Callan (Hoboken, NJ: Wiley-Blackwell, 2017), 2.

44. Daniel Lord Smail, *On Deep History and the Brain* (Berkeley: University of California Press, 2008), 14.

45. This is how Henri Bergson describes a similar vision using the example of a snapshot photograph: "We concentrate a period of this evolution in a stable view which we call a form, and, when the change has become considerable enough to overcome the fortunate inertia of our perception, we say that the body has changed its form. But in reality the body is changing form at every moment; or rather, there is no form, since form is immobile and the reality is movement. What is real is the continual change of form: form is only a snapshot view of a transition"; Henri Bergson, *Creative Evolution*, trans. Arthur Mitchell (New York: Dover, 1998 [1911]), 302.

46. Lambros Malafouris, "Creative Thinging: The Feeling of and for Clay," *Pragmatics and Cognition* 22, no. 1 (2014): 140–158.

47. Lambros Malafouris, "Mark Making and Human Becoming," *Journal of Archaeological Method and Theory* 28, no. 1 (2021): 95–119; and Maria Danae Koukouti and Lambros Malafouris, "Material Imagination: An Anthropological Perspective," in *The Cambridge Handbook of the Imagination*, ed. Anna Abraham (Cambridge: Cambridge University Press, 2020), 30–46.

48. Lewis R. Binford, "Archaeological Reasoning and Smudge Pits—Revisited," in *An Archeological Perspective* (New York: Seminar Press, 1972), 52–58.

49. J. Odling-Smee, *Niche Construction: How Life Contributes to Its Own Evolution* (Cambridge, MA: MIT Press, 2024).

50. Andy Clark, "Re-Inventing Ourselves: The Plasticity of Embodiment, Sensing, and Mind," *Journal of Medicine and Philosophy* 32, no. 3 (2007): 279–280.

51. Husserl, *The Phenomenology of Internal Time-Consciousness*, 178.

52. William James (1890) was probably the first to propose the distinction between the two interrelated levels of the self: the implicit level of the "I" (at which the self is merely a subject of experience) and the explicit level of the "me" (where self is an object of knowledge). See William James, *The Principles of Psychology* (New York: H. Holt and Company, 1890). For a review of more recent theoretical discussion and debate on this theme, see Angela Tagini and Antonino Raffone, "The 'I' and the 'Me' in Self-Referential Awareness: A Neurocognitive Hypothesis," *Cognitive Processing* 11, no. 1 (2009): 9–20.

53. David Hume, to give one famous example, suggested that what we call *self* consists of nothing more than an imaginative bundle of momentary impressions that are strung together to give the illusion of personal continuity; David Hume, *A Treatise of Human Nature* (Oxford: Oxford University Press, 1978). More recently, various narrative theorists have proposed a similar fictitious view of the self as a collection of stories (real and fictional) or, as Daniel Dennett defines it, the "nothing more than, and nothing less than, your center of narrative gravity"; Dennett, *Consciousness Explained*, 429.

54. Thomas Nagel, *The View from Nowhere* (Oxford: Oxford University Press, 1986), 30.

55. Hume, *A Treatise of Human Nature*, 252.

56. Dorothée Legrand and Perrine Ruby, "What Is Self-Specific? Theoretical Investigation and Critical Review of Neuroimaging Results," *Psychological Review* 116, no. 1 (2009): 252.

57. Philippe Rochat, "Origin of Self-Concept," in *Blackwell Handbook of Infant Development*, ed. G. Bremner and A. Foge (Oxford: Blackwell, 2001), 191–212; and Philippe Rochat, "Five Levels of Self-Awareness as They Unfold Early in Life," *Consciousness and Cognition* 12, no. 4 (2003): 717–731, 720–721.

58. Philippe Rochat, *Others in Mind: Social Origins of Self-Consciousness* (Cambridge: Cambridge University Press, 2009), 197 (emphasis in the original).

59. Marilyn Strathern, *The Gender of the Gift: Problems with Women and Problems with Society in Melanesia* (Berkeley: University of California Press, 1988).

60. Maturana and Varela, *Autopoiesis and Cognition*.

61. The sociologists Annemarie Mol and John Law describe this negotiation of boundary making using the example of cell walls and membranes: "Cell walls have a sodium-potassium pump and techniques for creating differences between what lies within them and what lies outside. Cells work to ensure that the fluid state they live in does not become a homogeneous solvent. They work to make gradients. The issue, then, becomes how other entities engage in their boundary-making. What are the practices of the politics of complex discrimination? And how might we (we?) draw boundaries in and with our work in social theory?"; Annemarie Mol and John Law, "Boundary Variations: An Introduction," *Environment and Planning D: Society and Space* 23, no. 5 (2016): 637–642, 641.

62. Gallagher, *Enactivist Interventions*; Marco Antonio Sepúlveda-Pedro, *Enactive Cognition in Place* (Cham: Palgrave Macmillan, 2023); Giovanna Colombetti, *The Feeling Body: Affective Science Meets the Enactive Mind* (Cambridge, MA: MIT Press, 2013); and Alva Noë, *The Entanglement: How Art and Philosophy Make Us What We Are* (Princeton, NJ: Princeton University Press, 2023).

63. Ezequiel A. Di Paolo, Elisa C. Cuffari, and Hanne De Jaegher, *Linguistic Bodies: The Continuity Between Life and Language* (Cambridge, MA: MIT Press, 2018).

64. According to Alfred Gell, *skin* in New Ireland "stands for the *transactable person*, the person divided up, recombined, and reconstituted"; Alfred Gell, *Art and Agency: An Anthropological Theory* (Oxford: Oxford University Press, 1998), 226 (emphasis in the original). See also Susanne Küchler, "Making Skins—Malangan and the Idiom of Kinship in Northern New Ireland," in *Anthropology, Art, and Aesthetics*, ed. Jeremy Coote (Oxford: Oxford University Press, 1994), 94–112.

65. Terence S. Turner, "The Social Skin," *HAU: Journal of Ethnographic Theory* 2, no. 2 [1980] (2012): 486–504. This is a reprint of Terence S. Turner, "The Social Skin," in *Not Work Alone: A Cross-cultural View of Activities Superfluous to Survival*, ed. Jeremy Cherfas and Roger Lewin (London: Temple Smith, 1980), 112–140.

66. Hanne De Jaegher and Ezequiel Di Paolo, "Participatory Sense-Making," *Phenomenology and the Cognitive Sciences* 6, no. 4 (2007): 485–507; and Thomas Fuchs and Hanne De Jaegher, "Enactive Intersubjectivity: Participatory Sense-Making and Mutual Incorporation," *Phenomenology and the Cognitive Sciences* 8, no. 4 (2009): 465–486.

67. Marcel Mauss, *An Essay on the Gift: The Form and Reason of Exchange in Archaic Societies* (London: Cohen & West, 1925).

68. Lambros Malafouris and Maria-Danae Koukouti, "Where the Touching Is Touched: The Role of Haptic Attentive Unity in the Dialogue Between Maker and Material," *Multimodality & Society* 2, no. 3 (2022): 265–287.

69. Eduardo Kohn, *How Forests Think: Toward an Anthropology Beyond the Human* (Berkeley: University of California Press, 2013), 117.

70. In *A Secular Age*, Taylor juxtaposes the porous subjectivity, as the mode of being typical of the enchanted premodern world, to the buffered self typical of the disenchanted modern world; Charles Taylor, *A Secular Age* (Cambridge, MA: Harvard University Press, 2007).

71. I borrow the term from Philippe Descola. See Philippe Descola, "Beyond Nature and Culture: The Traffic of Souls," *HAU: Journal of Ethnographic Theory* 2, no. 1 (2012): 473–500.

72. Whitehead, *Process and Reality*, 226. See also the discussion in Michael Halewood, "On Whitehead and Deleuze: The Process of Materiality," *Configurations* 13, no. 1 (2005), 57–76, 52–63.

73. Rochat, *Others in Mind*.

74. Rochat, *Others in Mind*, 40.

75. Latour, *Pandora's Hope*; and Latour, *Reassembling the Social*.

76. Rochat, *Others in Mind*, 14.

77. Michael Tomasello, Malinda Carpenter, Josep Call, Tanya Benhe, and Henrike Moll, "Understanding and Sharing Intentions: The Origins of Cultural Cognition," *Behavioral and Brain Sciences* 28, no. 5 (2005): 675–691; and Michael Tomasello and Malinda Carpenter, "Shared Intentionality," *Developmental Science* 10, no. 1 (2007): 121–125.

78. For ANT, an actant is anything "that acts or to which activity is granted by others"; Latour, "On Actor–Network Theory," 373.

79. Lambros Malafouris, Alexander Aston, and Nicolás Alessandroni, "Rethinking the 'We' in 'We' Intentionality: Intention-Sharing with—and not Simply About—Things," *Philosophical Psychology* (2024): 1–31.

80. Bruno Latour, "Technology Is Society Made Durable," *The Sociological Review* 38 (1990): 227.

81. Nagel, *The View from Nowhere*.

82. Luciano Floridi, *The Fourth Revolution: How the Infosphere Is Reshaping Human Reality* (Oxford: Oxford University Press, 2014).

83. See the catalogue accompanying the exhibition (March 2009–November 2010); Anita Herle, Mark Elliott, and Rebecca Empson, *Assembling Bodies: Art, Science and Imagination* (Cambridge: Museum of Archaeology and Anthropology, 2009).

84. Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (London: Bloomsbury, 1988).

Part I

Chapter 2

1. Malafouris, *How Things Shape the Mind*.

2. For a comparative anthropology of the changing relations between lines and surfaces and their significance in human life, see Tim Ingold, *Lines: A Brief History* (Abingdon: Routledge, 2007); and Tim Ingold, *The Life of Lines* (London: Routledge, 2015).

3. Tim Ingold, "The Man in the Machine and the Self-Builder," *Interdisciplinary Science Reviews* 35, no. 3–4 (2010): 353–364, 355.

4. Charles S. Peirce, *The Collected Papers of Charles Sanders Peirce*, ed. Charles Hartshorne and Paul Weiss, Vols. I–VI (Cambridge, MA: Harvard University Press, 1931–1935), Vols. VII–VIII ed. Arthur W. Burks (Cambridge, MA: Harvard University Press, 1958), electronic edition (Charlottesville: Intelex Corporation), 6.268.

5. John Dewey, *Experience and Nature* (Chicago: Open Court, 1925); Dewey, *Experience and Education*; and Dewey and Bentley, *Knowing and the Known*.

6. Whitehead, *Process and Reality*.

7. Bergson, *Creative Evolution*.

8. Merleau-Ponty, *Phenomenology of Perception*; and Maurice Merleau-Ponty, *The Visible and the Invisible*, trans. Claude Lefort (Evanston, IL: Northwestern University Press, 1968).

9. James J. Gibson, *The Ecological Approach to Visual Perception* (Boston: Houghton Mifflin, 1979).

10. Gregory Bateson, *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology* (San Francisco: Chandler, 1973); and Gregory Bateson, *Mind and Nature: A Necessary Unity* (New York: Bantam Books, 1979).

11. Deleuze and Guattari, *A Thousand Plateaus*; and Gilles Deleuze and Félix Guattari, *Rhizome: Introduction* (Paris: Éditions de Minuit, 1976).

12. Latour, "On Actor–Network Theory"; Latour, *Pandora's Hope*; and Latour, *Reassembling the Social*.

13. Barad, *Meeting the Universe Halfway*; Karen Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," *Signs: Journal of Women in Culture and Society* 28, no. 3 (2003): 801–831.

14. Andy Clark, *Being There: Putting Brain, Body, and World Together Again* (Cambridge, MA: MIT Press, 1997); Andy Clark, *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*, Philosophy of Mind Series (Oxford: Oxford University Press, 2008);

Thompson, *Mind in Life*; Thompson, *Waking, Dreaming, Being*; Edwin Hutchins, *Cognition in the Wild* (Cambridge, MA: MIT Press, 1995); Gallagher, *Enactivist Interventions*; Shaun Gallagher, *How the Body Shapes the Mind* (Oxford: Oxford University Press, 2005); Daniel D. Hutto and Erik Myin, *Radicalizing Enactivism: Basic Minds Without Content* (Cambridge, MA: MIT Press, 2013); Thomas Fuchs, *Ecology of the Brain: The Phenomenology and Biology of the Embodied Mind* (Oxford: Oxford University Press, 2018); and Varela et al., *The Embodied Mind*.

15. Gallagher, "Pragmatic Interventions," 119.

16. Alfred North Whitehead, *Science and the Modern World. Lowell Lectures, 1925* (New York: Macmillan, 1925), 74–75.

17. Malafouris, *How Things Shape the Mind*, chap. 4.

18. Edwin Hutchins, "Cognitive Ecology," *Topics in Cognitive Science* 2, no. 4 (2010): 705–715.

19. Malafouris, *How Things Shape the Mind*, chap. 5.

20. Malafouris, *How Things Shape the Mind*, chap. 6.

21. Lambros Malafouris, "At the Potter's Wheel: An Argument for Material Agency," in *Material Agency: Towards a Non-Anthropocentric Approach*, ed. Carl Knappett and Lambros Malafouris (Springer, 2008), 19–36, 34.

22. Malafouris, "Mark Making and Human Becoming."

23. Edwin Hutchins, "Enaction, Imagination, and Insight," in *Enaction: Toward a New Paradigm for Cognitive Science*, ed. John Stewart, Olivier Gapenne, and Ezequiel Di Paolo (Cambridge, MA: MIT Press, 2010), 425–450, 426.

24. Hutchins, "Enaction, Imagination, and Insight," 426.

25. Bateson, *Steps to an Ecology of Mind*.

26. Hutchins, "Cognitive Ecology."

27. Shaun Gallagher and Micah Allen, "Active Inference, Enactivism and the Hermeneutics of Social Cognition," *Synthese* 195, no. 6 (2018): 2627–2648, 2634 (emphasis in the original). Gallagher and Allen suggest that among the different predictive models available, the predictive engagement view is the one more relevant to embodied and enactive conceptualizations of the mind. They differentiate predictive engagement from the two other major views on the neuroscience of predictive models: *predictive coding*, which they see associated with internal Bayesian models and prediction error minimization, and *predictive processing*, which they see associated with radical connectionism and mainstream ideas of embodiment. We should note in this connection that the philosopher Andy Clark would propose that adopting a predictive processing perspective of brain function may offer "the best clue yet to the shape of a unified

science of mind and action"; Andy Clark, "Whatever Next? Predictive Brains, Situated Agents, and the Future of Cognitive Science," *Behavioral and Brain Sciences* 36, no. 3 (2013): 181–253, 182. This is so, as he explains, because such a model allows major aspects of neural functioning to be linked with the material structure of our worlds in a continuous manner. As he writes, "Working together, perception and action serve to selectively sample and actively sculpt the stimulus array. These direct links to active sculpting and selective sampling suggest deep synergies between the hierarchical predictive processing framework and work in embodied and situated cognition"; Clark, "Whatever Next?," 194.

28. Karl Friston, "The Free-Energy Principle: A Rough Guide to the Brain?," *Trends in Cognitive Sciences* 13, no. 7 (2009): 293–301; and Karl Friston, "Prediction, Perception and Agency," *International Journal of Psychophysiology* 83, no. 2 (2012): 248–252.

29. As Gallagher and Allen explain, "Following the FEP, perception and active inference are two sides of the same precision-weighted process allowing for the prioritization of actions that are likely to produce predicted outcomes and the contextualization of perception by prior action and history. This dependency of action on the structure of perception (and vice versa) provides a deeply embodied form of engagement, where the priors and actions an organism is likely to entertain are fundamentally constrained and afforded by the morphological structure of the agent's body. In this way, the Bayesian brain is uniquely equipped to exploit the finely tuned properties of an organism's dynamic morphological body and associated *Umwelt*"; Gallagher and Allen, "Active Inference, Enactivism and the Hermeneutics of Social Cognition," 2635–2636.

30. Martin Heidegger, *Poetry, Language, Thought*, trans. Albert Hofstadter (New York: Harper & Row, 1975), 166.

31. Whitehead, *Process and Reality*; and Alexander Litman, "Prehension as Relation," *The Journal of Philosophy* 44, no. 9 (1947): 234–240.

32. Dewey, *Experience and Nature*; Dewey, *Experience and Education*; and Dewey and Bentley, *Knowing and the Known*. See also Shaun Gallagher, "Philosophical Antecedents of Situated Cognition," in *Cambridge Handbook of Situated Cognition*, ed. Philip Robbins and Murat Aydede (Cambridge: Cambridge University Press, 2009), 35–52.

33. Andy Clark and David Chalmers, "The Extended Mind," *Analysis* 58, no. 1 (1998): 7–19.

34. Malafouris and Koukouti, "Where the Touching Is Touched"; Lambros Malafouris, Rory Carnegie, Miranda Creswell, Antonis Iliopoulos, Maria-Danae Koukouti, and Wendy Ross, "Perspectival Kinaesthetic Imaging," *Multimodality & Society* 3, no. 4 (2023): 366–398.

35. In particular, I am drawing on research from the HANDMADE—Understanding Creative Gesture in Pottery Making project (sponsored by the European Research Council). See https://handmade.web.ox.ac.uk/home.

36. Malafouris, "At the Potter's Wheel."

37. Whitehead, *Process and Reality*; and Litman, "Prehension as Relation."

38. Malafouris, "Creative Thinging."

39. In this book, the term *lived space* expresses the relational and dynamical conception of personal space as a dimension of the hylonoetic field. Similar to the philosopher and psychiatrist Thomas Fuchs, I use the term *lived space* to denote a field of forces (such as attraction and repulsion, elasticity, and resistance) centered on the person and defining the possibilities (valences, relevances, or affordances) of that person; Thomas Fuchs, "Psychotherapy of the Lived Space: A Phenomenological and Ecological Concept," *American Journal of Psychotherapy* 61, no. 4 (2007): 423–439, 426.

40. Albert Newen, Leon De Bruin, and Shaun Gallagher, *The Oxford Handbook of 4E Cognition* (Oxford: Oxford University Press, 2018).

41. Lambros Malafouris, "Bringing Things to Mind: 4Es and Material Engagement," in *The Oxford Handbook of 4E Cognition*, ed. Albert Newen, Leon De Bruin, and Shaun Gallagher (Oxford: Oxford University Press, 2018), 755–772.

Chapter 3

1. The term *palimpsest* originates in the European medieval tradition of using wax tablets and, later, paper manuscripts on which an author repeatedly erases and writes over an original inscription, creating, over time, a composite—the sum of all the erasures and overwritings; Gavin Lucas, *Understanding the Archaeological Record* (Cambridge: University of Cambridge Press), 115; and Gavin Lucas, *The Archaeology of Time* (Abingdon: Routledge, 2005). See also, Geoff Bailey, "Time Perspectives, Palimpsests and the Archaeology of Time," *Journal of Anthropological Archaeology* 26, no. 2 (2007): 198–223.

2. The term *nature* has many meanings in the English language. The two meanings that are more relevant here would be: (a) to denote some "essential quality that all and only things of its kind may be expected to possess"—or else what is universal rather than particular to each of its constituent individuals, and (b) to connote the world of physical reality and material entities as distinct from their mental or other representation inside the head or in the world—that we usually associate with culture. See discussion in Tim Ingold, ed., "Humanity and Animality," in *Companion Encyclopedia of Anthropology: Humanity, Culture and Social Life* (Routledge, 1994), 14–32, 21.

3. See relevant discussion and comments (especially by Ingold) in Agustín Fuentes, Jonathan Marks, Tim Ingold, et al., "On Nature and the Human," *American Anthropologist* 112, no. 4 (2010): 512–521, 513.

4. Gary F. Marcus and Simon E. Fisher, "*FOXP2* in Focus: What Can Genes Tell us About Speech and Language?," *Trends in Cognitive Sciences* 7, no. 6 (2003): 257–262.

5. As pointed out by, among others, Jonathan Marks, "It is impossible, and indeed, seems somewhat perverse, to imagine that we might strip away the cultural aspects of human existence and study its biological aspects separately, when they are so intertwined epistemologically and historically"; Jonathan Marks, "The Nature of Humanness," in *The Oxford Handbook of Archaeology*, ed. Chris Gosden, Barry Cunliffe, and Rosemary A. Joyce (Oxford: Oxford University Press, 2009), 237–253, 242.

6. Humanity, as Tim Ingold invoking Ortega y Gasset reminds us, is "something we have continually to work at. What we are, or what we can be, does not come ready made. We have, perpetually and never-endingly, to be making ourselves"; Fuentes et al., "On Nature and the Human," 514.

7. Jonathan Marks, *What It Means to Be 98% Chimpanzee: Apes, People, and Their Genes* (Berkeley: University of California Press, 2002).

8. Tim Ingold defines *enskilment* as "understanding in practice" or else becoming skillful through active material engagement; Tim Ingold, *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill* (Abingdon: Routledge, 2000), 416.

9. Also relevant here is the debate over the question of animal culture—that is, do animals have culture and how do we recognize it?—which has been at the center of heated controversy in recent decades. For a good review, see Kevin N. Laland and William Hoppitt, "Do Animals Have Culture?," *Evolutionary Anthropology: Issues, News, and Reviews: Issues, News, and Reviews* 12, no. 3 (2003): 150–159, 150.

10. The anthropologist Clifford Geertz gives us a good example of this persistent struggle with the tension of nature–culture: "Our ideas, our values, our acts, even our emotions, are, like our nervous system itself, cultural products—Products manufactured, indeed, out of tendencies, capacities, and dispositions with which we were, but manufactured none the less"; Clifford Geertz, *The Interpretation of Cultures* (New York: Basic Books, 1973), 4.

11. Philippe Descola, "Modes of Being and Forms of Predication," *HAU: Journal of Ethnographic Theory* 4, no.1 (2014): 271–280, 271. See also Philippe Descola, *Beyond Nature and Culture*, trans. Janet Lloyd (Chicago: University of Chicago Press, 2013).

12. Descola, "Modes of Being and Forms of Predication," 272.

13. Tim Ingold, "Beyond Biology and Culture. The Meaning of Evolution in a Relational World," *Social Anthropology* 12, no. 2 (2004): 209–221, 217.

14. Don Ihde, "Postphenomenological Re-embodiment," *Foundations of Science* 17, no. 4 (2012): 373–377, 374. For the links between postphenomenology and MET, see Don Ihde and Lambros Malafouris, "Homo Faber Revisited: Postphenomenology and Material Engagement Theory," *Philosophy & Technology* 32 (2019): 195–214.

15. Tim Ingold, "Prospect," in *Biosocial Becomings: Integrating Social and Biological Anthropology*, ed. Tim Ingold and Gisli Palsson (Cambridge: Cambridge University

Press, 2014), 1–21; and Tim Ingold and Gisli Palsson, eds., *Biosocial Becomings: Integrating Social and Biological Anthropology* (Cambridge: Cambridge University Press 2014).

16. In the words of Tim Ingold, "A human being is an individual of a species; being human is to exist as a person. In the first sense humanity refers to a biological taxon (*Homo sapiens*), in the second it refers to a moral condition (personhood)"; Ingold, "Humanity and Animality," 23.

17. Feinberg and Mallatt, *The Ancient Origins of Consciousness*; Edelman, *Wider than the Sky*; Godfrey-Smith, "Individuality, Subjectivity, and Minimal Cognition"; Reber, *The First Minds*; and Ginsburg and Jablonka, *The Evolution of the Sensitive Soul*.

18. For examples, see Elizabeth A. Tibbetts and James Dale, "Individual Recognition: It Is Good To Be Different," *Trends in Ecology & Evolution* 22, no. 10 (2007): 529–537.

19. Peter Godfrey-Smith, *Other Minds: The Octopus, the Sea, and the Deep Origins of Consciousness* (New York: Farrar, Straus and Giroux, 2016), 83.

20. Godfrey-Smith, *Other Minds*, 83.

21. Richard Karban and Kaori Shiojiri, "Identity Recognition and Plant Behavior," *Plant Signaling & Behavior* 5, no. 7 (2010): 854–855, 854; and Michal Gruntman and Ariel Novoplansky, "Physiologically Mediated Self/Non-Self Discrimination in Roots," *Proceedings of the National Academy of Sciences* 101, no. 11 (2004): 3863–3867.

22. Thomas Nagel, "What Is It Like to Be a Bat?," *The Philosophical Review* 83, no. 4 (1974): 435–450. I do not wish to imply that the bat is actually concerned with that question or that the question itself can be answered by the human observer who thought of it (in fact, Nagel's answer is that it cannot). I only want to illustrate one important possibility that the question of phenomenal consciousness actually entails: concern with what is like to be that life-form.

23. As the primatologist Gordon Gallup describes it, "Having raised the issue of existence, a logical next step is to contemplate your eventual nonexistence. In other words, the unique price we pay for self-awareness is the realization of the inevitability of our own individual demise"; Gordon Gallup, "Self-Awareness and the Emergence of Mind in Primates," *American Journal of Primatology* 2, no. 3 (1982): 237–248, 242.

24. Death, in the basic sense of biological mortality, is common in nature. But awareness of death—that is, of its necessity and inevitability—seems unnecessary for other-than-human life-forms that seem entirely preoccupied with their evolutionary proclivity to survive. This awareness of being mortal has been a constant source of existential anxiety for our species. For the impact that this mortality awareness may have on our sense of self, see especially Ernest Becker's work on terror management theorem; Ernest Becker, *Birth and Death of Meaning* (New York: Free Press, 1971).

25. For the different meanings of altruism and the implication that it has in the context of human evolution, see Benjamin Kerr, Peter Godfrey-Smith, and

Marcus W. Feldman, "What Is Altruism?," *Trends in Ecology & Evolution* 19, no. 3 (2004): 135–140.

26. Philippe Descola, "Human Natures," *Social Anthropology/Anthropologie Sociale* 17, no. 2 (2009): 145–157.

27. Descola, "Beyond Nature and Culture."

28. The term *other-than-human* person was coined in the 1920s by the anthropologist Irving Hallowell to describe Algonquian ontologies of animacy. His ethnography among Algonquian peoples (specifically the Ojibwa) provides some famous examples. Irving Hallowell, "Ojibwa Ontology, Behaviour and World View," in *Primitive Views of the World*, ed. Stanley Diamond (New York: Columbia University Press, 1960), 49–82.

29. For good reviews, see Gordon G. Gallup, James R. Anderson, and D. J. Shillito, "The Mirror Test," in *The Cognitive Animal: Empirical and Theoretical Perspectives on Animal Cognition*, ed. Marc Bekoff, Collin Allen, and Gordon M. Burghardt (Cambridge, MA: MIT Press, 2002), 325–333; Gallup et al., "Self-Recognition"; and Anderson and Gallup, "Mirror Self-Recognition."

30. Jakob Von Uexküll, "The Theory of Meaning," *Semiotica* 42, no. 1 (1982) [1940]: 25–79, 42.

31. Godfrey-Smith, *Other Minds*.

32. Andrews, *The Animal Mind*; Robert Lurz, ed., *The Philosophy of Animal Minds* (Cambridge: Cambridge University Press, 2009); and Godfrey-Smith, *Other Minds*.

33. Raymond Tallis, *Aping Mankind: Neuromania, Darwinitis and the Misrepresentation of Humanity* (Durham, UK: Acumen, 2011), 159. See also discussion of anthropofabulation in Cameron Buckner, "Morgan's Canon, Meet Hume's Dictum: Avoiding Anthropofabulation in Cross-Species Comparisons," *Biology & Philosophy* 28 (2013): 853–871. For a "better kind of continuity," see Louise Barrett, "A Better Kind of Continuity," *The Southern Journal of Philosophy* 53 (2015): 28–49.

34. Lars Chittka, Stephen J. Rossiter, Peter Skorupski, and Chrisantha Fernando, "What Is Comparable in Comparative Cognition?," *Philosophical Transactions of the Royal Society B: Biological Sciences* 367, no. 1603 (2012): 2677–2685.

35. Bateson, *Mind and Nature*.

36. See also Barrett, "A Better Kind of Continuity," 30; and Geoffrey Lloyd, "Humanity Between Gods and Beasts? Ontologies in Question," *Journal of the Royal Anthropological Institute* 17, no. 4 (2011): 829–845.

37. Godfrey-Smith, *Other Minds*.

38. As Nuttall explains, *sila* is the word for intelligence/consciousness and is understood to be the fundamental all-pervading principle and "life-giving force connecting

a person with the rhythms of the universe, and integrating the self with the natural world"; Mark Nuttall, "Living in a World of Movement: Human Resilience to Environmental Instability in Greenland," in *Anthropology and Climate Change*, ed. Susan A. Crate and Mark Nuttall (London: Routledge, 2016), 292–310, 299.

39. See discussion in Johnny Hartz Søraker, "Continuities and Discontinuities Between Humans, Intelligent Machines, and Other Entities," *Philosophy & Technology* 27, no. 1 (2014): 31–46.

40. Marks, *What It Means to Be 98% Chimpanzee*.

41. As Tim Ingold proposes, difference and diversity are not the same: "difference is a function of positionality, within a continuous universe of relations." By the same token, humanity is more than a species membership: "being human is a relational accomplishment, and something we have continually to work at"; Ingold, "The Man in the Machine and the Self-Builder," 353–354.

42. I use the term *habit* here in Dewey's sense of things done and experiences enacted by the environment by means of organic structures (sensitivity to ways of being) or acquired dispositions to act; John Dewey, *Human Nature and Conduct* (New York: Dover, 2002 [1922]).

Chapter 4

1. Charles Darwin, *On the Origin of Species by Means of Natural Selection; or, The Preservation of Favored Races in the Struggle for Life*, 5th ed. (New York: D. Appleton and Company, 1872); and Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (London: John Murray, 1871).

2. Erik Rietveld and Julian Kiverstein, "A Rich Landscape of Affordances," *Ecological Psychology* 26, no. 4 (2014): 325–352.

3. Sally McBrearty and Alison S. Brooks, "The Revolution That Wasn't: A New Interpretation of the Origin of Modern Human Behavior," *Journal of Human Evolution* 39, no. 5 (2000): 453–563; Nicholas Conard, "Cultural Modernity: Consensus or Conundrum?," *Proceedings of the National Academy of Sciences* 107, no. 17 (2010): 7621–7622; John Shea, "*Homo sapiens* Is as *Homo sapiens* Was: Behavioral Variability Versus "Behavioral Modernity in Paleolithic archaeology," *Current Anthropology* 52, no. 1 (2011): 1–35; and Jean-Jacques Hublin, Abdelouahed Ben-Ncer, Shara E. Bailey, et al., "New Fossils from Jebel Irhoud, Morocco and the Pan-African Origin of *Homo sapiens*," *Nature* 546, no. 7657 (2017): 289–292.

4. Nigel Thrift, "Intensities of Feeling: Towards a Spatial Politics of Affect," *Geografiska Annaler: Series B, Human Geography* 86, no. 1 (2004): 57–78.

5. Karola Stotz phrased the issue in this especially insightful way: "The focus on the human-being-in-its-developmental-niche dispenses with the need of a definition

of humankind based on universal and genetically specified abstractions. It should help us to embrace plasticity, human self-engineering, and an openness to the world. The 'nature' of the organism becomes the natural outcome nurtured through the open-ended process of development that is not genetically predetermined but reliably and flexibly guided by the process of developmental niche construction"; Karola Stotz, "Human Nature and Cognitive–Developmental Niche Construction," *Phenomenology and the Cognitive Sciences* 9, no. 4 (2010): 498–499. For niche construction theory, see Kevin N. Laland, J. Odling-Smee, and M. W. Feldman, "Niche Construction, Biological Evolution and Cultural Change," *Behavioral and Brain Sciences* 23 (2000): 131–146; Kevin Laland, Tobias Uller, Marc Feldman, et al., "Does Evolutionary Theory Need a Rethink?," *Nature* 514, no. 7521 (2014): 161–164; Kevin N. Laland, *Darwin's Unfinished Symphony* (Princeton, NJ: Princeton University Press, 2017); Kevin N. Laland, John Odling-Smee, and Marcus W. Feldman, "Niche Construction, Biological Evolution, and Cultural Change," *Behavioral and Brain Sciences* 23, no. 1 (2000): 131–146; Kevin N. Laland and Kim Sterelny, "Perspective: Seven Reasons (Not) to Neglect Niche Construction," *Evolution* 60, no. 9 (2006): 1751–1762; F. John Odling-Smee, Kevin N. Laland, and Marcus W. Feldman, *Niche Construction: The Neglected Process in Evolution* (Princeton, NJ: Princeton University Press, 2003); and Susan Oyama, Paul E. Griffiths, and Russell D. Gray, eds., *Cycles of Contingency: Developmental Systems and Evolution* (Cambridge, MA: MIT Press, 2001).

6. Evelyn Fox Keller, "Thinking About Biology and Culture: Can the Natural and Human Sciences Be Integrated?," *The Sociological Review* 64, no. 1 suppl (2017): 35.

7. Tim Ingold, "'People Like Us': The Concept of the Anatomically Modern Human," *Cultural Dynamics* 7, no. 2 (2016): 187–214.

8. Evelyn F. Keller, *The Century of the Gene* (Cambridge, MA: Harvard University Press, 2000), 63.

9. Kevin N. Laland, Tobias Uller, Marcus W. Freeman, et al., "The Extended Evolutionary Synthesis: Its Structure, Assumptions and Predictions," *Proceedings of the Royal Society B: Biological Sciences* 282, no. 1813 (2015): 20151019.

10. Ernst Mayr, "The Triumph of the Evolutionary Synthesis," *The Times Literary Supplement*, no. 4257 (1984): 1261–1262.

11. Mayr, "The Triumph of the Evolutionary Synthesis."

12. Laland, "The Extended Evolutionary Synthesis," 8.

13. Marcel Mauss, "Techniques of the Body," *Economy and Society* 2, no. 1 (1973 [1935]): 75. On the historical roots of the division between biology and culture in anthropology, see also Maurizio Meloni, "From Boundary-Work to Boundary Object: How Biology Left and Re-Entered the Social Sciences," *The Sociological Review* 64, no. 1 suppl (2017): 61–78.

14. Here, I am drawing on Ingold, "Beyond Biology and Culture."

15. Mauss, "Techniques of the Body."

16. Ingold, "Beyond Biology and Culture," 216.

17. Ingold, "Beyond Biology and Culture," 216.

18. Ingold, "Beyond Biology and Culture," 216. For a more recent exploration of those issues from an enactive perspective see also Émilien Dereclenne, *Technics and Enaction: A Philosophy of Imagination* (London: Bloomsbury Publishing, 2025).

19. This reduction remains at the heart of neo-Darwinian thinking. Although contemporary models of culture evolution may seem to promote a more interactive view of human evolution that recognizes the importance of biological and cultural factors, they also differentiate between genetic and nongenetic inheritance (e.g., imitation or social learning), and they ground biology to the genetic and culture to the nongenetic, reiterating the old unproductive split. As Ingold observes, "The implied essentialisation of biology as a constant of human being, and of culture as its variable and interactive complement, is . . . the single major stumbling block that up to now has prevented us from moving towards an understanding of our human selves, and of our place in the living world, that does not endlessly recycle the polarities, paradoxes and prejudices of western thought"; Ingold, "Beyond Biology and Culture," 217.

20. Ingold, "Beyond Biology and Culture," 218.

21. Ernst Mayr, *Animal Species and Evolution* (Cambridge, MA: Harvard University Press, 1963).

22. The dates of such fossils are highly variable, ranging from around a hundred thousand years ago to around three hundred thousand years ago, depending on which morphological markers one uses. For a recent review, see Marc Kissel and Agustin Fuentes, "The Ripples of Modernity: How We Can Extend Paleoanthropology with the Extended Evolutionary Synthesis," *Evolutionary Anthropology: Issues, News, and Reviews* 30, no. 1 (2021): 84–98.

23. Boyd and Richerson, *Culture and the Evolutionary Process*; Mesoudi, *Cultural Evolution*; Alex Mesoudi, Andrew Whiten, and Kevin N. Laland, "Towards a Unified Science of Cultural Evolution," *Behavioral and Brain Sciences* 29, no. 4 (2006): 329–347; Michael J. O'Brien, John Darwent, and R. Lee Lyman, "Cladistics Is Useful for Reconstructing Archaeological Phylogenies: Paleoindian Points from the Southeastern United States," *Journal of Archaeological Science* 28, no. 10 (2001): 1115–1136; and Jamshid Tehrani and Mark Collard, "Investigating Cultural Evolution Through Biological Phylogenetic Analyses of Turkmen Textiles," *Journal of Anthropological Archaeology* 21, no. 4 (2002): 443–463.

24. For a characteristic example of this approach, see Michael J. O'Brien, Matthew T. Boulanger, Briggs Buchanan, et al., "Design Space and Cultural Transmission: Case

Studies from Paleoindian Eastern North America," *Journal of Archaeological Method and Theory* 23 (2015): 692–740.

25. Kirsh, "Adapting the Environment Instead of Oneself."

26. This is also known as the anthropological question on the psychic unity of humankind, which I am going to discuss separately in chapter 5. That is the question of whether the observed cultural variation in human behavior and thinking is a surface property of an underlying natural or precultural biological unity.

27. Kirsh, "Adapting the Environment Instead of Oneself," 215.

28. Ingold, "Prospect," 9; and Ingold and Palsson, *Biosocial Becomings*.

29. Lambros Malafouris, "Mark making and human becoming," *Journal of Archaeological Method and Theory 28,* no.1 (2021): 95–119.

30. Kåre Stokholm Poulsgaard and Lambros Malafouris, "Understanding the Hermeneutics of Digital Materiality in Contemporary Architectural Modelling: A Material Engagement Perspective," *AI & Society* 38, no. 6 (2020): 2217–2227; Kåre Stokholm Poulsgaard and Lambros Malafouris, "Models, Mathematics and Materials in Digital Architecture," in *Cognition Beyond the Brain: Computation, Interactivity and Human Artifice*, ed. Stephen J. Crowley and Frédéric Vallée-Tourangeau (Cham: Springer, 2017): 283–304; and Kåre Stokholm Poulsgaard, "Enactive Individuation: Technics, Temporality and Affect in Digital Design and Fabrication," *Phenomenology and the Cognitive Sciences* 18, no. 1 (2017): 281–298.

31. Ingold, "Beyond Biology and Culture," 218.

32. It is important to note in this context is that from a process perspective, novelty is entailed in any becoming, not just human becoming. One of the great strengths of Whitehead's work has been to show how '"creativity' is the universal of universals"; Whitehead, *Process and Reality*, 21, 410.

33. Malafouris et al., "Rethinking the 'We' in 'We' Intentionality."

34. See discussion in Lambros Malafouris, "Between Brains, Bodies and Things: Tectonoetic Awareness and the Extended Self," *PhilosophicalTransactions of the Royal Society of London Series B* 363 (2008): 1993–2002.

35. Minna Ruckenstein and Mika Pantzar, "Datafied Life," *Techné: Research in Philosophy and Technology* 19, no. 2 (2015): 191–210.

36. The term denotes three-dimensional Internet experiences accessible by virtual reality devices; Andrew McStay, "The Metaverse: Surveillant Physics, Virtual Realist Governance, and the Missing Commons," *Philosophy & Technology* 36, no. 1 (2023).

37. Bergson, *Creative Evolution*, 137.

38. Laland et al., "Does Evolutionary Theory Need a Rethink?"; Laland, *Darwin's Unfinished Symphony*; Laland et al., "Niche Construction, Biological Evolution, and

Cultural Change"; Laland and Sterelny, "Perspective: Seven Reasons"; Odling-Smee et al., *Niche Construction*; Oyama et al., *Cycles of Contingency*; and Laland et al., "The Extended Evolutionary Synthesis."

39. As Stotz remarks, "Human beings have had a culture since before they were human. Since the human ontogenetic niche is culturally co-constructed, human nature is not the biological basis for culture but the partial product of it"; Stotz, "Human Nature and Cognitive–Developmental Niche Construction," 497.

40. Laland et al., "The Extended Evolutionary Synthesis."

41. Ihde and Malafouris, "Homo Faber Revisited."

42. Greg Miller, "The Seductive Allure of Behavioral Epigenetics," *Science* 329, no. 5987 (2010): 24–27. For a recent review of some major epigenetic findings and of their implications for anthropology through some good illustrative examples, see Margaret Lock, "Comprehending the Body in the Era of the Epigenome," *Current Anthropology* 56, no. 2 (2015): 151–177; and Margaret Lock, "The Epigenome and Nature/Nurture Reunification: A Challenge for Anthropology," *Medical Anthropology* 32, no. 4 (2013): 291–308.

43. The paradox is that the moment you become truly un-Cartesian, you can be accused of being anti-Darwinian.

44. If there is an element of human exceptionalism here, it is not exceptionalism about origins. Rather, it is exceptionalism about reflective critical self-consciousness and sensemaking. If there is a case for human exceptionalism, this can only be made in relation to our species predilection for making sense of our own existence as a species: What are we and where do we come from? See also Jonathan Marks, *Tales of the Ex-Apes: How We Think About Human Evolution* (Oakland: University of California Press, 2015). In itself, exceptionalism is not necessarily a problem. It becomes a problem, however, when instead of denoting the necessary capacity for individuation and specification that every organism has, it somehow becomes a medium for placing humans on nature's highest pedestal. In other words, human are exceptional in the same way that an earthworm or an octopus is exceptional.

45. The ability of using elementary tools is well demonstrated, in both nature and captivity, most famously by chimpanzees (*Pan troglodytes*) and New Caledonian crows (*Corvus moneduloides*). For a good review, see Dora Biro, Michael Haslam, and Christian Rutz, "Tool Use as Adaptation," *Philosophical Transactions of the Royal Society B: Biological Sciences* 368, no. 1630 (2013): 20120408.

Chapter 5

1. David Sweatt, "Neural Plasticity and Behavior—Sixty Years of Conceptual Advances," *Journal of Neurochemistry* 139, no. S2 (2016): 179–199; and Jonathan D. Power and Bradley L. Schlaggar, "Neural Plasticity Across the Lifespan," *Developmental Biology* 6, no. 1 (2016): e216.

2. Zhenyu Gao, Boeke J. van Beugen, and Chris I. De Zeeuw, "Distributed Synergistic Plasticity and Cerebellar Learning," *Nature Reviews Neuroscience* 13, no. 9 (2012): 619–635; and Bruce E. Wexler, *Brain and Culture: Neurobiology, Ideology, and Social Change* (Cambridge, MA: MIT Press, 2006).

3. Christopher J. Steele and Robert J. Zatorre, "Practice Makes Plasticity," *Nature Neuroscience* 21, no. 12 (2018): 1645–1646.

4. Chet C. Sherwood and Aida Gómez-Robles, "Brain Plasticity and Human Evolution," *Annual Review of Anthropology* 46, no. 1 (2017): 399–419.

5. Vittorio Gallese, "Embodied Simulation: From Neurons to Phenomenal Experience," *Phenomenology and the Cognitive Sciences* 4, no. 1 (2005): 23–48.

6. Vittorio Gallese and George Lakoff, "The Brain's Concepts: The Role of the Sensory-Motor System in Conceptual Knowledge," *Cognitive Neuropsychology* 22, no. 3–4 (2005): 455–479.

7. Stanislas Dehaene and Laurent Cohen, "Cultural Recycling of Cortical Maps," *Neuron* 56, no. 2 (2007): 384–398.

8. Michael L. Anderson, "Neural Reuse: A Fundamental Organizational Principle of the Brain," *Behavioral and Brain Sciences* 33, no. 4 (2010): 245–266; and Michael L. Anderson, *After Phrenology: Neural Reuse and the Interactive Brain* (Cambridge, MA: MIT Press, 2014).

9. W. C. Abraham and M. F. Bear, "Metaplasticity: The Plasticity of Synaptic Plasticity," *Trends in Neurosciences* 19, no. 4 (1996): 126–130; and W. C. Abraham, "Metaplasticity: Tuning Synapses and Networks for Plasticity," *Nature Reviews Neuroscience* 9, no. 5 (2008): 387.

10. B. G. Mockett and S. R. Hulme, "Metaplasticity: New Insights Through Electrophysiological Investigations," *Journal of Integrative Neuroscience* 7, no. 2 (2008): 315–336; and Sheng-Zhi Wang and Huizhong Whit Tao, "History Matters: Illuminating Metaplasticity in the Developing Brain," *Neuron* 64, no. 2 (2009): 155–157.

11. E. A. Maguire, D. G. Gadian, I. S. Johnsrude, et al., "Navigation-Related Structural Change in the Hippocampi of Taxi Drivers," *Proceedings of the National Academy of Sciences* 97, no. 8 (2000): 4398–4403; and Eva-Maria Griesbauer, Ed Manley, Jan M. Wiener, and Hugo J. Spiers, "London Taxi Drivers: A Review of Neurocognitive Studies and an Exploration of How They Build Their Cognitive Map of London," *Hippocampus* 32, no. 1 (2022): 3–20.

12. Tim Ingold has been using the term *biosocial becoming* to describe a perspective on human life that recognizes the mutuality and inseparability of the social and the biological. As he summarizes, "Every trajectory of becoming issues forth within a field that is intrinsically social and biological, or in short, *biosocial*. . . . This is why we speak of humans . . . not as species beings but as biosocial becomings. . . . *The domains of the social and the biological are one and the same*"; Ingold, "Prospect," 9 (emphases in the original).

13. Stiegler, *Technics and Time*, 152.

14. Maurice Bloch, *Anthropology and the Cognitive Challenge* (Cambridge: Cambridge University Press, 2012), 19.

15. Bloch, *Anthropology and the Cognitive Challenge*, 76.

16. Geertz, *The Interpretation of Cultures*.

17. Geertz, *The Interpretation of Cultures*, 49.

18. Geertz, *The Interpretation of Cultures*, 48.

19. Geertz, *The Interpretation of Cultures*, 49.

20. Geertz, *The Interpretation of Cultures*, 48.

21. Deleuze and Guattari, *A Thousand Plateaus*.

22. Deleuze and Guattari, *Rhizome*.

23. Deleuze and Guattari, *A Thousand Plateaus*, 10–11.

24. Gibson, *The Ecological Approach to Visual Perception*; and Gibson, "The Theory of Affordances."

25. Husserl uses the example of melody. A melody can be perceived as a whole through the perception of the successive tones that constitute it. In other words, a melody is a temporally extended successive unity of musical tones. Every time a tone is perceived, the previous tone is remembered and the tones that would follow are anticipated. Husserl uses the term *retention* to denote the process of directing attention to the way in which the present tone arrives, and the term *protention* to denote projections or anticipations of what will follow. Only when the final tone has been heard and slid into the depths of retention can we say that our perception of the melody belongs to the past; Husserl, *The Phenomenology of Internal Time-Consciousness*.

26. Chris Gosden, *Social Being and Time* (Oxford: Blackwell, 1994), 17.

27. Malafouris, *How Things Shape the Mind*, 246–247.

28. Bailey, "Time Perspectives, Palimpsests and the Archaeology of Time," 198.

29. Gavin Lucas, *Making Time: The Archaeology of Time Revisited* (London: Routledge, 2021).

Part II

Chapter 6

1. Ulric Neisser, "Five Kinds of Self-Knowledge," *Philosophical Psychology* 1, no. 1 (2008): 35.

2. Neisser, "Five Kinds of Self-Knowledge," 35.

3. Neisser, "Five Kinds of Self-Knowledge," 40–41.

4. Neisser, "Five Kinds of Self-Knowledge," 41.

5. Neisser, "Five Kinds of Self-Knowledge," 41.

6. Neisser, "Five Kinds of Self-Knowledge," 41.

7. Neisser, "Five Kinds of Self-Knowledge," 43.

8. Neisser, "Five Kinds of Self-Knowledge," 46.

9. As I will discuss in chapter 10 in relation to the hominid toolmaking activities, so far as self-knowledge is concerned, there is a big difference between *how* to flake a stone and knowing *where* and *when* flaking was practiced.

10. Neisser, "Five Kinds of Self-Knowledge," 47 (emphasis in the original).

11. Neisser, "Five Kinds of Self-Knowledge," 49.

12. Neisser, "Five Kinds of Self-Knowledge," 36.

13. Shaun Gallagher, "Philosophical Conceptions of the Self: Implications for Cognitive Science," *Trends in Cognitive Sciences* 4, no. 1 (2000): 14–21.

14. Gallagher, "Philosophical Conceptions of the Self," 18.

15. Antonio R. Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness* (New York: Harcourt Brace, 1999).

16. If the minimal aspects of human self are not a sufficient condition for the emergence of the coherent sense of continuity or identity over time, which is characteristic of human experience, then how did the latter come about? One answer that naturally comes to mind, which is consistent with the notion of a narrative self-constitution (see, e.g., Dennett, *Consciousness Explained*) and can be seen as an integral part of the concept of the narrative self, would be, of course, language. Humans are unique in that we have language. "And with language," Gallagher observes, "we begin to make our experience relatively coherent over extended time periods. We use words to tell stories, and in these stories we create what we call our selves. We extend our biological boundaries to encompass a life of meaningful experience"; Gallagher, "Philosophical Conceptions of the Self," 19. However, the above conception of the temporally extended self as a by-product of language functioning has met with opposition from various scholars. For instance, Erica Cosentino recently proposed that the ability of mental time travel (i.e., human capacity to project themselves mentally backwards or forward in time) is, at least to some degree, independent of language and, as such, may have provided the basis for the development of the narrative self; Erica Cosentino, "Self in Time and Language," *Consciousness and Cognition* 20, no. 3 (2011): 777–783.

17. Gallagher, "Philosophical Conceptions of the Self," 19.

18. Ulric Neisser, "Five Kinds of Self-Knowledge," *Philosophical Psychology* 1, no 1. (1988) 35–59.

19. Gallagher, "Philosophical Conceptions of the Self."

20. Endel Tulving, "Episodic Memory and Common Sense: How Far Apart?," *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences* 356, no. 1413 (2001): 1505–1515; and Tulving, *Elements of Episodic Memory*.

21. Cosentino, "Self in Time and Language," 777.

22. The neuroscientists Giacomo Rizzolatti and Corrado Sinigaglia illustrate how these factors interact with each other and with the objects that populate our world using the example of picking up a cup of coffee; Giacomo Rizzolatti and Corrado Sinigaglia, *Mirrors in the Brain: How Our Minds Share Actions and Emotions* (Oxford: Oxford University Press, 2008), 2.

23. Nicole David, Albert Newen, and Kai Vogeley, "The 'Sense of Agency' and Its Underlying Cognitive and Neural Mechanisms," *Consciousness and Cognition* 17, no. 2 (2008): 523.

24. Gallagher, "Philosophical Conceptions of the Self," 15.

25. Gallagher, "Philosophical Conceptions of the Self," 15.

26. Matthis Synofzik, Gottfried Vosgerau, and Albert Newen, "Beyond the Comparator Model: A Multifactorial Two-Step Account of Agency," *Consciousness and Cognition* 17, no. 1 (2007): 219–239; and Matthis Synofzik, Gottfried Vosgerau, and Albert Newen, "I Move, Therefore I Am: A New Theoretical Framework to Investigate Agency and Ownership," *Consciousness and Cognition* 17, no. 2 (2008): 411–424.

27. Shaun Gallagher, "Multiple Aspects in the Sense of Agency," *New Ideas in Psychology* 30, no. 1 (2012): 15–31, 15.

28. Carl Knappett and Lambros Malafouris, eds., *Material Agency: Towards a Non-Anthropocentric Approach* (Cham: Springer, 2008); and Malafouris, *How Things Shape the Mind*, chap. 6.

29. Sarah-Jayne Blakemore, Daniel M. Wolpert, and Christopher D. Frith, "Central Cancellation of Self-Produced Tickle Sensation," *Nature Neuroscience* 1, no. 7 (1998): 635–640; and Sarah-Jayne Blakemore, Daniel M. Wolpert, and Christopher D. Frith, "Abnormalities in the Awareness of Action," *Trends in Cognitive Sciences* 6, no. 6 (2002): 237–242.

30. Blakemore et al., "Abnormalities in the Awareness of Action"; and Christopher D. Frith, "The Cognitive Neuropsychology of Schizophrenia," *International Journal of Psychology* 35, no. 3–4 (2000): 272–273.

31. Daniel M. Wegner and Thalia Wheatley, "Apparent Mental Causation: Sources of the Experience of Will," *American Psychologist* 54, no. 7 (1999): 480–492; and Daniel M. Wegner, *The Illusion of Conscious Will* (Cambridge, MA: MIT Press, 2002).

32. For a good review and references, see Manos Tsakiris, Simone Schütz-Bosbach, and Shaun Gallagher, "On Agency and Body-Ownership: Phenomenological and Neurocognitive Reflections," *Consciousness and Cognition* 16, no. 3 (2007): 645–660. See also David et al., "The 'Sense of Agency' and Its Underlying Cognitive and Neural Mechanisms."

33. Chlöé Farrer et al., "Modulating the Experience of Agency: A Positron Emission Tomography Study," *NeuroImage* 18, no. 2 (2003): 324–333.

34. Tsakiris et al., "On Agency and Body-Ownership."

35. Tsakiris et al., "On Agency and Body-Ownership," 647.

36. Tsakiris et al., "On Agency and Body-Ownership," 646.

37. Tsakiris et al., "On Agency and Body-Ownership," 648.

38. Matthew Botvinick and Jonathan Cohen, "Rubber Hands 'Feel' Touch That Eyes See," *Nature* 391, no. 6669 (1998): 756.

39. Frédérique de Vignemont, "Embodiment, Ownership and Disownership," *Consciousness and Cognition* 20, no. 1 (2011): 82–93.

40. Manos Tsakiris and Patrick Haggard, "The Rubber Hand Illusion Revisited: Visuotactile Integration and Self-Attribution," *Journal of Experimental Psychology: Human Perception and Performance* 31, no. 1 (2005): 80–91.

41. Tsakiris et al., "On Agency and Body-Ownership," 649.

42. Note here that since "body-ownership seems to arise as an *interaction* between bottom–up processes originating from multisensory integration and top–down body-image influences originating from cognitive body representations" (Tsakiris et al., "On Agency and Body-Ownership," 650), it has been suggested that, similar to agency, one could distinguish between feeling of ownership and judgment of ownership (de Vignemont, "Embodiment, Ownership and Disownership").

43. Botvinick and Cohen, "Rubber Hands 'Feel' Touch That Eyes See"; and Tsakiris and Haggard, "The Rubber Hand Illusion Revisited."

44. de Vignemont, "Embodiment, Ownership and Disownership," 84.

45. This is what a recent study by Matthew Longo et al. attempted to do by taking a psychometric approach to introspective reports of the rubber hand illusion in order to investigate/quantify the structure of participants' experience of embodiment; Matthew R. Longo, Friederike Schüür, Marjolein, P. M. Kammers, et al., "What Is Embodiment? A Psychometric Approach," *Cognition* 107, no. 3 (2008): 978–998.

46. de Vignemont, "Embodiment, Ownership and Disownership," 84.

47. Longo et al., "What is Embodiment? A Psychometric Approach."

48. Longo et al., "What is Embodiment? A Psychometric Approach."

49. Another basic question in this context, of course, concerns the nature of the exact contribution of the body to cognition and whether this contribution can be accounted for by way of classical computational models or if something more radical is needed. The most common view of extended, embodied, and distributed cognition is the one largely compatible with computational functionalism, where external representational elements are taken to be constitutive components of the cognitive architecture, given their ability to implement and facilitate (be means of external storage and distribution) information processing. It is necessary when we speak of embodiment as the condition of cognitive extension to clarify some important, often implicit, distinctions, such as those between derived and non-derived content and between causal influence and constituency. Michael Wheeler, "Revolution, Reform, or Business as Usual?: The Future Prospects for Embodied Cognition," in *The Routledge Handbook of Embodied Cognition*, ed. Lawrence Shapiro and Shannon Spaulding (London: Routledge, 2014), 374–383; Andy Clark, "An Embodied Cognitive Science?," *Trends in Cognitive Sciences* 3, no. 9 (1999): 345–351; Gallagher, *How the Body Shapes the Mind*; Julian Kiverstein, "The Meaning of Embodiment," *Topics in Cognitive Science* 4, no. 4 (2012): 740–758; and Lawrence A. Shapiro and Shannon Spaulding, eds., *The Routledge Handbook of Embodied Cognition* (London: Routledge, 2014).

50. Here, I draw on a useful distinction proposed by Andy Clark between two varieties of embodiment: simple versus radical embodiment; Clark, "An Embodied Cognitive Science?"

51. I will use the term *cognitivism* in this paper to refer broadly to classical computational, representational, internalist, and nativist modular theories of cognition.

52. She also suggests that there are different types of embodiment and that only some of those types (i.e., self-specific) can lead to feelings of ownership; de Vignemont, "Embodiment, Ownership and Disownership," 82.

53. de Vignemont, "Embodiment, Ownership and Disownership," 82.

54. Alvin Goldman and Frédérique de Vignemont, "Is Social Cognition Embodied?," *Trends in Cognitive Sciences* 13, no. 4 (2009): 154–159, 154.

55. Malafouris, "Making Hands and Tools"; and Malafouris and Koukouti, "Where the Touching Is Touched."

56. For more detailed discussion and references, see L. Malafouris, "Material Engagement and the Embodied Mind," in *Cognitive Models in Palaeolithic Archaeology*, ed. T. Wynn and F. L. Coolidge (Oxford: Oxford University Press, 2016), 69–82. On the issue of embodied cognition, see A. Chemero, *Radical Embodied Cognitive Science*

(Cambridge, MA: MIT Press, 2009); Shapiro and Spaulding, *The Routledge Handbook of Embodied Cognition*; and Clark, "An Embodied Cognitive Science?"

57. Dorothée Legrand, "The Bodily Self: The Sensori-Motor Roots of Pre-Reflective Self-Consciousness," *Phenomenology and the Cognitive Sciences* 5, no. 1 (2006): 89–118, 89; and Dorothée Legrand and Susanne Ravn, "Perceiving Subjectivity in Bodily Movement: The Case of Dancers," *Phenomenology and the Cognitive Sciences* 8, no. 3 (2009): 389–408.

58. Legrand, "The Bodily Self," 90.

59. Legrand, "The Bodily Self," 91.

60. Hutchins, *Cognition in the Wild*.

61. Clark, "Re-Inventing Ourselves," 278.

62. Clark, "Re-Inventing Ourselves," 278.

63. This particular take on embodied cognition has affinities with the radical and ecological versions of enactivism. See, e.g., Hutto and Myin, *Radicalizing Enactivism*; Newen et al., *The Oxford Handbook of 4E Cognition*; Erik Rietveld, Damiaan Denys, and Maarten Van Westen, "Ecological-Enactive Cognition as Engaging with a Field of Relevant Affordances," in *The Oxford Handbook of 4E Cognition*, ed. Albert Newen, Leon De Bruin, and Shaun Gallagher (Oxford: Oxford University Press, 2018), 41–70; and Gallagher, *Enactivist Interventions*.

Chapter 7

1. Bruno Snell, *The Discovery of the Mind* (Oxford: Blackwell, 1953).

2. Christopher Gill, *Personality in Greek Epic, Tragedy, and Philosophy: The Self in Dialogue* (Oxford: Oxford University Press, 1995); Richard Gaskin, "Do Homeric Heroes Make Real Decisions?," *The Classical Quarterly* 40, no. 1 (2009): 1–15; and Bernard Williams, *Shame and Necessity* (Berkeley: University of California Press, 1993).

3. Gill, *Personality in Greek Epic, Tragedy, and Philosophy*, 31.

4. Williams, *Shame and Necessity*.

5. Williams, *Shame and Necessity*, 23.

6. Elena Daprati, Nicholas Franck, Nicholas Georgieff, et al., "Looking for the Agent: An Investigation into Consciousness of Action and Self-Consciousness in Schizophrenic Patients," *Cognition* 65, no. 1 (1997): 71–86; Shaun Gallagher, "Self-Reference and Schizophrenia: A Cognitive Model of Immunity to Error Through Misidentification," in *Exploring the Self: Philosophical and Psychopathological Perspectives on Self-Experience*, ed. Dan Zahavi (Amsterdam: John Benjamins, 2000), 203–239; Frith, "The Cognitive

Neuropsychology of Schizophrenia"; and Chris Frith, "The Self in Action: Lessons from Delusions of Control," *Consciousness and Cognition* 14, no. 4 (2005): 752–770.

7. Joëlle Proust, "Thinking of Oneself as the Same," *Consciousness and Cognition* 12, no. 4 (2003): 504.

8. Steven Van Wolputte, "Hang On to Your Self: Of Bodies, Embodiment, and Selves," *Annual Review of Anthropology* 33, no. 1 (2004): 251–269.

9. Dennett, *Consciousness Explained*.

10. For discussion of those delusions, see Frith, "The Self in Action."

11. Michael Clarke, *Flesh and Spirit in the Songs of Homer: A Study of Words and Myths* (Oxford; Oxford University Press, 1999).

12. Clarke, *Flesh and Spirit in the Songs of Homer*, 118–119.

13. Snell, *The Discovery of the Mind*, 8.

14. Charles Taylor, *Sources of the Self: The Making of the Modern Identity* (Cambridge, MA: Harvard University Press, 1989), 112.

15. Hallowell, "Ojibwa Ontology, Behavior and World View," 21.

16. Alfred Irving Hallowell, *Culture and Experience*, Publications of the Philadelphia Anthropological Society, vol. 4 (Philadelphia: University of Pennsylvania Press, 1955), 179; and Hallowell, "Ojibwa Ontology, Behavior and World View," 36.

17. Strathern, *The Gender of the Gift*, 13.

18. It should be noted that it was the anthropologist McKim Marriott who first introduced the idea of the dividual in her ethnographic work in South Asia. McKim Marriott, "Hindu Transactions: Diversity without Dualism," in *Transaction and Meaning: Directions in the Anthropology of Human Issues*, ed. Bruce Kapferer (Philadelphia: Institute for the Study of Human Issues, 1976), 109–142, 111.

19. Nurit Bird-David, "'Animism' Revisited," *Current Anthropology* 40, no. S1 (1999): 67–91; Nurit Bird-David, "Illness-Images and Joined Beings. A Critical/Nayaka Perspective on Intercorporeality," *Social Anthropology* 12, no. 3 (2004): 325–339; and Nurit Bird-David and Danny Naveh, "Relational Epistemology, Immediacy, and Conservation," *Journal for the Study of Religion, Nature and Culture* 2, no. 1 (2008): 57–73.

20. Rane Willerslev, *Soul Hunters: Hunting, Animism, and Personhood Among the Siberian Yukaghirs* (London: University of California Press, 2007).

21. Eduardo Viveiros de Castro, "Cosmological Deixis and Amerindian Perspectivism," *The Journal of the Royal Anthropological Institute* 4, no. 3 (1998): 469–488.

22. Bird-David, "'Animism' Revisited"; and Bird-David and Naveh, "Relational Epistemology, Immediacy, and Conservation."

23. Strathern, *The Gender of the Gift*.

24. Pointing to a particular stone on a small mud platform near her shelter, saying that suddenly, while she was digging for roots, "*this* devaru came towards her." Bird-David adds that another man also pointed to another stone from the same area explaining how "*this devaru jumped onto*" the lap of his sister-in-law while sitting under a tree, resting. See discussion in Bird-David, "'Animism' revisited."

25. Hallowell recounts how he once asked an old Ojibwa man whether "all the stones we see about us here are alive." Although stones are grammatically animate in Ojibwa, the man (Hallowell recalls) "reflected a long while and then replied, 'No! But *some* are'"; Hallowell, "Ojibwa Ontology, Behavior and World View," 24.

26. Stewart Elliott Guthrie, *Faces in the Clouds: A New Theory of Religion* (New York: Oxford University Press, 1993), 38, 41.

27. Bird-David, "'Animism' Revisited," 69.

28. Marshall Sahlins, in fact, criticizes that the notion of the dividual conflates properties of kinship for properties of selfhood; Marshall Sahlins, "What Kinship Is (Part One)," *Journal of the Royal Anthropological Institute* 17, no. 1 (2011): 2–19.

29. As Bird-David remarks, "Beings who are absorbed into this 'we-ness' are devaru, and while differentiated from *avaru* (people), they and avaru, in some contexts, are absorbed into one 'we-ness,' which Nayaka also call *nama sont*. . . . In one basic sense of this complex notion, devaru are relatives in the literal sense of being 'that or whom one interrelates with' (not in the reduced modern English sense of '*humans connected with others by blood or affinity*')"; Bird-David, "'Animism' Revisited," 73 (emphasis in the original).

30. Eduardo Viveiros de Castro, "Images of Nature and Society in Amazonian Ethnology," *Annual Review of Anthropology* 25, no. 1 (1996): 179–200; Viveiros de Castro, "Cosmological Deixis and Amerindian Perspectivism"; Eduardo Viveiros de Castro, "Comment on Bird-David, N. 1999 'Animism' Revisited: Personhood, Environment, and Relational Epistemology," *Current Anthropology* 40, no. S1 (1999); 79–80Eduardo Viveiros de Castro and Jeffrey M. Perl, "Exchanging Perspectives," *Common Knowledge* 25, no. 1–3 (2019) [2004]: 463–484; Eduardo Viveiros de Castro, *The Inconstancy of the Indian Soul: The Encounter of Catholics and Cannibals in 16th-Century Brazil*, trans. Gregory Duff Morton (Chicago: Prickly Paradigm Press, 2011); and Eduardo Viveiros de Castro, "In Some Sense," *Interdisciplinary Science Reviews* 35, no. 3–4 (2013): 318–333.

31. Fernando Santos-Granero, "Beinghood and People-Making in Native Amazonia," *HAU: Journal of Ethnographic Theory* 2, no. 1 (2012): 181–211.

32. Viveiros de Castro, "Cosmological Deixis and Amerindian Perspectivism," 478; Eduardo Viveiros de Castro, *Cosmological Perspectivism in Amazonia and Elsewhere*, Four lectures delivered at the Department of Social Anthropology, University of

Cambridge, February–March 1998, vol. 1, Masterclass Series (Manchester: HAU Books, 2012), 48 http://haubooks.org/viewbook/masterclass1/cosmological_perspectivism.pdf; and Laura Rival, "The Attachment of the Soul to the Body Among the Huaorani of Amazonian Ecuador," *Ethnos* 70, no. 3 (2005): 285–310.

33. Viveiros de Castro, *Cosmological Perspectivism in Amazonia and Elsewhere*, 54.

34. Viveiros de Castro, *Cosmological Perspectivism in Amazonia and Elsewhere*, 46.

35. Viveiros de Castro, *Cosmological Perspectivism in Amazonia and Elsewhere*, 54.

36. Santos-Granero uses the term *beinghood* instead of *personhood* because "it allows for the consideration of subjective, or subjectivized beings that are not necessarily persons"; Santos-Granero, "Beinghood and People-Making in Native Amazonia."184.

37. Santos-Granero, "Beinghood and People-Making in Native Amazonia," 182–183.

38. Santos-Granero also argues that for the Yanesha, the meaning of dividuality is closer to what McKim Marriott had in mind when she introduced this term to express how, in Hindu, thought personhood "absorb heterogeneous material influences"; Santos-Granero, "Beinghood and People-Making in Native Amazonia," 183.

39. Santos-Granero, "Beinghood and People-Making in Native Amazonia," 194.

40. Santos-Granero, "Beinghood and People-Making in Native Amazonia," 198.

41. Santos-Granero, "Beinghood and People-Making in Native Amazonia," 193.

42. Rane Willerslev, "Not Animal, Not Not-Animal: Hunting, Imitation and Empathetic Knowledge Among the Siberian Yukaghirs," *Journal of the Royal Anthropological Institute* 10, no. 3 (2004): 629–652; and Willerslev, *Soul Hunters*.

43. Willerslev, "Not Animal, Not Not-Animal," 633.

44. Willerslev, "Not Animal, Not Not-Animal," 629.

45. Willerslev, "Not Animal, Not Not-Animal."

46. Willerslev, "Not Animal, Not Not-Animal," 629.

47. Willerslev, "Not Animal, Not Not-Animal," 639.

48. Willerslev, "Not Animal, Not Not-Animal," 638.

49. Michael T. Taussig, *Mimesis and Alterity: A Particular History of the Senses* (New York: Routledge, 1993).

50. Willerslev, "Not Animal, Not Not-Animal," 639.

51. Willerslev, "Not Animal, Not Not-Animal," 639.

52. Willerslev, "Not Animal, Not Not-Animal," 647.

53. Willerslev, "Not Animal, Not Not-Animal," 642 (emphasis in the original).

54. Although see Bloch, *Anthropology and the Cognitive Challenge*; Karl Smith, "From Dividual and Individual Selves to Porous Subjects," *The Australian Journal of Anthropology* 23, no. 1 (2012): 50–64; and Chris Fowler, *The Archaeology of Personhood: An Anthropological Approach* (London: Routledge, 2004). See especially Chris Fowler, "Relational Personhood Revisited," *Cambridge Archaeological Journal* 26, no. 3 (2016).

55. Marcel Mauss's essay on the person (*Une Catégorie de L'Esprit Humain: La Notion de Personne, Celle de "Moi"*; English translation by Carrithers et al. 1985) remains a central point of reference for the topic of self; Marcel Mauss, *Une Catégorie de L'Esprit Humain: La Notion de Personne, Celle de "Moi": Un plan de travail* (London: Royal Anthropological Institute of Great Britain and Ireland London, 1938).

56. Bloch also noted this apparent discontinuity; Bloch, *Anthropology and the Cognitive Challenge*.

57. Mary Douglas, *Natural Symbols: Explorations in Cosmology* (London: Barrie & Rockliff/Cresset Press, 1970), 93.

58. As Tim Ingold points out: "On the one hand, these ideas allow the social or cultural anthropologist to lay claim to an autonomous area of study, constituted by the varieties of personhood and subjective experience, without denying the objective, material foundations of human existence in the natural world. On the other hand, they enable the biological anthropologist to bring human beings within the compass of a theory of evolution which presupposes, but nevertheless cannot comprehend, the process whereby, at a certain historical juncture, certain humans came to be in the position of being able to formulate it"; Tim Ingold, "Becoming Persons: Consciousness and Sociality in Human Evolution," *Cultural Dynamics* 4, no. 3 (2016): 355–378, 359.

59. As Maurice Bloch also remarks, citing the critiques of Melford Spiro (1993) and Naomi Quinn (2006), this conceptual ambiguity renders anthropological study of self "of very uncertain epistemological status"; Bloch, *Anthropology and the Cognitive Challenge*, 123. See also Douglas Hollan, "Cross-Cultural Differences in the Self," *Journal of Anthropological Research* 48, no. 4 (1992): 283–300.

60. Viveiros de Castro, "Cosmological Perspectivism in Amazonia and Elsewhere," 55.

61. See Malafouris et al., "Rethinking the 'we' in 'we' Intentionality," for a thorough discussion.

62. Josef Parnas, Paul Møller, Tilo Kircher, et al., "EASE: Examination of Anomalous Self-Experience," *Psychopathology* 38, no. 5 (2005): 236–258; Andrea Raballo, Ditte Saebye, and Josef Parnas, "Looking at the Schizophrenia Spectrum Through the Prism of Self-disorders: An Empirical Study," *Schizophrenia Bulletin* 37, no. 2 (2009): 344–351; and Andrea Raballo, Michele Poletti, Antonio Preti, and Josef Parnas, "The

Self in the Spectrum: A Meta-analysis of the Evidence Linking Basic Self-Disorders and Schizophrenia," *Schizophrenia Bulletin* 47, no. 4 (2021): 1007–1017.

63. Bird-David, "'Animism' Revisited," 73.

64. Willerslev, "Not Animal, Not Not-Animal."

65. Willerslev, "Not Animal, Not Not-Animal," 637–638.

66. Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

67. As the anthropologist Alf Hornborg observes in his commentary to the article by Bird-David, "'Animism' revisited," relatedness is "undoubtedly *everywhere* fundamental to the local and embedded dimensions of human life. Why exoticize it into something that 'they'—'the Nayaka'—have?" (p. 81). On our contemporary anxieties about where or how to draw boundaries between persons and things relevant to the issue of animism, see also Alf Hornborg, "Animism, Fetishism, and Objectivism as Strategies for Knowing (or Not Knowing) the World," *Ethnos* 71, no. 1 (2006): 21–32; and Smith, "From Dividual and Individual Selves to Porous Subjects."

68. Melford E. Spiro, "Is the Western Conception of the Self 'Peculiar' within the Context of the World Cultures?," *Ethos* 21, no. 2 (1993): 107–153, 116; Sahlins, "What Kinship Is (Part One)"; Sahlins, "What Kinship Is (Part Two)"; and Edward LiPuma, "Modernity and Forms of Personhood in Melanesia," in *Bodies and Persons: Comparative Perspectives from Africa and Melanesia*, ed. Micahel Lambek and Andrew Strathern (Cambridge: Cambridge University Press, 1998), 53–79.

69. Smith, "From Dividual and Individual Selves to Porous Subjects."

70. Cecilia Busby, "Permeable and Partible Persons: A Comparative Analysis of Gender and Body in South India and Melanesia," *The Journal of the Royal Anthropological Institute* 3, no. 2 (1997): 261–278.

71. Busby, "Permeable and Partible Persons," 270.

72. Busby, "Permeable and Partible Persons," 270.

73. Busby, "Permeable and Partible Persons," 269.

74. Aparecida Vilaça, "Chronically Unstable Bodies: Reflections on Amazonian Corporalities," *Journal of the Royal Anthropological Institute* 11, no. 3 (2005): 445–464.

75. Santos-Granero, "Beinghood and People-Making in Native Amazonia."

76. Sahlins, "What Kinship Is (Part One)," 12.

77. See also Bloch, *Anthropology and the Cognitive Challenge*, chap. 6; and Fowler, "Relational Personhood Revisited."

78. Gill, *Personality in Greek Epic, Tragedy, and Philosophy*.

79. Louis Dumont, *Essays on Individualism: Modern Ideology in Anthropological Perspective* (Chicago: University of Chicago Press, 1986), 94. For possible links with notions of the dividual, see also Mark S. Mosko, "Unbecoming Individuals," *HAU: Journal of Ethnographic Theory* 5, no. 1 (2015): 361–393.

80. This is also pointed out by Fernando Santos-Granero concerning the people-making practices in native Amazonia; Santos-Granero, "Beinghood and People-Making in Native Amazonia," 183–184.

81. Mauss, *An Essay on the Gift*.

82. Willerslev, "Not Animal, Not Not-Animal," 648.

83. Bird-David, "'Animism' Revisited," 72.

84. Gilbert Simondon, "The Genesis of the Individual," in *Incorporations*, ed. J. Crary and S. Kwinter (New York: Zone, 1992), 297–317; and Gilbert Simondon, *Du Mode d'Existence des Objets Techniques* [*The Mode of Existence of Technical Objects*] (Paris: Éditions Aubier, 1989 [1958]).

85. Simondon, "The Genesis of the Individual," 300.

86. Poulsgaard, "Enactive Individuation."

87. Simondon, *Du mode d'existence des objects techniques*.

88. Especially his concepts of grammatization and epiphylogenetic memory. See Stiegler, *Technics and Time*.

89. For other recent attempts at combining enactivism with Simondon's philosophy, see also Emilien Dereclenne, "Simondon and Enaction: The Articulation of Life, Subjectivity, and Technics," *Adaptive Behavior* 29, no. 5 (2019): 449–458; and Ezequiel Di Paolo, "Enactive Becoming," *Phenomenology and the Cognitive Sciences* 20, no. 5 (2020): 783–809.

90. Fowler, "Relational Personhood Revisited."

91. Fowler, "Relational Personhood Revisited," 402.

92. Robert Jay Lifton, *The Protean Self: Human Resilience in an Age of Fragmentation* (New York: Basic Books, 1993).

93. Anthony Elliott, *Reinvention* (London: Routledge, 2013).

94. Deborah Lupton, *The Quantified Self: A Sociology of Self-Tracking* (Cambridge: Polity, 2016).

95. Floridi, *The Fourth Revolution*.

96. Taylor, *A Secular Age*.

97. See also LiPuma, "Modernity and Forms of Personhood in Melanesia"; Fowler, "Relational Personhood Revisited"; and Smith, "From Dividual and Individual Selves to Porous Subjects."

98. Raballo et al., "Looking at the Schizophrenia Spectrum Through the Prism of Self-disorders"; and Raballo et al., "The Self in the Spectrum."

99. Clifford Geertz, "Person, Time, and Conduct in Bali," in *The Interpretation of Cultures* (New York: Basic Books, 1973), 360–411.

100. Bloch, *Anthropology and the Cognitive Challenge*, 125. He also suggests that the way to change that is by placing "the anthropological ideas *within* a model that is not antagonistic, but compatible, with what cognitive sciences can teach us"; Bloch, *Anthropology and the Cognitive Challenge*, 122 (emphasis in the original).

101. Bloch, *Anthropology and the Cognitive Challenge*, 125.

102. Bloch, *Anthropology and the Cognitive Challenge*, 11.

103. Bloch, *Anthropology and the Cognitive Challenge*, 125.

Part III

1. Deleuze and Guattari, *Rhizome*; and Deleuze and Guattari, *A Thousand Plateaus*.

2. I should point out the intimate association of the term *chiasm* with Merleau Ponty's later thought based primarily on his last, unfinished manuscript, *The Visible and the Invisible*, where it appears in the title of the last chapter, "The Intertwining—The Chiasm"; Merleau-Ponty, *The Visible and the Invisible*, 160.

Chapter 8

1. Thomas Fuchs describes this spatial correspondence of the lived body and the physical body as *syntopy*: "This syntopy was already analyzed by Husserl (1989), using the example of the hand feeling the touching of an object that simultaneously moves over the skin. In this 'co-apprehension' of what is given in the subjective and the objective attitude, the body manifests itself as a unit. . . . the coextension of the subjective, lived body and the material organic body is no longer surprising. It is, however, functionally meaningful too: conscious experience is where the interactions with the environment take place—in the periphery, not in the brain"; Fuchs, *Ecology of the Brain*, 12–14.

2. Here, I draw again on Alfred Whitehead's process ontology; Whitehead, *Process and Reality*, 222. See also the discussion in Halewood, "On Whitehead and Deleuze," 52–63.

3. Whitehead, *Process and Reality*, 151.

4. The anthropologist Terence S. Turner coined the term to describe not so much the universal practice of decorating, dressing, or otherwise altering the human form but rather the fact "that the surface of the body seems everywhere to be treated, not only as the boundary of the individual as a biological and psychological entity but as the frontier of the social self as well"; Turner, "The Social Skin," in *Not Work Alone*, 112. Also reprinted in Turner, "The Social Skin," *HAU: Journal of Ethnographic Theory*. One could extend the notion of social skin even further to incorporate more recent notions of the artificial skin and the algorithmic skin that emerge in media studies. See, e.g., David Beer, *Popular Culture and New Media: The Politics of Circulation* (New York: Palgrave Macmillan, 2013).

5. Vittorio Gallese and Corrado Sinigaglia, "The Bodily Self as Power for Action," *Neuropsychologia* 48, no. 3 (2010): 746–755, 746.

6. Atsushi Iriki, Michio Tanaka, and Yoshiaki Iwamura, "Coding of Modified Body Schema During Tool Use by Macaque Postcentral Neurones," *Neuroreport* 7, no. 14 (1996): 2325–2330; Anna Berti and Francesca Frassinetti, "When Far Becomes Near: Remapping of Space by Tool Use," *Journal of Cognitive Neuroscience* 12, no. 3 (2000): 415–420; Angelo Maravita, Masud Husain, Karen Clarke, and Jon Driver, "Reaching with a Tool Extends Visual–Tactile Interactions into Far Space: Evidence from Cross-Modal Extinction," *Neuropsychologia* 39, no. 6 (2001): 580–585; Angelo Maravita, Charles Spence, and Jon Driver, "Multisensory Integration and the Body Schema: Close to Hand and Within Reach," *Current Biology* 13, no. 13 (2003): 531–539; Angelo Maravita and Atsushi Iriki, "Tools for the Body (Schema)," *Trends in Cognitive Sciences* 8, no. 2 (2004): 79–86; Nicholas P. Holmes and Charles Spence, "Beyond the Body Schema: Visual, Prosthetic, and Technological Contributions to Bodily Perception and Awareness," in *Human Body Perception from the Inside Out*, ed. Günther Knoblich, Ian Thornton, Marc Grosjean, and Maggie Shiffrar (Oxford: Oxford University Press, 2006), 15–64; Nicholas P. Holmes and Charles Spence, "The Body Schema and Multisensory Representation(s) of Peripersonal Space," *Cognitive Processing* 5, no. 2 (2004): 94–105; and Nicholas P. Holmes, Gemma A. Calvert, and Charles Spence, "Extending or Projecting Peripersonal Space with Tools? Multisensory Interactions Highlight Only the Distal and Proximal Ends of Tools," *Neuroscience Letters* 372, no. 1–2 (2004): 62–67. For the distinction between body schema and body image, see Shaun Gallagher, "Body Image and Body Schema: A Conceptual Clarification," *The Journal of Mind and Behavior* 7, no. 4 (1986): 541–554; and Frédérique de Vignemont, "Body Schema and Body Image—Pros and Cons," *Neuropsychologia* 48, no. 3 (2010): 669–680.

7. Mereology (from the Greek *meros* for "part") refers to study of the relations of part to whole and the relations of part to part within a whole. See Frédérique de Vignemont, Manos Tsakiris, and Patrick Haggard, "Body Mereology," in *Human Body Perception from the Inside Out*, ed. Günther Knoblich, Ian M. Thornton, Marc Grosjean, and Maggie Shiffrar (Oxford: Oxford University Press, 2006), 147–170.

8. Clark, "Re-Inventing Ourselves," 279.

9. Berti and Frassinetti, "When Far Becomes Near"; and Elisabetta Làdavas and Andrea Serino, "Action-Dependent Plasticity in Peripersonal Space Representations," *Cognitive Neuropsychology* 25, no. 7–8 (2008): 1099–1113.

10. For a brief critical review of the evidence provided by three main experimental approaches—single unit neurophysiology, neuropsychological studies of cross-modal extinction, and behavioral studies using the cross-modal congruency task—see Nicholas Holmes, "Does Tool Use Extend Peripersonal Space? A Review and Re-analysis," *Experimental Brain Research* 218 (2012): 273–282.

11. Iriki's seminal work with macaque monkeys was the first to show that after some training in tool use, the receptive fields of some bimodal visuotactile neurons expanded and finally included the entire length of the tool. This study was soon followed by further neuroscientific studies with both animals and humans, which have revealed analogous findings about the ability of tools to induce an extension of the near space. Atsushi Iriki, Michio Tanaka, and Yoshiaki Iwamura, "Attention-Induced Neuronal Activity in the Monkey Somatosensory Cortex Revealed by Pupillometrics," *Neuroscience Research* 25, no. 2 (1996): 173–181.

12. For instance, in one of the earliest studies, Anna Berti and Francesca Frassinetti showed, in the case of a right-hemisphere stroke patient, a clear dissociation between near and far spaces in the manifestation of visual neglect. (Visual neglect is impairment in the processing and exploration of the space contralateral to the brain lesion.) Through that, they provided concrete experimental evidence that "an artificial extension of the patient's body (the stick) caused a re-mapping of far space as near space"; Berti and Frassinetti, "When Far Becomes Near," 415. In another famous sensory extinction experiment, published the same year, Alessandro Farnè and Elisabetta Làdavas lend further support to the hypothesis that the boundaries of peripersonal space are plastic, showing that, for instance, they can be expanded along the length of the tool axis when retrieving distant objects with a rake; Alessandro Farnè and Elisabetta Làdavas, "Dynamic Size-Change of Hand Peripersonal Space Following Tool Use," *NeuroReport* 11, no. 8 (2000): 1645–1649. Last, an experiment by Jessica Witt, Dennis Proffitt, and William Epstein, based this time on normal human subjects, found that subjects perceived an object as being closer if it was reachable in near space (whether by the hand or when a hand tool was used) and further if it was not within reach, even if the object was exactly the same distance away in both cases. These findings have been interpreted as indicative that changes in reachability are concomitant with changes to the boundaries of peripersonal space. As Witt et al. observed, reachability "defines the boundary of our immediate action space. The range of this space can be extended by having a hand tool. Perception is influenced by this affordance for immediate action"; Jessica K. Witt, Dennis R. Proffitt, and William Epstein, "Tool Use Affects Perceived Distance, But Only When You Intend to Use It," *Journal of Experimental Psychology: Human Perception and Performance* 31, no. 5 (2005): 880–888, 887.

13. Lucilla Cardinali, Francesca Frassinetti, Claudio Brozzoli, Christian Urquizar, Alice C. Roy, and Alessandro Farnè, "Tool-Use Induces Morphological Updating of the Body Schema," *Current Biology* 19, no. 12 (2009): 478–479; and Lucilla Cardinali, Claudio Brozzoli, and Alessandro Farnè, "Peripersonal Space and Body Schema: Two Labels for the Same Concept?," *Brain Topography* 21, no. 3–4 (2009): 252–260.

14. Henry Head and Gordon Holmes, "Sensory Disturbances from Cerebral Lesions," *Brain* 34, no. 2–3 (1911): 102–254, 188.

15. Giovanni Berlucchi and Salvatore Aglioti, "The Body in the Brain: Neural Bases of Corporeal Awareness," *Trends in Neurosciences* 20, no. 12 (1997): 560–564; Maravita et al., "Multisensory Integration and the Body Schema"; and Maravita and Iriki, "Tools for the Body (Schema)."

16. Giuseppe di Pellegrino and Elisabetta Làdavas, "Peripersonal Space in the Brain," *Neuropsychologia* 66 (2015): 126–133; Làdavas and Serino, "Action-Dependent Plasticity in Peripersonal Space Representations"; and Andrea Serino, "Peripersonal Space (PPS) as a Multisensory Interface Between the Individual and the Environment, Defining the Space of the Self," *Neuroscience & Biobehavioral Reviews* 99 (2019): 138–159.

17. Maravita et al., "Multisensory Integration and the Body Schema," 536.

18. As observed by Berlucchi and Aglioti, "When the cyclist dismounts from his bike this ceases to be part of his body schema"; Berlucchi and Aglioti, "The Body in the Brain," 561.

19. Gabrielle Benette Jackson, "Skillful Action in Peripersonal Space," *Phenomenology and the Cognitive Sciences* 13, no. 2 (2013): 313–334.

20. Hutchins, *Cognition in the Wild*, 366.

21. For instance, see Malafouris et al., "Perspectival Kinaesthetic Imaging," 366–398.

22. Even within the narrow limits of cortical action, we should not assume that there is a single representation of peripersonal space. For instance, de Vignemont and Iannetti propose a functional distinction between bodily protection and goal-directed action that requires distinct sensory and motor processes that obey different principles; Frédérique de Vignemont and G. D. Iannetti, "How Many Peripersonal Spaces?," *Neuropsychologia* 70 (2015): 327–334.

23. The notion of the lived space denotes the totality of the person's pre-reflective environment and sphere of action possibilities. See Fuchs, "Psychotherapy of the Lived Space," 425–426.

24. From a MET perspective, the meaning of PPS is not merely representational, denoting how our brains represent the reachable space immediately surrounding our body. Instead, it is enactive, denoting how brain, body, and world become attuned in order to realize action possibilities within the lived affordance space where humans

and things are entangled. See also Shaun Gallagher, "Situating Interaction in Peripersonal and Extrapersonal Space: Empirical and Theoretical Perspectives," in *Situatedness and Place: Multidisciplinary Perspectives on the Spatio-Temporal Contingency of Human Life*, ed. Thomas Hünefeldt and Annika Schlitte (Cham: Springer, 2018), 67–79.

25. Edward S. Casey, "Between Geography and Philosophy: What Does It Mean to Be in the Place-World?," *Annals of the Association of American Geographers* 91, no. 4 (2001): 683–693, 684.

26. Kurt Lewin, *Principles of Topological Psychology*, trans. Fritz Heider and Grace M. Heider (New York: McGraw-Hill, 1936).

27. Fuchs, "Psychotherapy of the Lived Space."

28. David Kirsh, blending Gibsonian ecological psychology of active perception with contemporary insights from the enactive paradigm, introduced the notion of enactive landscapes to capture the co-creation of perception and action in the undifferentiated domains of bodily, technical, and social activity; David Kirsh, "Embodied Cognition and the Magical Future of Interaction Design," *ACM Transactions on Computer-Human Interaction (TOCHI)* 20, no. 1 (2013): 1–30. Relevant here are notions of the landscape of affordances. See Rietveld and Kiverstein, "A Rich Landscape of Affordances"; Rietveld et al., "Ecological-Enactive Cognition as Engaging with a Field of Relevant Affordances," 41–70; and Erik Rietveld and Anne Ardina Brouwers, "Optimal Grip on Affordances in Architectural Design Practices: An Ethnography," *Phenomenology and the Cognitive Sciences* 16, no. 3 (2016): 545–564. Moreover, I should point out that Tim Ingold, in his classic paper on the temporality of the landscape, refers to this array of mutual interlocking activities by the concept of *taskscape*; Tim Ingold, "The Temporality of the Landscape," *World Archaeology* 25, no. 2 (1993): 152–174, 158.

29. Graham Harman, "Technology, Objects and Things in Heidegger," *Cambridge Journal of Economics* 34, no. 1 (2009): 17–25, 19.

30. Rizzolatti and Sinigaglia, *Mirrors in the Brain*, 77.

31. Rietveld and Kiverstein, "A Rich Landscape of Affordances"; and Rietveld and Brouwers, "Optimal Grip on Affordances in Architectural Design Practices."

32. For an exploration of the impact of digital media, see Sarah Pink and Vaike Fors, "Being in a Mediated World: Self-Tracking and the Mind–Body–Environment," *Cultural Geographies* 24, no. 3 (2017): 375–388. For a nice discussion of how a smartphone is owned or extends the body, see Chang Sup Park and Barbara K. Kaye, "Smartphone and Self-Extension: Functionally, Anthropomorphically, and Ontologically Extending Self via the Smartphone," *Mobile Media & Communication* 7, no. 2 (2018): 215–231. For previous research on the role of haptic (touch) screens on feelings of embodiment, see Ingrid Richardson, "Faces, Interfaces, Screens: Relational Ontologies of Framing, Attention and Distraction," *Transformations: Journal of Media and Culture*, no. 18 (2010): 1–15. See also Sarah Pink, Jolynna Sinanan, Larissa Hjorth, and Heather Horst,

"Tactile Digital Ethnography: Researching Mobile Media Through the Hand," *Mobile Media & Communication* 4, no. 2 (2015): 237–251.

33. Helena De Preester and Manos Tsakiris, "Body-Extension Versus Body-Incorporation: Is There a Need for a Body-Model?," *Phenomenology and the Cognitive Sciences* 8, no. 3 (2009): 307–319.

34. Here is how such a prosthesis user describes his experience: "Well, to me it's as if, though I've not got my lower arm, it's as though I've got it and it's (the prosthesis) part of me now. It's as though I've got two hands, two arms"; Craig D. Murray, "An Interpretative Phenomenological Analysis of the Embodiment of Artificial Limbs," *Disability and Rehabilitation* 26, no. 16 (2004): 963–973, 970.

35. De Preester and Tsakiris, "Body-Extension Versus Body-Incorporation."

36. See also Helena De Preester, "Technology and the Body: The (Im)Possibilities of Re-embodiment," *Foundations of Science* 16, no. 2–3 (2011): 119–137, 122–124.

37. For instance, if we look closer at the experiments by Maravita and Iriki, the proposed assimilation of the tool into the monkey's body schema essentially refers to a neural process by which the visual receptive fields of some bimodal neurons (i.e., neurons responding both to visual and tactile stimuli at or near the hand) expanded to include the entire length of the handheld rake used for food retrieval: "The tool became incorporated into a putative brain representation of the hand wielding it and that visual stimuli presented at the tip of the tool might be coded by the brain in a similar fashion to those presented directly at the hand"; Maravita and Iriki, "Tools for the Body (Schema)," 82.

38. Matthew Botvinick, "Probing the Neural Basis of Body Ownership," *Science* 305, no. 5685 (2004): 783.

39. This is something that De Preester and Tsakiris also recognize briefly at the end of their paper, using the example of specialized tool users, such as musicians, which often characterize "the relation between themselves and their instrument as an experience of completion or wholeness"; De Preester and Tsakiris, "Body-Extension Versus Body-Incorporation," 317–318.

40. Jean-Paul Sartre, *Being and Nothingness; An Essay in Phenomenological Ontology* (New York: Citadel Press, 1964 [1943]), 591–592.

41. Jennifer Dyl and Seymour Wapner, "Age and Gender Differences in the Nature, Meaning, and Function of Cherished Possessions for Children and Adolescents," *Journal of Experimental Child Psychology* 62, no. 3 (1996): 340–377.

42. Fiona Cram and Helen Paton, "Personal Possessions and Self-Identity: The Experiences of Elderly Women in Three Residential Settings," *Australian Journal on Ageing* 12, no. 1 (1993): 19–24; and Jon L. Pierce, Tatiana Kostova, and Kurt T. Dirks, "The

State of Psychological Ownership: Integrating and Extending a Century of Research," *Review of General Psychology* 7, no. 1 (2003): 84–107.

43. David J. Turk, Kim van Bussel, Gordon D. Waiter, and C. Neil Macrae, "Mine and Me: Exploring the Neural Basis of Object Ownership," *Journal of Cognitive Neuroscience* 23, no. 11 (2011): 3657–3668.

44. As De Preester indicates, the distinction between tool and prosthesis is not rigid: "I do not claim that tool use *always* is a matter of extension and never one of incorporation, or that prosthesis use *always* is a matter of incorporation. . . . The distinction we are searching for is the distinction between body incorporation and body extension, not between tool and prosthesis per se, since at least the latter can enjoy both statuses"; De Preester, "Technology and the Body," 125.

45. James, *The Principles of Psychology*, 289.

46. Russell W. Belk, "Possessions and the Extended Self," *Journal of Consumer Research* 15, no. 2 (1988): 139–168; Russell W. Belk, "The Ineluctable Mysteries of Possessions," *Journal of Social Behavior and Personality* 6, no. 6 (1991): 17–55; Russell W. Belk, "Extended Self in a Digital World," *Journal of Consumer Research* 40, no. 3 (2013): 477–500; and James K. Beggan, "On the Social Nature of Nonsocial Perception: The Mere Ownership Effect," *Journal of Personality and Social Psychology* 62, no. 2 (1992): 229–237.

47. Botvinick and Cohen, "Rubber Hands 'Feel' Touch That Eyes See"; H. Henrik Ehrsson, Charles Spence, and Richard E. Passingham, "That's My Hand! Activity in Premotor Cortex Reflects Feeling of Ownership of a Limb," *Science* 305, no. 5685 (2004): 875–877; Tsakiris and Haggard, "The Rubber Hand Illusion Revisited"; and Longo et al., "What is Embodiment? A Psychometric Approach."

48. De Preester and Tsakiris explain this sense of body ownership over the fake rubber hand not by extending one's body but rather by incorporating the prosthetic rubber hand into one's body and causing the real hand to disappear; De Preester and Tsakiris, "Body-Extension Versus Body-Incorporation," 312. The fact that ownership over an artificial body part has direct consequences for real body parts can be further supported by experimental evidence showing a decrease in skin temperature of the real hand during the Rubber Hand Illusion; G. Lorimer Moseley, Nick Olthof, Annemeike Venema, et al., "Psychologically Induced Cooling of a Specific Body Part Caused by the Illusory Ownership of an Artificial Counterpart," *Proceedings of the National Academy of Sciences* 105, no. 35 (2008): 13169–13173.

49. Lauren G. Fasig, "Toddlers' Understanding of Ownership: Implications for Self-Concept Development," *Social Development* 9, no. 3 (2001): 370–382; and Madison L. Pesowski, Shaylene E. Nancekivell, Arber Tasimi, and Ori Friedman, "Ownership and Value in Childhood," *Annual Review of Developmental Psychology* 4, no. 1 (2022): 161–183.

50. Sheila J. Cunningham, David J. Turk, Lynda M. Macdonald, and C. Neil Macrae, "Yours or Mine? Ownership and Memory," *Consciousness and Cognition* 17, no. 1 (2008): 312–318; and Mirjam Van den Bos, Sheila J. Cunningham, Martin A. Conway, and David J. Turk, "Mine to Remember: The Impact of Ownership on Recollective Experience," *Quarterly Journal of Experimental Psychology* 63, no. 6 (2010): 1065–1071.

51. Sheila J. Cunningham and David J. Turk, "Editorial: A Review of Self-Processing Biases in Cognition," *Quarterly Journal of Experimental Psychology* 70, no. 6 (2017): 987–995.

52. Beggan, "On the Social Nature of Nonsocial Perception."

53. Carey K. Morewedge and Colleen E. Giblin, "Explanations of the Endowment Effect: An Integrative Review," *Trends in Cognitive Sciences* 19, no. 6 (2015): 339–348; and Daniel Kahneman, "The Endowment Effect, Loss Aversion, and Status Quo Bias," *Journal of Economic Perspectives* 5 (1991): 193–206.

54. Salvatore M. Aglioti, Nicola Smania, M. Manfredi, and Giovanni Berlucchi, "Disownership of Left Hand and Objects Related to It in a Patient with Right Brain Damage," *Neuroreport* 8, no. 1 (1996): 293–296; and Berlucchi and Aglioti, "The Body in the Brain."

55. Berlucchi and Aglioti, "The Body in the Brain," 561.

56. Raballo et al., "Looking at the Schizophrenia Spectrum Through the Prism of Self-disorders"; and Raballo et al., "The Self in the Spectrum."

57. For instance, the posterior cingulate gyrus, the anterior cingulate gyrus, medial portions of the superior frontal gyrus/paracingulate cortex, the right temporoparietal junction, the superior temporal sulcus, the temporal poles, the hippocampus, the anterior insula, mid-portions of the inferior frontal gyrus, the middle frontal gyrus, the intraparietal sulcus, and the inferior parietal lobule. For references, see Matthew A. J. Apps and Manos Tsakiris, "The Free-Energy Self: A Predictive Coding Account of Self-Recognition," *Neuroscience & Biobehavioral Reviews* 41 (2014): 85–97; and Legrand and Ruby, "What Is Self-Specific?"

58. The philosophers Andy Clark and Alva Noë, each from their own distinctive yet closely related theoretical perspective, argue against the internalist identification of self-experience with brain events. For Noë, the idea that self-consciousness depends only on what happens inside the brain has "no empirical or philosophical justification." Self-experience is enacted out of our heads. Alva Noë, *Out of Our Heads: Why You Are Not Your Brain, and Other Lessons from the Biology of Consciousness* (New York: Hill and Wang, 2009), 181; Clark, *Being There*; and Clark, "Re-Inventing Ourselves."

59. The term *assemblage* is used here in the technical sense (non-essentialist) that originates in the philosophy of Gilles Deleuze and Felix Guattari: the elements of the assemblage are bound like a dry-stone wall, a flexible union, free to recombine,

open to change along diverging lines; Gilles Deleuze and Félix Guattari, *What Is Philosophy?* (New York: Columbia University Press, 1994), 23. See also Thomas Nail, "What Is an Assemblage?," *SubStance* 46, no. 1 (2017): 21–37.

60. Cf. also Fowler, "Relational Personhood Revisited," 403.

61. For similar suggestions, see especially Fowler, "Relational Personhood Revisited"; and LiPuma, "Modernity and Forms of Personhood in Melanesia," 53–79.

62. LiPuma, in "Modernity and Forms of Personhood in Melanesia," also argues for the confluence of individual and dividual: "in all cultures . . . there exist both individual and dividual modalities or aspects of personhood," 58.

63. Ingold, *Imagining for Real*.

64. Ingold, *The Life of Lines*, 14; and Tim Ingold, "On Human Correspondence," *Journal of the Royal Anthropological Institute* 23, no. 1 (2017): 9–27.

65. For a detailed discussion of those distinctions, see Shaun Gallagher, "Direct Perception in the Intersubjective Context," *Consciousness and Cognition* 17, no. 2 (2008): 535–543; Thomas Fuchs, "The Phenomenology and Development of Social Perspectives," *Phenomenology and the Cognitive Sciences* 12 (2013): 655–683; Vasu Reddy, "On Being the Object of Attention: Implications for Self–Other Consciousness," *Trends in Cognitive Sciences* 7, no. 9 (2003): 397–402; and Zahavi, *Subjectivity and Selfhood*.

66. Such a transactional understanding can also be seen as perspectival, but it should not be equated with the anthropological perspectivism we discussed in chapter 7.

67. Merleau-Ponty, *The Visible and the Invisible*.

68. According to Merleau-Ponty's famous example of one hand touching the other, the relationship is reversible; Merleau-Ponty, *The Visible and the Invisible*, 139.

Chapter 9

1. Synofzik et al., "Beyond the Comparator Model"; Synofzik et al., "I Move, Therefore I Am"; and Gallagher, "Multiple Aspects in the Sense of Agency."

2. Lucy Suchman, *Human–Machine Reconfigurations: Plans and Situated Actions* (Cambridge: Cambridge University Press, 2007).

3. As Chris Fowler rightly observes, self "is always relational, but *the relationships involved vary qualitatively in nature and strength*, draw different boundaries and identify different features of personhood as axiomatic, from case to case"; Fowler, "Relational Personhood Revisited," 140 (emphasis in the original).

4. Shaun Gallagher, "A Pattern Theory of Self," *Frontiers in Human Neuroscience* 7 (2013): 443.

5. These differentiations are based on Hanne De Jaegher, E. Di Paolo, and S. Gallagher, "Can Social Interaction Constitute Social Cognition?," *Trends in Cognitive Sciences* 14, no. 10 (2010): 441–447, 443.

6. Legrand and Ruby, "What Is Self-Specific?"

7. Dewey, *Logic*.

8. Gallagher, "Pragmatic Interventions," 119.

9. Dewey and Bentley, *Knowing and the Known*.

10. Barad, *Meeting the Universe Halfway*; and Barad, "Posthumanist Performativity."

11. Gallagher, "Philosophical Antecedents of Situated Cognition," 35–52.

12. The famous pragmatist and process philosopher Charles Peirce would claim, as discussed by Gallagher, "that the thoughts of a living writer are *in* any printed copy of his book than they are *in* his brain"; Charles S. Peirce, *The Collected Papers of Charles Sanders Peirce*, 7.364 (my emphasis); and Gallagher, "Pragmatic Interventions," 114.

13. Latour, *Reassembling the Social*.

14. Latour, "On Actor–Network Theory."

15. For a detailed discussion, see Malafouris et al., "Rethinking the 'We' in 'We' Intentionality."

16. Gallagher, "Direct Perception in the Intersubjective Context"; De Jaegher and Di Paolo, "Participatory Sense-Making"; Fuchs and De Jaegher, "Enactive Intersubjectivity"; and De Jaegher et al., "Can Social Interaction Constitute Social Cognition?"

17. Eva Hammarskjöld, Jan Ekholm, and Karin Harms-Ringdahl, "Reproducibility of Work Movements with Carpenters' Hand Tools," *Ergonomics* 32, no. 8 (1989): 1005–1018.

18. See Lambros Malafouris and Maria Danae Koukouti, "How the Body Remembers its Skills: Memory and Material Engagement," *Journal of Consciousness Studies* 25, no. 7–8 (2018): 158–180.

19. In this sense, one could see the co-production of form in self and other (human or nonhuman). For instance, in our example, pottery styles and forms use the potter's body to reproduce and change themselves and vice versa.

20. For more detailed discussion, see Malafouris, "At the Potter's Wheel," 19–36.

21. Fuchs and De Jaegher, "Enactive Intersubjectivity."

22. Fuchs and De Jaegher, "Enactive Intersubjectivity," 470.

Part IV

1. Malafouris, *How Things Shape the Mind*.

2. Rietveld and Kiverstein, "A Rich Landscape of Affordances."

3. Malafouris et al., "Rethinking the 'We' in 'We' Intentionality."

4. K. W. Arthur, *The Lives of Stone Tools: Crafting the Status, Skill, and Identity of Flintknappers* (Tucson: University of Arizona Press, 2018).

Chapter 10

1. The term *tooling* was coined by ethologists Dorothy Fragaszy and Madhur Mangalam to signify a shift toward understanding tools as actions rather than merely as objects. Dorothy M. Fragaszy and Madhur Mangalam, "Tooling," in *Advances in the Study of Behavior*, ed. Marc Naguib (Amsterdam: Elsevier, 2018), 177–241; and Michael Arbib, Dorothy Fragaszy, Susan D. Healy, and Dietrich Stout, "Tooling and Construction: From Nut-Cracking and Stone-Tool Making to Bird Nests and Language," *Current Research in Behavioral Sciences* 5 (2023): 100121.

2. Andrew Whiten, Kathy Schick, and Nicholas Toth, "The Evolution and Cultural Transmission of Percussive Technology: Integrating Evidence from Palaeoanthropology and Primatology," *Journal of Human Evolution* 57, no. 4 (2009): 420–435; and Blandine Bril, Jeroen Smaers, and James Steele, et al., "Functional Mastery of Percussive Technology in Nut-Cracking and Stone-Flaking Actions: Experimental Comparison and Implications for the Evolution of the Human Brain," *Philosophical Transactions of the Royal Society B: Biological Sciences* 367, no. 1585 (2012): 59–74.

3. Francesco d'Errico, Christopher Henshilwood, Marian Vanhaeren, and Karen van Niekerk, "*Nassarius kraussianus* Shell Beads from Blombos Cave: Evidence for Symbolic Behaviour in the Middle Stone Age," *Journal of Human Evolution* 48, no. 1 (2005): 3–24; and Christopher Henshilwood, Francesco d'Errico, Marian Vanhaeren, and Zenobia Jacobs, "Middle Stone Age Shell Beads from South Africa," *Science* 304, no. 5669 (2004): 404.

4. For the meaning of enactive signification, see chapter 2 and Malafouris, *How Things Shape the Mind*, chap. 5.

5. New discoveries from Dikika in Ethiopia (Shannon P. McPherron, Zeresenay Alemseged, Curtis W. Marean, et al., "Evidence for Stone-Tool-Assisted Consumption of Animal Tissues Before 3.39 Million Years Ago at Dikika, Ethiopia," *Nature* 466, no. 7308 [2010]: 857–860) and West Turkana, Kenya, seem to extend—subject to further reinforcing finds—the date of the earliest evidence of hominin stone toolmaking back to 3.3 million years ago; Sonia Harmand, Jason E. Lewis, Craig S. Feibel, et al.,

"3.3-Million-Year-Old Stone Tools from Lomekwi 3, West Turkana, Kenya," *Nature* 521, no. 7552 (2015): 310–315.

6. Lyn Wadley, "Compound-Adhesive Manufacture as a Behavioral Proxy for Complex Cognition in the Middle Stone Age," *Current Anthropology* 51, no. S1 (2010): S111–S119.

7. Thomas Wynn, "Ergonomic Clusters and Displaced Affordances in Early Lithic Technology," *Adaptive Behavior* 29, no. 2 (2021): 181–195.

8. Wadley, "Compound-Adhesive Manufacture."

9. I borrow the distinction from John J. Shea, "Occasional, Obligatory, and Habitual Stone Tool Use in Hominin Evolution," *Evolutionary Anthropology: Issues, News, and Reviews* 26, no. 5 (2017): 200–217.

10. Charles Darwin, in his *Descent of Man* in 1871, was probably the first to use this notion of freeing of the hands in an evolutionary context, wrongly assuming, however, that intelligence preceded, and drove, bipedalism. Still, the notion itself remains important, underlying the intimate links between hands, making, movement, and human embodiment. For a good review of the recent hypotheses associated with bipedalism, see Kevin D. Hunt, "Bipedalism," in *Basics in Human Evolution*, ed. Michael P. Muehlenbein (Amsterdam: Elsevier, 2015), 103–112.

11. Tallis, *Aping Mankind*, 215.

12. Raymond Tallis, *Michelangelo's Finger: An Exploration of Everyday Transcendence* (New Haven, CT: Yale University Press, 2010), 20–21.

13. Tallis, *Michelangelo's Finger*, 21.

14. Tallis, *Michelangelo's Finger*, 21.

15. Tallis, *Michelangelo's Finger*, 22; and Tallis, *Aping Mankind*, 215.

16. Hélène Roche, A. Delagnes, J. P. Brugal, et al., "Early Hominid Stone Tool Production and Technical Skill 2.34 Myr Ago in West Turkana, Kenya," *Nature* 399, no. 6731 (1999): 57–60; and Sileshi Semaw, P. Renne, J. W. Harris, et al., "2.5-Million-Year-Old Stone Tools from Gona, Ethiopia," *Nature* 385, no. 6614 (1997): 333–336.

17. McPherron, "Evidence for Stone-Tool-Assisted Consumption of Animal Tissues."

18. Harmand et al., "3.3-Million-Year-Old Stone Tools from Lomekwi 3, West Turkana, Kenya."

19. Overmann and Coolidge, *Squeezing Minds from Stones*; and Frederick L. Coolidge and Thomas Wynn, *The Rise of Homo sapiens: The Evolution of Modern Thinking* (Oxford: Oxford University Press, 2018). For a good review of deep roots that the use of stone tools has in our evolutionary lineage, see Michael Haslam, Adriana Hernandez-Aguilar, Victoria Ling, et al., "Primate Archaeology," *Nature* 460, no. 7253 (2009): 339–344.

20. Stanley H. Ambrose, "Paleolithic Technology and Human Evolution," *Science* 291, no. 5509 (2001): 1748–1753; and Robert Foley and Marta Mirazón Lahr, "On Stony Ground: Lithic Technology, Human Evolution, and the Emergence of Culture," *Evolutionary Anthropology: Issues, News, and Reviews: Issues, News, and Reviews* 12, no. 3 (2003): 109–122.

21. Valentine Roux and Blandine Brill, eds., *Stone Knapping: The Necessary Conditions for a Uniquely Hominin Behaviour* (Cambridge: McDonald Institute for Archaeological Research, 2005); and Overmann and Coolidge, *Squeezing Minds from Stones*.

22. Conchoidal fracture denotes "the phenomenon producing a Herzian cone, which leaves conspicuous bulbs of percussion on the fracture plane and razor-sharp cutting edges"; and Tetsushi Nonaka, Blandine Bril, and Robert Rein, "How Do Stone Knappers Predict and Control the Outcome of Flaking? Implications for Understanding Early Stone Tool Technology," *Journal of Human Evolution* 59, no. 2 (2010): 156–157.

23. Ignacio de la Torre, "The Origins of Stone Tool Technology in Africa: A Historical Perspective," *Philosophical Transactions of the Royal Society B: Biological Sciences* 366, no. 1567 (2011): 1028–1037.

24. Dietrich Stout, Jay Quade, Sileshi Semaw, Michael J. Rogers, and Naomi E. Levin, "Raw Material Selectivity of the Earliest Stone Toolmakers at Gona, Afar, Ethiopia," *Journal of Human Evolution* 48, no. 4 (2005): 365–380; and Sonia Harmand, "Variability in Raw Material Selectivity at the Late Pliocene Sites of Lokalalei, West Turkana, Kenya," in *Interdisciplinary Approaches to the Oldowan*, ed. Erella Hovers and David R. Braun (Dordrecht: Springer, 2009), 85–97.

25. Dietrich Stout, "Stone Toolmaking and the Evolution of Human Culture and Cognition," *Philosophical Transactions of the Royal Society B: Biological Sciences* 366, no. 1567 (2011): 1057.

26. John J. Shea, "Making and Using Stone Tools: Advice for Learners and Teachers and Insights for Archaeologists," *Lithic Technology* 40, no. 3 (2015): 231–248; and Justin Pargeter, Nada Khreisheh, and Dietrich Stout, "Understanding Stone Tool-Making Skill Acquisition: Experimental Methods and Evolutionary Implications," *Journal of Human Evolution* 133 (2019): 146–166.

27. Generally speaking, that involves observations and experimentation with modern processes (e.g., stone toolmaking) with the aim of establishing the relationships (causal or other) between those modern processes and their products and then using that information to infer (by means of relational analogies) past processes whose products share nontrivial feature(s) with the modern product(s).

28. Valentine Roux, Blandine Bril, and G. Dietrich, "Skills and Learning Difficulties Involved in Stone Knapping: The Case of Stone-Bead Knapping in Khambhat, India," *World Archaeology* 27, no. 1 (1995): 63–87; Valentine Roux and Blandine Bril, "General Introduction: A Dynamic Systems Framework for Studying a Uniquely Hominin

Innovation," in *Stone Knapping: The Necessary Conditions for a Uniquely Hominin Behaviour*, ed. Valentine Roux and Blandine Bril (Cambridge: McDonald Institute for Archaeological Research, 2005), 1–22; Dietrich Stout and Thierry Chaminade, "Making Tools and Making Sense: Complex, Intentional Behaviour in Human Evolution," *Cambridge Archaeological Journal* 19, no. 1 (2009): 85–96; Dietrich Stout, Nicholas Toth, Kathy Schick, and Thierry Chaminade, "Neural Correlates of Early Stone Age Toolmaking: Technology, Language and Cognition in Human Evolution," *Philosophical Transactions of the Royal Society B: Biological Sciences* 363, no. 1499 (2008): 1939–1949; Stout, "Stone Toolmaking and the Evolution of Human Culture and Cognition"; Dietrich Stout and Thierry Chaminade, "The Evolutionary Neuroscience of Tool Making," *Neuropsychologia* 45, no. 5 (2007): 1091–1100; Pargeter et al., "Understanding Stone Tool-Making Skill Acquisition"; Justin Pargeter, Nada Khreisheh, John J. Shea, and Dietrich Stout, "Knowledge vs. Know-How? Dissecting the Foundations of Stone Knapping Skill," *Journal of Human Evolution* 145 (2020): 102807; Karenleigh A. Overmann and Thomas Wynn, "On Tools Making Minds: An Archaeological Perspective on Human Cognitive Evolution," *Journal of Cognition and Culture* 19, no. 1–2 (2019): 39–58; and Thomas Wynn, "Archaeology and Cognitive Evolution," *Behavioral and Brain Sciences* 25, no. 3 (2003): 389–402.

29. As Dietrich Stout's ethnography in the modern community of Langda in Papua Provence, Indonesia, has shown, apprenticeships in traditional stone toolmaking skills can last ten years or more. This heavy investment in time, individual practice, and commitment needed to consolidate basic perceptual–motor skills of toolmaking demands motivation promoted by the social context. In the Langda community, this is seen in the social value placed on practice and instruction from more experienced toolmakers, acting "as a social 'scaffold' promoting individual skill acquisition"; Stout, "Stone Toolmaking and the Evolution of Human Culture and Cognition"; and Dietrich Stout, "Skill and Cognition in Stone Tool Production," *Current Anthropology* 43, no. 5 (2002): 693–722. Similar observations can be made in the case of other materials and practices, such as the use of ochre where the time invested from collection and preparation to use suggests increased social value. See, e.g., Tammy Hodgskiss, "Cognitive Requirements for Ochre Use in the Middle Stone Age at Sibudu, South Africa," *Cambridge Archaeological Journal* 24, no. 3 (2014): 424.

30. Mary W. Marzke and M. Steven Shackley, "Hominid Hand Use in the Pliocene and Pleistocene: Evidence from Experimental Archaeology and Comparative Morphology," *Journal of Human Evolution* 15, no. 6 (1986): 439–460; Mary W. Marzke, N. Toth, K. Schick, et al., "EMG Study of Hand Muscle Recruitment during Hard Hammer Percussion Manufacture of Oldowan Tools," *American Journal of Physical Anthropology* 105, no. 3 (1998): 315–332; Mary W. Marzke, "Who Made Stone Tools?," in *Stone Knapping: The Necessary Conditions for a Uniquely Hominin Behaviour*, ed. Valentine Roux and Blandine Brill (Cambridge: McDonald Institute for Archaeological Research, 2005), 243–256; Nonaka et al., "How Do Stone Knappers Predict and Control the Outcome of Flaking?"; and Roux and Bril, "General Introduction."

31. Lambros Malafouris, "How Does Thinking Relate to Tool Making?," *Adaptive Behavior* 29, no. 2 (2021): 107–121; Lambros Malafouris, "Knapping Intentions and the Marks of the Mental," in *The Cognitive Life of Things: Recasting the Boundaries of the Mind*, ed. Lambros Malafouris and Colin Renfrew (Cambridge: McDonald Institute for Archaeological Research, 2010), 13–22; Malafouris, "Making Hands and Tools"; Wynn et al., "4E Cognition in the Lower Palaeolithic"; and Ihde and Malafouris, "Homo Faber Revisited."

32. Merleau-Ponty coined this term to denote the tight connection between the agent and the world brought about by means of perceptive and motor schemas allowing for a basic or "operative intentionality"; Merleau-Ponty, *Phenomenology of Perception*.

33. As analyzed by Husserl, *The Phenomenology of Internal Time-Consciousness*.

34. Malafouris, "How Does Thinking Relate to Tool Making?"

35. Ludwig Wittgenstein, *Preliminary Studies for the "Philosophical Investigations"* (Oxford: Blackwell, 1958).

36. See Kai Engbert, Andreas Wohlschläger, and Patrick Haggard, "Who Is Causing What? The Sense of Agency Is Relational and Efferent-Triggered," *Cognition* 107, no. 2 (2008): 693–704; and Kai Engbert and Andreas Wohlschläger, "Intentions and Expectations in Temporal Binding," *Consciousness and Cognition* 16, no. 2 (2007): 255–264.

37. Patrick Haggard and Sam Clark, "Intentional Action: Conscious Experience and Neural Prediction," *Consciousness and Cognition* 12, no. 4 (2003): 695–707.

38. This has been the subject of many experimental studies exploring issues of handedness and its relationship with the observed contralateral brain activation. See, e.g., Michael C. Corballis, "From Mouth to Hand: Gesture, Speech, and the Evolution of Right-Handedness," *Behavioral and Brain Sciences* 26, no. 02 (2003): 199–208; Stout and Chaminade, "Making Tools and Making Sense"; and Natalie T. Uomini, "The Prehistory of Handedness: Archaeological Data and Comparative Ethology," *Journal of Human Evolution* 57, no. 4 (2009): 411–419.

39. Gallagher and Allen, "Active Inference," 2635–2636.

40. As Merleau-Ponty describes, the blind person's stick is no longer perceived for itself as an object. Rather, it is now "an area of sensitivity, extending the scope and active radius of touch, and providing a parallel to sight. In the exploration of things, the length of the stick does not enter expressly as a middle term: the blind man is rather aware of it through the position of objects than of the position of objects through it"; Merleau-Ponty, *Phenomenology of Perception*, 143.

41. Bateson, *Steps to an Ecology of Mind*, 318.

42. Lambros Malafouris, "Beads for a Plastic Mind: The 'Blind Man's Stick'(BMS) Hypothesis and the Active Nature of Material Culture," *Cambridge Archaeological*

Journal 18, no. 3 (2008): 401–414; Lambros Malafouris, "The Brain–Artefact Interface (BAI): A Challenge for Archaeology and Cultural Neuroscience," *Social Cognitive and Affective Neuroscience* 5, no. 2–3 (2010): 264–273; and Lambros Malafouris, "What Does the Stick Do for the Blind?," in *Thinking in the World*, ed. Jill Bennett and Mary Zournazi (London: Bloomsbury Academic, 2019), 115–128.

43. Richard Sennett, *The Craftsman* (New Haven, CT: Yale University Press, 2008), 227.

44. Iain Davidson, "Evolution of Cognitive Archaeology through Evolving Cognitive Systems," in *Squeezing Minds from Stones: Cognitive Archaeology and the Evolution of the Human Mind*, ed. Karenleigh A. Overmann and Frederick L. Coolidge (Oxford: Oxford University Press, 2019), 79–101; and Iain Davidson and William C. McGrew, "Stone Tools and the Uniqueness of Human Culture," *Journal of the Royal Anthropological Institute* 11, no. 4 (2005): 793–817.

45. See also Maxine Sheets-Johnstone, *The Primacy of Movement* (Amsterdam: John Benjamins, 1999).

46. Lambros Malafouris, "Metaplasticity and the Primacy of Material Engagement," *Time and Mind* 8, no. 4 (2015): 351–371; Malafouris, "Making Hands and Tools"; and Malafouris, "Knapping Intentions and the Marks of the Mental."

47. Malafouris, "Between Brains, Bodies and Things."

48. Philippe Rochat and Zahavi Dan, "The Uncanny Mirror: A Re-framing of Mirror Self-Experience," *Consciousness and Cognition* 20, no. 2 (2011): 204–213; Anderson and Gallup, "Mirror Self-Recognition"; and Gallup et al., "Self-Recognition," 15–16. As I discuss elsewhere, there is nothing in the mirror task that is not explicable by recourse to sensory perception and action. Moreover, I would argue that exposure to the mirror, far from being a neutral test of self, provides humans and other animals with a technique of self. In other words, the mirror, more than being a passive testing device for self-recognition, should be seen instead as a powerful means to that end—a tool or scaffold for self-recognition and sensory enculturation. For a more detailed discussion, see Maria Danae Koukouti and Lambros Malafouris, *An Anthropological Guide to the Art and Philosophy of Mirror Gazing* (London: Bloomsbury Academic, 2021).

49. The mirror analogy has been explored further in the context of pottery making by Maria Danae Koukouti, "Making Mirrors: Aesthetic Experience and Narratives of Self-Identification in Material Practices," Possibility Studies *and Society* (forthcoming).

50. Throughout this book, my use of the term *information* derives from cybernetics (as developed in the 1940s by Norbert Wiener, John von Neumann, and others). The cybernetic use of *information* is inherently dynamic, and importantly, it has nothing to do with semantics and meaning. On the technical cybernetic construal, *information* is not about coding (in the sense that the genome came to be identified with information coding for particular traits making up the genotype) or content (in the sense of the content of a message that is transmitted from a sender to a recipient).

Rather, it is about differences that make a difference. For a good critical discussion of these issues, see Ingold, "Beyond Biology and Culture."

51. For detailed discussion and references, see Emiliano Bruner, *Cognitive Archaeology, Body Cognition, and the Evolution of Visuospatial Perception* (Amsterdam: Elsevier, 2023); and Emiliano Bruner and Atsushi Iriki, "Extending Mind, Visuospatial Integration, and the Evolution of the Parietal Lobes in the Human Genus," *Quaternary International* 405 (2016): 98–110.

52. Ulric Neisser, "Five Kinds of Self-Knowledge," *Philosophical Psychology* 1, no. 1 (1988): 35–59.

53. Lambros Malafouris, "Enactychism: Enacting Chance in Creative Material Engagement," *Possibility Studies & Society* 1, no. 3 (2023): 300–310.

54. Martin Heidegger, *Being and Time* (New York: Harper, 1962).

55. See Malafouris et al., "Rethinking the 'We' in 'We' Intentionality."

56. Bril et al., "Functional Mastery of Percussive Technology in Nut-Cracking and Stone-Flaking Actions," 67.

57. Bril et al., "Functional Mastery of Percussive Technology in Nut-Cracking and Stone-Flaking Actions."

58. For good discussions of causal cognition in nonhuman animals, see Derek Penn, Keith J. Holyoak, and Daniel J. Povinelli, "Darwin's Mistake: Explaining the Discontinuity Between Human and Nonhuman Minds," *Behavioral and Brain Sciences* 31, no. 2 (2008): 109–130, 118.

59. Jackie Chappell and Alex Kacelnik, "Tool Selectivity in a Non-Primate, the New Caledonian Crow (*Corvus moneduloides*)," *Animal Cognition* 5, no. 2 (2002): 71–78.

60. Lewis Wolpert, "Causal Belief and the Origins of Technology," *Philosophical Transactions of the Royal Society of London. Series A: Mathematical, Physical and Engineering Sciences* 361, no. 1809 (2003): 1709–1719, 1713.

61. Penn et al., "Darwin's Mistake," 119.

62. Wolpert, "Causal Belief and the Origins of Technology," 1712.

63. Clive Gamble, *Origins and Revolutions: Human Identity in Earliest Prehistory* (Cambridge: Cambridge University Press, 2007), 118–119.

64. Roberta Corrigan and Peggy Denton, "Causal Understanding as a Developmental Primitive," *Developmental Review* 16, no. 2 (1996): 162–202.

65. Renée Baillargeon, Laura Kotovsky, and Amy Needham, "The Acquisition of Physical Knowledge in Infancy," in *Causal Cognition: A Multidisciplinary Debate*, ed.

Dan Sperber, David Premack Dan, and Ann James Premack (Oxford: Oxford University Press, 1995), 79–116.

66. This concept, Wolpert suggests, may have originally evolved in early humans; Wolpert, "Causal Belief and the Origins of Technology," 1713.

67. Benjamin Libet's experiments have famously shown that although human intentions are perceived as occurring prior to movements, the intention to act may arise after the brain has initiated an action. In particular, Libet's claim was that conscious intention follows rather than precedes the readiness potential (an established measure of neural preparation for movement). Benjamin Libet, Elwood W. Wright Jr., Bertram Feinstein, and Dennis K. Pearl, "Subjective Referral of the Timing for a Conscious Sensor Experience: A Functional Role for the Somatosensory Specific Projection System in Man," *Brain* 194 (1979): 193–224; and Benjamin Libet, Curtis A. Gleason, Elwood W. Wright, and Dennis K. Pearl, "Time of Conscious Intention to Act in Relation to Onset of Cerebral Activity (Readiness-Potential)," *Brain* 106 (1983): 623–642. For the relevance of Libet's methodology relevant to the issue of material agency, see Malafouris, "At the Potter's Wheel," 19–36.

68. Haggard and Cole describe Libet's approach in brief as follows: "Subjects view a rotating clock hand and make intentional actions at a time of their own choice. The clock stops rotating after a random interval and subjects report the position of the clock hand at which they experienced a particular event designated by the experimenter, such as the first intention to move or the onset of physical movement"; Patrick Haggard and Jonathan Cole, "Intention, Attention and the Temporal Experience of Action," *Consciousness and Cognition* 16, no. 2 (2007): 211–220, 212. See also Engbert et al., "Who is Causing What"; Patrick Haggard, Sam Clark, and Jeri Kalogeras, "Voluntary Action and Conscious Awareness," *Nature Neuroscience* 5, no. 4 (2002): 382–385; and Haggard and Clark, "Intentional Action."

69. Haggard et al., "Voluntary Action and Conscious Awareness," 382.

70. Kai Engbert, Andreas Wohlschläger, Richard Thomas, and Patrick Haggard, "Agency, Subjective Time, and Other Minds," *Journal of Experimental Psychology: Human Perception and Performance* 33, no. 6 (2007): 1261–1268; Engbert et al., "Who is Causing What?"; Engbert and Wohlschläger, "Intentions and Expectations in Temporal Binding"; Haggard and Clark, "Intentional Action"; and Haggard et al., "Voluntary Action and Conscious Awareness."

71. Andrea Desantis, Cédric Roussel, and Florian Waszak, "On the Influence of Causal Beliefs on the Feeling of Agency," *Consciousness and Cognition* 20, no. 4 (2011): 1211–1220, 1217.

72. Brenda M. Farnell, "Theorizing 'the Body' in Visual Culture," in *Made to Be Seen: Perspectives on the History of Visual Anthropology*, ed. Marcus Banks and Jay Ruby (Chicago: University of Chicago Press, 2011), 141.

73. Christopher Stuart Henshilwood and Benoît Dubreuil, "The Still Bay and Howiesons Poort, 77–59 ka," *Current Anthropology* 52, no. 3 (2011): 361–400; Christopher S. Henshilwood and Curtis W. Marean, "The Origin of Modern Human Behavior," *Current Anthropology* 44, no. 5 (2003): 627–651; Francesco d'Errico, Christopher Henshilwood, Graeme Lawson, et al., "Archaeological Evidence for the Emergence of Language, Symbolism, and Music—An Alternative Multidisciplinary Perspective," *Journal of World Prehistory* 17, no. 1 (2003): 1–70; and Paul Mellars, "Major Issues in the Emergence of Modern Humans," *Current Anthropology* 30, no. 3 (1989): 349–385.

74. Christopher S. Henshilwood, Francesco d'Errico, Karen L. van Niekerk, et al., "A 100,000-Year-Old Ochre-Processing Workshop at Blombos Cave, South Africa," *Science* 334, no. 6053 (2011): 219–222; and d'Errico et al., "*Nassarius kraussianus* Shell Beads from Blombos Cave."

75. Abdeljalil Bouzouggar, Nick Barton, Marian Vanhaeren, et al., "82,000-Year-Old Shell Beads from North Africa and Implications for the Origins of Modern Human Behavior," *Proceedings of the National Academy of Sciences* 104, no. 24 (2007): 9964–9969.

76. Francesco d'Errico and Christopher S Henshilwood, "The Origin of Symbolically Mediated Behaviour," in *Homo Symbolicus: The Dawn of Language, Imagination and Spirituality*, ed. Christopher S. Henshilwood and Francesco d'Errico (Amsterdam: John Benjamins, 2011), 49–74; and Christopher S. Henshilwood and Benoît Dubreuil, "Reading the Artefacts: Gleaning Language Skills from the Middle Stone Age in Southern Africa," in *The Cradle of Language*, ed. Rudolf Botha and Chris Knight (Oxford: Oxford University Press, 2009), 41–61.

77. I should explain that *taphonomic analysis* (from the Greek *taphos* for "burial" and *nomos* for "law") refers to the study of what happens to organic materials from the time of death to their discovery in the archaeological record. It helps archaeologists distinguish between natural post-deposition processes and human-caused modifications to remains. This includes understanding the impact of environmental conditions (e.g., soil acidity, temperature, and moisture), biological agents (e.g., scavengers, bacteria, and fungi), physical processes (e.g., erosion, transportation by water, and weathering) and human activities (e.g., burial practices, construction, and tool use). Morphometric analysis involves the quantitative measurement and analysis of the form, shape, and size of objects (e.g., stone tools) to examine variations in the design, function, and craftsmanship. This method combines various statistical tools and is often used in conjunction with 3D modeling technologies.

78. For discussion of the debate, see Antonis Iliopoulos, "The Evolution of Material Signification: Tracing the Origins of Symbolic Body Ornamentation through a Pragmatic and Enactive Theory of Cognitive Semiotics," *Signs and Society* 4, no. 2 (2016): 244–277; Antonis Iliopoulos, "The Material Dimensions of Signification: Rethinking the Nature and Emergence of Semiosis in the Debate on Human Origins," *Quaternary International* 405 (2016): 111–124; Antonis Iliopoulos and Lambros Malafouris,

"Symbols and Material Signs in the Debate on Human Origins," in *The Oxford Handbook of Human Symbolic Evolution*, ed. Nathalie Gontier, Andy Lock and Chris Sinha (Oxford: Oxford University Press, 2021), 369–399; Duilio Garofoli and Antonis Iliopoulos, "Replacing Epiphenomenalism: A Pluralistic Enactive Take on the Metaplasticity of Early Body Ornamentation," *Philosophy & Technology* 32, no. 2 (2019): 215–242; Malafouris, "Beads for a Plastic Mind"; Lambros Malafouris, "Comment on 'The Still Bay and Howiesons Poort, 77–59 ka: Symbolic Material Culture and the Evolution of the Mind during the African Middle Stone Age' by Christopher S. Henshilwood and Benoît Dubreuil," *Current Anthropology* 52, no. 3 (2011): 385–386; Duilio Garofoli, "Metaplasticit-ies: Material Engagement Meets Mutational Enhancement," in *Embodiment in Evolution and Culture*, ed. Gregor Etzelmüller and Christian Tewes (Tübingen: Mohr Siebeck, 2016), 307–336; Duilio Garofoli, "Cognitive Archaeology Without Behavioral Modernity: An Eliminativist Attempt," *Quaternary International* 405 (2016): 125–135; Duilio Garofoli, "Do Early Body Ornaments Prove Cognitive Modernity? A Critical Analysis from Situated Cognition," *Phenomenology and the Cognitive Sciences* 14, no. 4 (2014): 803–825; and Duilio Garofoli, "Embodied Cognition and the Archaeology of Mind: A Radical Reassessment," in *Handbook of Evolutionary Research in Archaeology*, ed. Anna M. Prentiss (Berlin: Springer, 2019), 379–405.

79. Marian Vanhaeren, Francesco d'Errico, Karen L. van Niekerk, Christopher S. Henshilwood, and Rudolph M. Erasmus, "Thinking Strings: Additional Evidence for Personal Ornament Use in the Middle Stone Age at Blombos Cave, South Africa," *Journal of Human Evolution* 64, no. 6 (2013): 500–517.

80. Rochat, "Five Levels of Self-Awareness," 721, fig. 2.

81. Rochat, "Five Levels of Self-Awareness"; and Philippe Rochat, *The Infant's World* (Cambridge, MA: Harvard University Press, 2001).

82. Tulving, "Episodic Memory and Common Sense"; and Tulving, *Elements of Episodic Memory*.

83. Rochat, "Five Levels of Self-Awareness."

84. Anderson and Gallup, "Mirror Self-Recognition"; Gallup et al., "The Mirror Test"; and Gallup et al., "Self-Recognition."

85. Several lines of evidence clearly support the view that this basic number sense can be considered to be an evolved, innate, biological competence shared by preverbal infants and other animals. However, although we share a common numerical basis with many other animals, none of them seems to be capable of making the mental leap from this basic number sense to the possession of a concept of number—that is, the ability to manipulate large exact numerocities beyond the above-mentioned subitizing range of three or four—even after years of training in a controlled environment. Lisa Feigenson, Stanislas Dehaene, and Elizabeth Spelke. "Core Systems of Number," *Trends in Cognitive Sciences* 8, no. 7 (2004): 307–314, 313; and Dora Biro and Tetsuro

Matsuzawa, "Use of Numerical Symbols by the Chimpanzee (*Pan troglodytes*): Cardinals, Ordinals, and the Introduction of Zero," *Animal Cognition* 4 (2001): 193–199.

86. Rochael Gelman and Brian Butterworth, "Number and Language: How Are They Related?," *Trends in Cognitive Sciences* 9, no. 1 (2005): 6–10.

87. Edwin Hutchins, "Material Anchors for Conceptual Blends," *Journal of Pragmatics* 37, no. 10 (2005): 1555–1577.

88. This process is not symbolic or representational (e.g., associated with the ability from mentalism or theory of mind) but rather affective, enactive, and indexical. I do not deny the association of those practices with new perspective-taking abilities—for instance, as proposed by Henshilwood and Dubreuil in "The Still Bay and Howiesons Poort, 77–59 ka." However, this new ability to perceive how a body looks from another person's perspective should be understood from an enactive-ecological point of view. See Malafouris, "Comment on 'The Still Bay and Howiesons Poort, 77–59 ka.'" See also Garofoli and Iliopoulos, "Replacing Epiphenomenalism."

89. Fuchs and De Jaegher, "Enactive Intersubjectivity."

90. Turner, "The Social Skin," in *Not Work Alone*.

91. Alfred Gell, *Wrapping in Images: Tattooing in Polynesia* (Oxford: Clarendon Press, 1993), 38–39.

92. Gell, *Wrapping in Images*. See also Susannah Ostojic and John Taylor, "S/kinship: The Relational Ontology of Tattoos in Contemporary Australian Discourse and Practice," *The Australian Journal of Anthropology* 34, no. 2 (2023): 94–109.

93. Tallis, *Michelangelo's Finger*, 28.

94. Rochat, *Others in Mind*.

95. Michael Tomasello, *A Natural History of Human Thinking* (Cambridge, MA: Harvard University Press, 2014); Michael Tomasello, *Becoming Human: A Theory of Ontogeny* (Cambridge, MA: Harvard University Press, 2019); and Tomasello et al., "Understanding and Sharing Intentions."

96. For more detailed discussion and examples, see Malafouris et al., "Rethinking the 'We' in 'We' Intentionality."

97. Merleau-Ponty, *Phenomenology of Perception*.

98. Rietveld and Kiverstein, "A Rich Landscape of Affordances."

99. Fuchs and De Jaegher, "Enactive Intersubjectivity."

100. Edmund Husserl, *Logical Investigations* (London: Routledge, 1970). For a very interesting discussion of *epoché* relevant to the separation of things, images, and words and their implications for understanding what makes a schizophrenic type of

consciousness, see Giovanni Stanghellini, "Schizophrenic Consciousness, Spiritual Experience, and the Borders Between Things, Images and Words," *Transcultural Psychiatry* 42, no. 4 (2016): 611–629.

101. L. Wadley, T. Hodgskiss, and M. Grant, "Implications for Complex Cognition from the Hafting of Tools with Compound Adhesives in the Middle Stone Age, South Africa," *Proceedings of the National Academy of Sciences* 106, no. 24 (2009): 9590–9594; and L. Wadley, "Compound-Adhesive Manufacture as a Behavioral Proxy for Complex Cognition in the Middle Stone Age," *Current Anthropology* 51(S1) (2010): S111–S119.

Chapter 11

1. Floridi, *The Fourth Revolution*.

2. Nicholas Negroponte, *Being Digital* (New York: Vintage, 1996), 101.

3. Important to note is that the kind of digital selfhood I am trying to articulate here should be differentiated with what usually goes by the name of digital self-representation. Digital self-representation is only a single dimension or aspect of the phenomenon I call *digital selfhood*.

4. Rogers Brubaker, "Digital Hyperconnectivity and the Self," *Theory and Society* 49, no. 5–6 (2020): 771–801.

5. Brubaker, "Digital Hyperconnectivity and the Self."

6. Luciano Floridi, *The Onlife Manifesto: Being Human in a Hyperconnected Era* (Cham: Springer, 2015), 264.

7. Floridi, *The Fourth Revolution*.

8. Sherry Turkle, "Always-On/Always-On-You: The Tethered Self," in *Handbook of Mobile Communication Studies*, ed. J. Katz (Cambridge, MA: MIT Press, 2008), 122–123, 121–138.

9. Turkle, "Always-On/Always-On-You," 121. See also Sherry Turkle, *Life on the Screen: Identity in the Age of the Internet* (New York: Simon & Schuster, 1995).

10. Russell Belk, "Digital Consumption and the Extended Self," *Journal of Marketing Management* 30, no. 11–12 (2014): 1101–1118, 1102; and Belk, "Extended Self in a Digital World."

11. Robert W. Clowes, "Screen Reading and the Creation of New Cognitive Ecologies," *AI & Society* 34, no. 4 (2019): 705–720; Robert W. Clowes, "Thinking in the Cloud: The Cognitive Incorporation of Cloud-Based Technology," *Philosophy & Technology* 28, no. 2 (2014): 261–296; and Robert W. Clowes, "Immaterial Engagement: Human Agency and the Cognitive Ecology of the Internet," *Phenomenology and the Cognitive Sciences* 18, no. 1 (2018): 259–279.

12. In Barad's performative sense, see Barad, *Meeting the Universe Halfway*, 79–116; and Barad, "Posthumanist Performativity."

13. Tom Boellstorff, "For Whom the Ontology Turns: Theorizing the Digital Real," *Current Anthropology* 57, no. 4 (2016): 387–407.

14. As Ella Hafermalz and Kai Riemer ask, "Does an entity 'have' materiality, or is materiality an accomplishment?"; Ella Hafermalz and Kai Riemer, "The Question of Materiality: Mattering in the Network Society," paper presented at the 23rd European Conference on Information Systems, ECIS, May 2015, 2.

15. Barad, "Posthumanist Performativity."

16. Hafermalz and Riemer, "The Question of Materiality," 2.

17. Kåre Stokholm Poulsgaard, "Digital Materiality: Creativity and Collaboration in Digital Design at 3XN Architects and GXN Innovation" (DPhil thesis, University of Oxford, 2020); Poulsgaard, "Enactive Individuation"; Poulsgaard and Malafouris, "Understanding the Hermeneutics of Digital Materiality"; and Poulsgaard and Malafouris, "Models, Mathematics and Materials in Digital Architecture."

18. Floridi, *The Fourth Revolution*.

19. Stiegler, *Technics and Time*.

20. Dawn Nafus and Jamie Sherman, "This One Does Not Go Up to 11: The Quantified Self Movement as an Alternative Big Data Practice," *International journal of communication* 8 (2014): 1784–1794; and Melanie Swan, "Sensor Mania! The Internet of Things, Wearable Computing, Objective Metrics, and the Quantified Self 2.0," *Journal of Sensor and Actuator networks* 1, no. 3 (2012): 217–253.

21. Lupton, *The Quantified Self*.

22. Ben Williamson, "Algorithmic Skin: Health-Tracking Technologies, Personal Analytics and the Biopedagogies of Digitized Health and Physical Education," *Sport, Education and Society* 20, no. 1 (2014): 133–151.

23. Peter Heehs, *Writing the Self: Diaries, Memoirs, and the History of the Self* (New York: Bloomsbury Academic, 2013).

24. Kate Crawford, Jessa Lingel, and Tero Karppi, "Our Metrics, Ourselves: A Hundred Years of Selftracking from the Weight Scale to the Wrist Wearable Device," *European Journal of Cultural Studies* 18, no. 4–5 (2015): 479–496; and Jill Walker Rettberg, *Seeing Ourselves Through Technology: How We Use Selfies, Blogs and Wearable Devices to See and Shape Ourselves* (London: Palgrave Macmillan, 2014), chap. 1.

25. Koukouti and Malafouris, *An Anthropological Guide to the Art and Philosophy of Mirror Gazing*.

26. Bernard E. Harcourt, *Exposed: Desire and Disobedience in the Digital Age* (Cambridge, MA: Harvard University Press, 2015); John Cheney-Lippold, *We Are Data: Algorithms and the Making of Our Digital Selves* (New York: New York University Press, 2017); and Carissa Véliz, *Privacy Is Power* (Brooklyn: Melville House, 2021).

27. Malafouris, "Mark Making and Human Becoming."

28. Jenna Burrell and Marion Fourcade, "The Society of Algorithms," *Annual Review of Sociology* 47, no. 1 (2021): 213–237; David Beer, "The Social Power of Algorithms," in *The Social Power of Algorithms*, ed. David Beer (Abingdon: Routledge, 2019), 1–13; and Brent Daniel Mittelstadt, Patrick Allo, Mariarosaria Taddeo, Sandra Wachter, and Luciano Floridi, "The Ethics of Algorithms: Mapping the Debate," *Big Data & Society* 3, no. 2 (2016):1–21.

29. Engin F. Isin and Evelyn Sharon Ruppert, *Being Digital Citizens* (London: Rowman & Littlefield International, 2020); and Minna Ruckenstein and Natasha Dow Schüll, "The Datafication of Health," *Annual Review of Anthropology* 46, no. 1 (2017): 261–278.

30. The computer scientist John MacCormick describes a basic algorithm as "a precise recipe that specifies the exact sequence of steps required to solve a problem." He outlines nine types of algorithm that he views as central to contemporary society, such as compression algorithms (e.g., MP3 and JPEGS), indexing algorithms, ranking algorithms, and pattern-recognition algorithms (used in search engines such as Google or Amazon to filter and to recommend); John MacCormick, *Nine Algorithms that Changed the Future: The Ingenious Ideas that Drive Today's Computers* (Princeton, NJ: Princeton University Press, 2012), 3. See also Beer, *Popular Culture and New Media*, 66; and Beer, "The Social Power of Algorithms."

31. Adrian Mackenzie, *Cutting Code: Software and Sociality* (New York: Peter Lang, 2006).

32. Mackenzie, *Cutting Code*, 44.

33. Brubaker, "Digital Hyperconnectivity and the Self."

34. Christopher Burr, Mariarosaria Taddeo, and Luciano Floridi, "The Ethics of Digital Well-Being: A Thematic Review," *Science and Engineering Ethics* 26, no. 4 (2020): 2313–2343.

35. Jean M. Twenge, Gabrielle N. Martin, and W. Keith Campbell, "Decreases in Psychological Wellbeing Among American Adolescents After 2012 and Links to Screen Time During the Rise of Smartphone Technology," *Emotion* 18, no. 6 (2018): 765–780; and Amy Orben and Andrew K. Przybylski, "The Association Between Adolescent Well-Being and Digital Technology Use," *Nature Human Behaviour* 3, no. 2 (2019): 173–182.

36. Brubaker, "Digital Hyperconnectivity and the Self," 784.

37. Williamson, "Algorithmic Skin," 135.

38. Brubaker, "Digital Hyperconnectivity and the Self," 788.

39. Brubaker, "Digital Hyperconnectivity and the Self," 788.

40. Elena Esposito, "Algorithmic Memory and the Right to Be Forgotten on the Web," *Big Data & Society* 4, no. 1 (2017): 1–11.

41. Floridi, *The Fourth Revolution*.

42. Hartmut Rosa contends that the logic of modernity cannot be understood unless we add the temporal perspective to our analysis of the four material dimensions of society (i.e., individualization, differentiation, rationalization, and domestication). He also points out that our analysis of those temporal patterns "cannot neatly be separated from them in phenomenological terms; there is no 'social time' independent of social structure, culture, etc."; Hartmut Rosa, "Social Acceleration: Ethical and Political Consequences of a Desynchronized High–Speed Society," *Constellations* 10, no. 1 (2003): 3–33, 3; Hartmut Rosa and William E. Scheuerman, "Introduction," in *High Speed Society: Social Acceleration, Power and Modernity*, ed. Hartmut Rosa and William E. Scheuerman (University Park: Pennsylvania State University Press, 2009), 1–29; and Hartmut Rosa, *Social Acceleration: A New Theory of Modernity* (New York: Columbia University Press, 2013).

43. David Harvey, referring to the new high-speed communication and transport practices; David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford: Blackwell, 1989). Other theorists see relentless acceleration and the compression of time as the defining characteristics of early twenty-first-century society. See Thomas Hylland Eriksen, *Tyranny of the Moment: Fast and Slow Time in the Information Age* (London: Pluto Press, 2001); and Paul Virilio, *Speed and Politics* (New York: Semiotext(e), 1986 [1977]).

44. Floridi, *The Fourth Revolution*.

45. Rosa, "Social Acceleration," 6.

46. The sociologists Eric Hsu and Anthony Elliott have set out to explore precisely the kind of impact the speeding up of social life has on the psychological, affective, and emotional dimensions of human experience and especially on our sense of self. They argue that social acceleration "affects—and also is affected by—people's sense of selfhood in a variety of different ways"; Eric L. Hsu and Anthony Elliott, "Social Acceleration Theory and the Self," *Journal for the Theory of Social Behaviour* 45, no. 4 (2015): 397–418, 399.

47. Hsu and Elliott, "Social Acceleration Theory and the Self," 6–7.

48. Rosa, *Social Acceleration*, 246.

49. Rosa, *Social Acceleration*, 246–247.

50. Hsu and Elliott, "Social Acceleration Theory and the Self," 11.

51. If the self can become stationary as a result of intense social acceleration, it can also challenge the very logics of a high-speed society by decelerating. The distinctive feature of the decelerating self is that it arises (intentionally or inadvertently) as a mode of being that counteracts the accelerative process aiming at slowing down the pace of life; Hsu and Elliott, "Social Acceleration Theory and the Self," 12.

52. Hsu and Elliott, "Social Acceleration Theory and the Self," 9. Here, Hsu and Elliott are drawing on Nigel Thrift, "Re-inventing Invention: New Tendencies in Capitalist Commodification," *Economy and Society* 35, no. 02 (2006): 279–306.

53. Elliott, *Reinvention*.

54. Elliott, *Reinvention*.

55. Hsu and Elliott, "Social Acceleration Theory and the Self," 10.

56. As Lifton explains, "We are becoming fluid and many sided. Without quite realizing it, we have been evolving a sense of self appropriate to the restlessness and flux of our time. This mode of being differs radically from that of the past, and enables us to engage in continuous exploration and personal experiment"; Lifton, *The Protean Self*, 1.

57. Turkle, *Life on the Screen*, 10.

58. Robert W. Clowes, "The Cognitive Integration of E-Memory," *Review of Philosophy and Psychology* 4, no. 1 (2013): 107–133.

59. Chris Gosden and Yvonne Marshall, "The Cultural Biography of Objects," *World Archaeology* 31, no. 2 (2010): 169–178; and Hoskins, *Biographical Objects*.

60. Belk, "Extended Self in a Digital World."

61. Sherry Turkle, *Alone Together: Why We Expect More from Technology and Less from Each Other* (New York: Basic Books, 2011).

62. Ihde and Malafouris, "Homo Faber Revisited."

63. Michel Foucault, "The Ethic of the Care for the Self as a Practice of Freedom: An Interview with Michael Foucault on 20th January 1984," in *The Final Foucault*, ed. James William Bernauer and David M. Rasmussen (Cambridge, MA: MIT Press, 1987), 112–131; and Michel Foucault, *Technologies of the Self: A Seminar with Michel Foucault*, ed. Luther H. Martin, Huck Gutman, and Patrick H. Hutton (Amherst: University of Massachusetts Press, 1988), 1–20.

64. Clowes, "Thinking in the Cloud," 261–296.

65. Aaron Perzanowski, *The Right to Repair: Reclaiming the Things we Own* (Cambridge: Cambridge University Press, 2022).

66. Bernard Stiegler, *The Re-Enchantment of the World: The Value of Spirit Against Industrial Populism* (London: Bloomsbury, 2014), 1.

Chapter 12

1. Gilles Deleuze, *Empiricism and Subjectivity: An Essay on Hume's Theory of Human Nature* (New York: Columbia University Press, 1991).

2. Taylor, *Sources of the Self*, 112.

3. Chalmers, *The Conscious Mind*.

4. Thomas Metzinger, *Being No One: The Self-Model Theory of Subjectivity* (Cambridge, MA: MIT Press, 2003), 1.

5. As Clark observes, "There is no self, if by self we mean some central cognitive essence that makes me who and what I am. In its place there is just the 'soft self': a rough-and tumble, control-sharing coalition of processes—some neutral, some bodily, some technological—and an ongoing drive to tell a story, to paint a picture in which 'I' am the central player"; Andy Clark, *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence* (Oxford: Oxford University Press, 2003), 138.

6. Joseph Henrich, *The WEIRDest People in the World: How the West Became Psychologically Peculiar and Particularly Prosperous* (London: Penguin, 2020). See also Joseph Henrich, Steven J. Heine, and Ara Norenzayan, "The Weirdest People in the World?," *Behavioral and Brain Sciences* 33, no. 2–3 (2010): 61–83.

7. Ingold, *The Life of Lines*.

8. Bernard Stiegler, "Technics of Decision an Interview," *Angelaki* 8, no. 2 (2003): 151–168.

9. Alexander Nagel, "Leonardo and Sfumato," *Res: Anthropology and Aesthetics* 24 (1993): 7–20.

10. As the philosopher Michael Wheeler observes in his online essay "Thinking Beyond the Brain," "If our minds are partly in our smartphones and even our buildings, then that is not a transformation in human nature, but only the latest manifestation of the age-old human ontology of dynamically assembled, organic-technological cognitive systems. Nevertheless, once our self-understanding catches up with our hybrid nature, the world promises to be a very different place"; Michael Wheeler, "Thinking Beyond the Brain," 2011, http://computationalculture.net/article/beyond-the-brain.

11. James Williams, *Stand Out of Our Light: Freedom and Resistance in the Attention Economy* (Cambridge: Cambridge University Press, 2018), 3–4; Galit Wellner, "Onlife Attention: Attention in the Digital Age," in *Hyperconnectivity and Digital Reality: Towards the*

Eutopia of Being Human, ed. Kathrin Otrel-Cass (Cham: Springer, 2019), 47–65; Galit Wellner, "Attention and Technology: From Focusing to Multiple Attentions," in *Access and Mediation: Transdisciplinary Perspectives on Attention*, ed. Maren Wehrle, Diego D'Angelo, and Elizaveta Solomonova (Berlin: De Gruyter, 2022), 239–258; and Bas de Boer, "Attending to Your Lifestyle: Self-Tracking Technologies and Relevance," in *Access and Mediation: Transdisciplinary Perspectives on Attention*, ed. Maren Wehrle, Diego D'Angelo, and Elizaveta Solomonova (Berlin: De Gruyter, 2022), 217–237.

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