

# Introduction

*Gregor Etzelmüller/Christian Tewes*

Since the 19th century, the theory of evolution has unsettled and shaken traditional and fundamental anthropological assumptions about the place of human beings in nature. The Darwinian integration of human evolution into natural history was countered by the philosophical and theological anthropologies of the 20th century (Scheler, Plessner, Gehlen, Portmann, Pannenberg) with their attempts to hold on to the special status of humans in their intrinsically openness to the world and their spirit-endowed nature. Today, evolutionary anthropology, as well as the more recent philosophical anthropology, are increasingly based on the paradigm of embodied cognition (e.g., Varela, Thompson and Rosch, Clark, Gallagher, Thompson, Deacon, Donald, Tomasello, and Jung). Building on “embodied and enactive cognitive science”, this volume aims at answering the question to what extent the human mind and human cultural cognition are attributable to the structures of human existence, structures that have emerged in the course of evolution and have in turn been affected by cultural evolution. The paradigm of embodiment shows why the traditional dualistic opposition of *nature* and *culture*, *body* and *mind* is unjustified and how it can be overcome by an enactive framework of research on embodiment.

## 1. Current Research on Embodied Cognition

If one surveys the landscape of ever-growing research into embodied cognition, one sees not only commonalities but also important differences in the interpretation of this paradigm’s theoretical commitments. With Richard Menary, one can distinguish between a *moderate* and a *strong* embodied mind thesis. The proponents of the former view think that some mental states *depend* on non-neural bodily processes or states. The latter position, by contrast, emphasizes that at least some mental states are *constituted* by those non-neural bodily processes (see Menary 2015). It is worth noting that the moderate approach even encompasses certain varieties of internalism. According to the latter position, cognition can be located within the brain (it is brain bound) without involving any constitutive processes that *exceed* the boundaries of the skull. Frederick Adams and Kenneth Aizawa, for instance, do not deny that the nervous system is connected to the body and the environment in multifarious causal ways. They also acknowledge the claim that cognitive vehicles in the lifeworld such as mathematical notations,

or writing tools such as pencils or graphic characters, enable and support the accomplishment of cognitive tasks and operations (see Adams and Aizawa 2001). However, they are strongly critical of the claim that those states are constitutive for cognition. They stick to the more traditional view in the cognitive sciences that the human mind supervenes exclusively on brain states.

Both enactivism and the extended mind thesis reject this internalist reading of cognition in favour of strong approaches to the embodiment paradigm. Proponents of enactivism have pointed out that there is a mutual and constant circulation between body, brain and their environment (Thompson and Varela 2001, 424). The explication of this circular process in sensorimotor and autopoietic terms reveals that the strong embodied mind thesis is not solely justified by the almost trivial insight that perceptual content plays a foundational role in the human mind. The crucial point is rather that cognition is not something that happens inside the skull but is constituted as a “relational domain” by the incessant interaction between body, mind, and world (see Thompson and Stapleton 2009).

To understand this kind of interaction in more detail, it is important to note that the living organism *enacts* the world in which it exists. This means that organisms actively constitute their environment and are simultaneously constituted by it. Thus, the strong embodied mind thesis is justified in the case of enactivism by means of explicating *the relational co-constitution* of cognitive and mental processes.

Moreover, this approach leads to the conclusion that there is not simply a pre-given world that an animal with a central nervous system matches or represents by means of its neural states (Stewart 2014, 3). Rather, when animals build nests, dams, or burrows, they *reshape* and *structure* the developmental environment for subsequent generations (Sterelny 2010, 470).

Accordingly, the cognitive and cultural evolution of human beings is not to be seen as a constant process of adaptation to an independent environment existing identically for every living being; it is instead to be seen as a process of co-evolution of interrelated systems. Over the course of human development, it is particularly the historical-cultural dimension of cognition and the culturally shaped environment that – contingent on each other – expand in scope. When one approaches the theory of embodiment from such an evolutionary perspective, one begins to see its potential for overcoming the still implicitly present Cartesian divide between mind (*res cogitans*) and matter (*res extensa*) which continues to cast its shadow on the scientific exploration of man.

This dichotomy expresses itself in the fact that the natural roots of human beings are traditionally explored by means of the natural sciences and related disciplines, whereas the varieties of cultural practices in the lifeworld frequently fall into the domain of the humanities. This division of labor is always in danger of merely giving the dualism a new name, for instance a contrast between *nature* and *mind* or *nature* and *nurture*. Especially in anthropology, there is a strong tendency to uphold dichotomous thinking, even today (Thompson 2007, 410–411).

Evolutionary anthropology has tended to emphasize the continuity between animals and human beings by pointing to recent findings from evolutionary psy-

chology, palaeoanthropology, molecular biology, comparative neurosciences, etc. Most properties or skills that have been considered exclusive human features in the past are rooted in capacities that can be found in other species too (see de Waal 2009, Welsch, Singer, and Wunder 2011). The strict naturalistic reinterpretation of those findings in a Neo-Darwinian framework sometimes leads to the claim that it may be possible to explain cultural entities or institutions such as religion or art purely in terms of biological functions (see Dennett 2006, Dawkins 2006). Additionally, evolutionary anthropology assumes that there is, in a realistic sense, a given human nature due to the environmental constraints on human adaptation.

Some cultural anthropologists, on the other hand, basing their tenets on historical studies, respond to these encroachments with a rather radical view. They favor a constructivist stance, correctly pointing out that the natural sciences and the interpretation of experiments and findings are also produced within the cultural realm of the lifeworld (Schnegg 2015, 42). A more radical interpretation of this fact is the conviction that scientific findings need to be conceived as *cultural constructs* (von Glasersfeld 1996). From this point of view, science does not reveal forms or aspects of reality (laws, structures, and entities) that exist as the result of a *relational co-constitution* of human practices with the environment. To take one example, not only gender but even the ostensibly “natural” distinction of the sexes has been conceptualized in this research tradition as an *ideological construct* (see Butler 2014). Here the impact of postmodernist and radical constructivist thinking on cultural anthropology is obvious (Schnegg 2015, 39).

Unsurprisingly, such tendencies sometimes result in a clash between different research traditions, and dualistic implications sometimes reappear in modern guise. This has led to a chasm opening up between evolutionary and historical anthropology, hampering scientific attempts to bridge the natural and cultural realm with a coherent conceptual framework.

## 2. Evolutionary Continuity and Discontinuity

As the above considerations have already indicated, it is the central thesis of this book that enactivism has the potential to contribute in significant ways to overcome this unfruitful divide in contemporary anthropological research. This is because enactivism allows for a genuine and coherent explication of the strong embodied mind thesis. Evan Thompson, for instance, has worked out in detail the thesis that there is a deep continuity between mind and life (Thompson 2007).

His key idea is that even the simplest organism enacts its environment in such a way that, via a sense-making process, an environment emerges that is meaningful for the organism. “In observing other creatures struggling to continue their existence – starting with bacteria that actively swim away from a chemical repellent – we can, through the evidence of our own experience and the Darwinian evidence of the continuity of life, view inwardness and purposiveness as proper to living being” (Thompson 2007, 163). To take another example, physicochem-

ical macromolecules may manifest themselves within the milieu of a bacterium as nutrition or poison, that is, as *meaningful affordances* that either support or threaten the organism's life. These are relational emergent properties which cannot be reduced to a purely physicochemical description of reality.

This is entirely in line with Hans Jonas' concept of life as something manifested in the peculiar organization of organisms, which he sees as coextensive with mindful, self-sustaining processes. The fact that mental life is always embodied does not only mean "that the mind even on its highest reach remains part of the organism" but that the organism, even in its lowest form, prefigures mind (Jonas 1966, 1; Sheets-Johnstone 1999, 52). Especially the autopoietic explanation of organisms, their adaptivity and teleological structure, may be regarded as the attempt to operationalize those bio-philosophical insights and make them available for further empirical research (see Di Paolo 2005).

However, it would be wrong to suppose that *cultural processes* are simply built upon biological processes as higher layers of organization. It is one thing to elaborate convincing arguments and refer to empirical evidence for the evolutionary continuity of mind and life. It is quite another matter to give explanations for how the obvious discontinuities among non-human primates and humans have evolved. One explanation given for the distinctiveness of the latter is in terms of *plasticity*. Learning capacities and creativity, such as the ability to adapt to novel situations in multifarious ways or to create new problem-solving strategies, are important properties of plasticity. It has frequently been pointed out that plasticity is a design feature of the brain with specific modifications among the species. To a certain extent, this feature is present in every brain system.

However, in such a comparative approach, a distinctive feature of the human brain is its *superplasticity*. Human beings are remarkably quick at evaluating a wide range of strategies for surviving in, and adapting to, a rapidly changing environment (Donald 2001, 210). Compared with other animals, "what is different about human beings is that they are not just adapted for specific pre-existent structures in their environment such as pheromone trails and larvae, but rather that they are adapted for acquiring totally new skills and knowledge from their social-cultural environments" (Tomasello 2003, 238 f.).

As studies of niche construction have shown, the co-constitution of organisms and environment generally results from continuous bottom-up *and* top-down processes. This is true a fortiori with processes of *enculturation*, which are key factors in creating niches for enabling, developing, and stabilizing new learning strategies and flexible behavior. Those cultural niches are based on the acquisition and transfer of the cultural practices of social groups in a way that modifies both the biological and informational environment in mutually determining ways (Sterelny 2010, 470; Menary 2015, 4). Thus, from a phylogenetic and ontogenetic perspective culture plays a paramount role in explaining significant aspects of the evolutionary discontinuity between non-human and human primates mentioned above.

### 3. Evolutionary Specificities of the Human Body

Michael Tomasello's research on great apes and infants can be of help in deepening our understanding of these relations between nature and culture. Humans differ from great apes in at least two important respects: by means of intergenerational learning processes and a complex understanding of actors as intentional and cooperative agents. Already by the age of six months, infants develop the ability to follow the direction of a parent's gaze. This enables them to predict people's action in familiar surroundings. This is an important prerequisite to understanding fully-fledged intentional actions at a later age. An important intermediate state for understanding decision-making processes and action plans is the so called "nine month revolution" (Tomasello 2001, 61). At this age children start to understand other human beings as goal-directed and they begin to engage in triadic interactions (Tomasello et al. 2005, 682).

This leads to powerful cultural learning strategies, such as imitative learning, whereby the observer must conduct a complex means-end analysis of actions (Tomasello et al. 2005, 680). As these findings indicate, it is wrong to suppose that the ability for triadic interaction could be acquired in an atomistic fashion. It is obvious from an evolutionary viewpoint that culture functions as an ontogenetic niche for children. From the very beginning of their lives, children are engaged and immersed in ongoing social practices and a world of cultural artefacts, which enable their participation in social interactions (Portmann 1944; Tomasello 2001, 78–79).

It is important to emphasize, however, that a fundamental cognitive ability such as following the gaze of conspecifics requires a special shape and setup of the body for *realizing* such intersubjective cognitive processes in the first place. The latter is the upshot of synchronic *cultural* and *biological* evolutionary processes. In support of these thesis, research points to the fact that the human eye has passed through an evolutionary process of adaptation that enables a gaze to be followed. There is evidence that "in humans the widely exposed sclera (the white of the eye surrounding the darker coloured iris) make it easy for others to discern the gaze direction" (Kobayashi and Kohshima 2001, 419). This is an adaptation that distinguishes us, among other things, from other primates.

Furthermore, it is possible to show that the contribution made by eyeball movement (compared to head movement) to the change in gaze direction is very high in humans (Kobayashi and Kohshima 2001, 434). In evolutionary terms, this might be due to mutations that changed the phenotypes in such a way that it supported the generation of new forms of social interaction. At the same time, those properties are positively selected due to their functional effectiveness within the socio-cultural realm. Of course, such changes and adaptations occur in the context of specific constraints upon the entire morphological structure of the body and its embeddedness in the cultural environment.

To give an example, the larger the size of the body becomes, the more effective is eyeball movement for controlling gaze direction compared to head or body movement (Kobayashi and Kohshima 2001, 426–427). This underlines on the

one hand the significance of the shape, composition and makeup of the individual body for the emergence of cultural niches. On the other hand, it indicates how cultural constraints can be simultaneously co-constitutive for the human body when we may assume that eyeball movement for controlling gaze direction is positively selected in the emerging cultural niche. This is then an example how cultural and biological factors in evolution are combined an inseparable synergetic process (Malafouris 2013, 39).

These aspects of the the phylo- and ontogenetic setup of social interactions get a further justification in a phenomenological approach to intercorporeality that is an integral part of the enactive research program. Here we refer to the thesis that social interactions are based on a form of *direct perception*. At a pre-reflective level, we have direct access, for instance, to the emotional states of other persons, an access which is not mediated by sub-personal or personal simulation processes or inferences (Gallagher 2008, 539).

One can explicate and complement this account with the concept of *inter-bodily resonance*. A person's feelings are expressed in various bodily reactions (facial, gestural, or interoceptive) which function as a resonance platform. Thomas Fuchs has termed this process *intra-bodily resonance* (Froese and Fuchs 2013, 212). When those expressions become visible by means of intra-bodily-resonance processes (blushing and frowning as expressions of anger), they also become accessible for other people and serve as inter-personal resonance platforms of the feeling-bodies, intertwined and mutually shaped by an ongoing interactive process (a succinct example is contagious laughter). These basic inter-bodily expressive patterns are directly accessible in perception.

The remarks above on gaze direction already indicate that this capacity allows us to take the perspective of conspecifics and to direct our mutual attention to a third entity. This leads to an important extension of inter-bodily relationships. Building on the capacity for direct perception, it is possible to grasp how the evolutionary development of triadic communication and the ability to symbolize and reconstruct the perspective (beliefs, desires, plans) of other human beings ("theory of mind") could occur in the first place.

However, even the evolution of human language has only been possible because of a further evolutionary variation of the human body, in particular the supralaryngeal vocal tract:

The human larynx or 'voice box' (containing the vocal folds or vocal cords) differs significantly in position from the larynx of other primates such as monkeys ... One unfortunate consequence of this development is that the lower position of the human larynx makes it much more possible for the humans to choke on pieces of food ... In evolutionary terms, there must have been a big advantage in getting this extra vocal power (i. e. larger range of sounds) ... (Yule 2014, 5).

The advantage of a differentiated language outweighed its potentially fatal disadvantage (Fuchs 2013, 23f.). As Donald summarizes research on that matter, this must be due to a positive selection pressure at the cultural level (Donald 1991, 237).

If we consider evolutionary development and the examples of the human eye and vocal tract we can see that the intertwining of natural and cultural evolutionary processes generate bodily forms which allow for richer forms of intersubjectivity (and in this sense further forms of cultural developments) and which are positively selected due to a feedback loop of selection pressure within cultural niches. In this sense we can speak of a mutual causality of nature and culture.

The multidirectional and circular interactions of physiological, psychological, and social processes come to the fore once one resists those dualistic tendencies in the humanities and natural sciences mentioned earlier. What is needed is an interdisciplinary focus on the exploration of the embodied mind. The enactive probing and shaping of the environment by the organism leads to an emergence of mental processes at different levels of complexity with an immediate feedback upon how the organism guides its current and prospective action cycles in its habitat (Stewart [2010] 2014, 4–5). This implies that any understanding of the nature of human beings needs to take into account their mental, cognitive, and social operations as well as the physical embeddedness of those mental processes.

#### 4. Aims and Structure of the Volume

It is the aim of this anthology to examine, unfold, and substantiate the thesis that the paradigm of embodiment can bridge the gap between cultural and evolutionary anthropology, thereby enabling a fruitful exchange between the two different research perspectives. Further, the paradigm of embodiment can offer new answers to the question of how evolutionary processes could give rise to a living being with a specific mental constitution capable of *accelerating, stabilizing, and influencing* its own cultural development in such a remarkable way (Tomasello's famous "ratchet effect", Tomasello 2001, 5).

It is likely that a coherent answer to this question will also include a new account of nature which is different from any model of nature that reductive naturalism or physicalism offer (McDowell 1994, 77). Because human beings are to a certain extent responsive to reason-giving processes that are indispensable in a complete description and explanation of human actions in action theory and anthropological research, an evolutionary approach must explain how *natural* evolutionary processes could bring forth human beings who interact with and are responsive to the "space of reason" within the socio-cultural realm. Taking these aspects together, this points to the continuity of mind and life in nature whereby basic sense-making processes prefigure at least some aspects of the normative and meaningful dimension of full-fledged reasons. This is especially important with regard to ethical reflections and how reasons could, to put it in Davidson's terms, be "causes" or play at least a vital role in the development of self-governance and moral commitments of persons (see Davidson [1963] 1980b, [1970] 1980c, [1971] 1980d). The self-differentiation of values and the enactive mind within the evolutionary life-mind continuum is therefore important in that it sheds light on the explication of reason and normativity (Di Paolo Rohde, and De Jaegher [2010] 2014, 50–51).

With regard to these questions, the volume starts with an elaboration of the concept of embodiment (Section One). As already indicated, the literature on embodiment explicates this paradigmatic concept in diverse ways. Certainly there is general agreement between *classical enactivism*, *radical enactivism*, and the *extended mind theory* that cognitive states not only depend on bodily processes but that bodily processes play a constitutive role for the mental formation and effectiveness of a person. However, there are also important differences in detail in how these shared assumptions are developed. The significance of these details for the entire embodied approach to evolution and culture is the central topic of the first chapter and is analyzed in the papers that follow. The authors go on to explore how, in the structural coupling of the organism with its habitat, not only new forms of significance emerge but also mental and cognitive abilities that cannot be reduced to the physio-chemical realm.

This question is explored further in Section Two: how, by means of their intercorporeal constitution in the lifeworld, do human beings develop cognitive and linguistic capacities which transcend the *here and now* of their immediate bodily-based egocentric perspective, such as in declarative memory and prospective plans of action? At the cultural level, the embodied mind manifests itself as a “cultural bodily-based power materialized in countless cultural products that enables individual as well as intersubjective conducts of life in dense memories and imaginations” (Welker 2015, 310). Using insights from different fields, such as cognitive semiotics, biological anthropology, developmental psychology, and philosophy of language, the contributors to this section develop an evolutionary explanation of language and symbol use.

Section Three explores to what extent the paradigm of embodiment can overcome the widening chasm between evolutionary and historical anthropology. Discussing the ideas of Charles Darwin, the section shows how human evolution brings forth a being, which is able to develop forms of sympathy and empathy. In the co-evolution of human cognition and empathy, specific human forms of joint attention and mimesis play a crucial role. They lead to powerful cultural learning strategies. Consequently, on the one side, evolutionary anthropology conceives of humans as beings whose variety can only be described by historical means. On the other side, historical anthropology makes it clear that even premodern cultures were familiar with the fact that human beings are embodied.

The insights of Sections Two and Three are used to shed light on the issue of human phylogenesis in Section Four. To explain the origins of contemporary human cultural behavior, evolutionary-biological processes such as genetic mutation and selection are widely seen as – to some extent – necessary but not sufficient. The contributors to this section follow “bottom-up” approaches to get closer to the central question of how the specific combination of natural and cultural characters expressed by contemporary humans could have developed in physical and cognitive interaction with the material world. This last part of the book focuses on the significance of participatory interaction with artefacts and materiality for our development as a species. In this regard, material-engagement theory and its insights are of primary interest in the volume’s final section.

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