

**THE HUMBLE GENIUS: ON THE COGNITIVE ROLE  
OF THE HUMAN HAND FROM THE EMBODIED VIEWPOINT**

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**ABSTRACT:** The main goal of the paper will be to present and critically examine the cognitive importance of the human hand in the process of perception as well as in the process of development of characteristically human forms of intelligence. This examination is carried out mainly (but not exclusively) from the point of view of G. H. Mead's 'haptic philosophy'. The author endeavors to root this pragmatist viewpoint, first in contemporary theories of human bipedalism, and, subsequently, in current enactive views of the role of the hand in the development of human cognitive capacities.

**1. Introduction**

From the point of view of ordinary experience, our interaction with the world of material objects might seem to us perhaps as natural as breathing, or blinking. Indeed, the human interaction with the outer reality feels this way also because it actually begins before our birth – already in the safe environment of the mother's womb the unborn child experiences the uterine wall when pushing against it. In this way, even before we are born, we are being prepared for an environment of resisting material objects. By the time we reach a relatively independent degree of self-consciousness, our dealings with the material world are assimilated by our bodies to such a degree, that they disappear from the horizon of our explicit awareness and become a part of what has been called the 'background.' The main focus of the present paper will be 1) to explicitly thematize the role which the human hand plays in our dealings with the world of material things, and 2) to investigate what potential this 'handed engagement' (which is indeed unprecedented in the entire animal kingdom) has for shaping our minds, brains, and culture. The perhaps provocative title of the paper 'The Humble Genius' was chosen deliberately to immediately call the reader's attention to the fact that our embodied interactions with the environment mostly seem to us so transparent that we tend to forget about them and think of embodiment,

perhaps, in too abstract terms. Most of the practical interactions with the material as well as social world take place by means of our hands and yet, very little effort has hitherto been put to a deeper reflection on how our *handed nature* shapes our brain, body, and also culture. The hand is, as this paper is going to argue, a 'humble genius' because it does most of the work in shaping our thought and culture and yet, it cannot speak – it remains silent and obedient in all circumstances. Perhaps exactly this ingenious humility of the hand led the French art historian Henri Focillon to write a remarkable pamphlet "Eloge de la main" [The praise of the hand] which deserves to be cited at length:

J'entreprends cet éloge de la main comme on remplit un devoir d'amitié. Au moment où je commence à l'écrire, je vois les miennes qui sollicitent mon esprit, qui l'entraînent. Elles sont là, ces compagnes inlassables, qui, pendant tant d'années, ont fait leur besogne ... Par elles l'homme prend contact avec la dureté de la pensée. Elles dégagent le bloc. Elles lui imposent une forme, un contour et, dans l'écriture même, un style. Elles sont presque des êtres animés. Des servantes ? Peut-être. Mais douées d'un génie énergique et libre, d'une physionomie – visages sans yeux et sans voix, mais qui voient et qui parlent. Certains aveugles acquièrent à la longue une telle finesse de tact qu'ils sont capables de discerner, en les touchant, les figures d'un jeu de cartes, à l'épaisseur infinitésimale de l'image. Mais les voyants eux aussi ont besoin de leurs mains pour voir, pour compléter par le tact et par la prise la perception des apparences ... La face humaine est surtout un composé d'organes récepteurs. La main est action : elle prend, elle crée, et parfois on dirait qu'elle pense. Au repos, ce n'est pas un outil sans âme, abandonné sur la table ou pendant le long du corps : l'habitude, l'instinct et la volonté de l'action méditent en elle.<sup>1</sup> (Focillon 1934, 3-4)

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<sup>1</sup> I undertake this praise of the hand as one fulfills a duty of friendship. When I start to write, I see my hands which solicit my mind, which propel it. They are there, these tireless companions, who for so many years, did their work ... By means of them a man made contact with the hardness of thought. They clear off the way [of thinking]. They impose [it] a shape, a contour, and in the writing, even a style. They are almost animate beings. Mere servants? Perhaps. But endowed with a strong and free spirit, with a physiognomy – who see and speak, although they have no eyes and no voice. Certain blinders over time acquire such a delicacy of touch that they are able to discern the suits of a card game, the infinitesimal thickness of an image. But the seeing [ones] also need

Focillon rightly remarks, that the hands are the center of (human) action, i.e. although we are embodied like other animals, what makes us distinctly human is the scope in which we are able to creatively use our hands to transform our habitat. Over the last two decades, the pragmatically informed 4EA (embodied, extended, enactive, embedded, affective) accounts of cognition<sup>2</sup> have provided us with excellent reasons why it is no longer possible to think of the mind in absence of the body and materiality which surrounds it. This paper would like to point to the hand not only as a mediator between those two but much rather aims to present it as an element which indeed plays a constitutive role in how we perceive the world. The main intellectual source of this endeavor will be the 'haptic philosophy' of George H. Mead, who arguably was the only classical pragmatist to have underlined to a crucial degree the constitutive role of the human hand for specifically human forms of cognition (Miller in Mead 1982, 12). However, before one can get to Mead's theory on the cognitive role of the hand, it will be necessary to paint a broader syncretic picture of how it might have happened that humans developed their unique manual abilities. To this end, it will be necessary to shed some light on certain contemporary evolutionary theories regarding the development of the human bipedalism which freed the hands in the first place and brought about important changes in human anatomy and, consequently, also in the human brain and social relations. Second, Mead's conception of contact and distance experience will be elucidated along with certain phenomenological consequences that such a conception brings. Next,

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their hands to see, to complete by touch and grasp the perception of forms ... The human face is primarily a compound of receptor organs. The hand is action: it takes, creates, and sometimes it looks like it thinks. At rest, it is not a soulless tool, abandoned on the table or hanging along the body: the habit, instinct and will to action meditate in it. [Translation – R.M.]

<sup>2</sup> See, e.g., Burke (2013), Gallagher (2014a), Gallagher & Miyahara (2012), Chemero (2011), Johnson (2008), Jung (2009), Menary (2007), Madzia (2013), Madzia & Jung (2016), Rockwell (2005), Solymosi & Shook (2013), etc.

Mead's enactive realist theory of a physical object will be introduced in order to prepare some conceptual foundations for what one could call the pragmatist metaphysics of materiality. In the fourth step, all of the previous considerations will be put together with Mead's theory of symbolic interaction in order to demonstrate the possibilities which Mead's concept of communication *via* significant symbols offers us when investigating the multifaceted human relations towards the world of things, artifacts, objects, and material signs. In this manner, it will be demonstrated how our 'handed' form of embodiment gave rise to the phenomenon of material culture, and in turn, how the material culture changes the human neuronal as well as social profile.

## **2. The liberation of hands: the upright posture & what it means for us**

The history of man becoming a tool-maker, gesturer, and a producer of signs and (material) culture is inseparably connected to the development of human bipedalism and upright posture for several reasons; first and the most obvious being the fact that without relatively free front limbs, no sophisticated tool making would be possible as the limbs would be predominantly used for maintaining balance and generating movement in space. Secondly, despite the fact that monkeys and apes are quadrupedal they are known to be able to use (if not produce) several kinds of tools. It turns out then, that the whole story of human bipedalism is a bit more complicated than this and that bipedalism did not develop by humans primarily in order to enable them to produce or use tools. However, it still remains an undeniable fact that bipedalism and upright posture played an absolutely crucial role in the evolution of humans as a species with unique cognitive characteristics. As Shaun Gallagher, notes: "if humans had not attained the upright posture ... or did not evolve with hands, the human brain would likely be much smaller, our sensory and motor systems would be different (more attuned to the olfactory than to vision), and none of it would function in the specific

way it functions now. Indeed, we would likely have to redefine what we mean by rationality” (2015, 99-100). Some anthropologists such as Carsten Niemitz point out that the human orthograde posture and locomotion are not only unique among all mammals: “Even among all land-dwelling vertebrates, human bipedalism is unparalleled, since erect-walking penguins, with their short rudder-like feet, have a completely different functional anatomy and biomechanics (...). Moreover, neither dinosaurs nor ostriches or any other sauropsid or marsupial moving on their hind feet show an orthograde spine in locomotion” (2010, 241). Although the human upright posture is usually presented as a great evolutionary step forward, from the point of view of functional biomechanics, there are also very serious disadvantages our ancestors had to face when adopting the upright posture. The French anthropologist Yvette Deloison (2004) even go so far as to contend that bipedalism brings humans to such an unfavorable position *vis-à-vis* other quadrupedal species that it does not offer sufficient advantages for it to have persisted according to the classic criteria of natural selection. There is several crucial functional impediments which make the upright posture disadvantageous: i) *slowness* which according to Lovejoy (1981) increases predatory pressure against much faster apex predators such as eagles or leopards; ii) *higher risk of injuries* – elevated position of the center of mass of the upright body above a small supporting area increases the probability of injuries from falls (Skoyles 2006); iii) *higher energy consumption* – an erect locomotion performed by quadrupedal primates is highly energy-consuming and subjects the joints of such primates to new and different stresses. Taking into account that the evolution of bipedalism must have taken perhaps millions of years this factor has to be taken as an effective selective pressure against an erection of the body for locomotion.

So how did it happen that humans ended up walking on two feet? There are multiple theories concerning this question. Because of space limitations it will not be

possible to address all of them here.<sup>3</sup> Let us, therefore, take a closer look at those which are, in one way or another, directly related to the role of the hand.

- 1) *The freeing of the hands hypothesis* – promoted initially by Charles Darwin in his book *The Descent of Man* (1871) and influential in especially in 1960s. According to this theory, human bipedalism was a result of evolutionary pressure in hominids which increasingly engaged themselves in activities such as tool-using, weapon-handling, food-gathering, and self-defense. However, as indicated above, the upright posture is not a functionally necessary position for manipulation with things, neither by humans, nor by other primates.
- 2) *The provisioning hypothesis* – according to this theory, food transport was the origin of the late hominid bipedalism. As the advocates of this theory contend, using hands for food carrying was a significant improvement in comparison to quadrupedalism where food is transported by means of the mouth, or a hand grip of a single arm. Niemitz (2010), however, argues that such a behavior happens quite rarely by our closest relatives, i.e., big apes. Although he admits that food carrying might have been a complementary factor in the evolution of bipedalism, he doubts that this activity, on its own, might have caused such a significant transformation in human functional make-up.
- 3) *The reaching for food hypothesis* – proceeds from the hypothesis that bipedalism originated in a savannah scenario. In those circumstances it was often necessary for our ancestor to be able to reach and pick up fruits from higher parts of bushes and trees. According to this theory, bipedalism evolved

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<sup>3</sup> For an excellent summary of these theories, see Niemitz (2010).

in order to improve access to food sources close to the ground. Nevertheless, actions such as reaching for food are usually very episodic, in other words, they do not take a very long time. In this sense, one may doubt whether such a fundamental change in human functional make-up really can be a result of short-term actions (however important such actions may be) such as food picking.

- 4) *The display hypothesis* – argues that bipedalism has its origins in a novel way of resolution of intragroup conflicts. In this scenario, an individual entering into a conflict with another individual would stand up on his rear limbs (hence a ‘display hypothesis’) in order to intimidate his opponent. The surprising effects of such a behavior would, then, often result in winning of fights and getting more offspring. Subsequently, the offspring would stand up more and more often and achieve a higher status because of this novel behavior. Apart from the apparent speculativity of this theory, the objection can be raised that the display behavior takes up relatively very brief periods of time. In other words, this theory, again, does not seem to answer the question why our ancestors would remain upright after the social conflict has been solved.

As Niemitz himself observes “The main question is not why our ancestors stood up for some reason and for longer durations than they had done before. It is of much greater importance why they remained upright afterwards, and why they started walking for a considerable span of time” (2010, 250). In the paper extensively cited above, Niemitz proposes the so-called ‘shore dweller hypothesis’, according to which human bipedalism came into existence as a result of wading behavior adopted by our hominid ancestors. As he argues, late hominids found themselves in a different, far wetter environment than their earlier savannah ancestors and were often forced to look for resources in

swamps, small lakes and river shores. Although they were not able to swim, they moved along flowing waters, coastal areas, and swamps, often holding on to branches or lianas. The wading behavior forced them to walk upright for longer periods of time, the water relieved the pressure on joints in submerged body parts, helped to maintain balance as well as prevented serious injuries resulting from falling down. According to Niemitz, our longer legs and arms (eventually best adapted for manipulating, tool-making, and throwing) are also a result of environmental pressure as the natural selection process by waders would prioritize individuals with longer legs. These legs, as he argues, would eventually be so long that humans would preserve upright posture even when moving on dry land.

It is not the goal of this paper to adjudicate between the competing theories of the origins of upright posture. Much rather, what appears interesting from the pragmatist point of view is that according to all these anthropological theories, the eventual liberation of human hands took place not because of some transformation in the early human brain but much more likely because of novel ways in which our hominid ancestors were able to engage their environmental affordances. Even mental capacities such as long-term planning, foresight, etc. might have been consequences of radical transformations in our bodily make-up, that is to say – of our upright posture. As Shaun Gallagher (2005) notes, the upright posture is probably one of the essential elements of what makes us human. It transforms the entire human anatomy – it changes the functional structure of the human foot, ankle, knee, hip, and vertebral column, as well as the proportions of limbs. All these aspects enable the upright posture, but are also shaped by the attainment of it, which in turn permits the specifically human development of shoulders, arms, hands, skull, and face. The liberation of hands changes the physiological demands on the structure of our shoulders, which no longer need to be as massive as those of our ancestors, thus leaving space for

a better development of our brain. Since hands become the primary organ for manipulation, our mouth is no longer in need for a massive musculature which retreats in favor of muscles responsible for linguistic articulation and creates more space for brain development (Gallagher 2014b). From the philosophical point of view, it is also important to note that since the upright posture is not an inborn capacity, it has to be learned by a child at the age of about one. Walking on two feet, maintenance of balance and movement in space in such a manner is by far not an easy task for an infant. Especially at the beginning, it has to be struggled for: “[t]his depends on a basic level of consciousness, namely, wakefulness. Fall asleep and you fall down. Posture and movement start to shape this basic wakefulness even prior to standing; movement, including early crawling behavior, influences the development of perception and cognition” (Gallagher 2005, 148). An awareness of one’s own body, its movements, and intentions is an important side-effect of the upright posture.

By being more distant from the ground, we also become more distant from things in our immediate surroundings – we gain sight of what is distant from us and this pushes us to develop mental capacities such as long-term planning, sharper vision, and foresight. Our olfactory mechanisms (way more dominant by most mammals) shrink in favor of vision. Accordingly, our environmental horizon of affordances is widened and distanced. Jesse Prinz, for instance, argues that the characteristic prehensile thumb, which could develop thanks to human bipedal posture

has made us especially skilled at manipulating the world. Arguably these two advantages [the position of the thumb and bipedal posture – R.M.] are arguably the physical underpinnings of human uniqueness. We are, more than any other creature, a handed species. Being handed even distinguishes us from the great apes, whose hands double as feet, limiting their role considerably. Apes use tools, but only when sitting or being relatively stationary. We can track animals while holding a spear poised for throwing or plant seeds while walking across a

field ... Hands also allow us to do many things that other creatures do with their mouths, such as fighting, foraging, tearing, and grasping food. This new division of labor may serve to make mouths more available for communicating. (Prinz 2013, xi-xii)

Standing on two feet frees the hands for gnostic touching, manipulation, carrying, tool use, and also for basal forms of joint attention such as declarative pointing.<sup>4</sup> One should, nevertheless, not forget that visual experience, just like the haptic one, remain, two different modes of skillful, bodily exploration of the world – as Alva Noë once stated – “vision is touch-like. Like touch, vision is active” (2004, 73). With the development of upright posture and the liberation of hands, the sphere of manipulation and the sphere of vision diverge enormously which, apart from capacities mentioned above, brings about the necessity for finer eye-hand coordination. All these functional changes introduce behavioral complexities to which the brain needs to respond by new structural developments. These structural developments are, in turn, enabled by a diet richer in proteins, gained by means of hands liberation, tool-making, cooking, better hunting techniques etc. The entire process of hand liberation, being itself a product of various environmental pressures, leading to significant developments of the brain-structure which, in turn, leads to improvement in multiple mental capacities (which bring about active refashioning of the environment by human beings) is not of a linear but rather of circular nature where all the elements of the causal chain mutually reinforce each other on various levels. In this context, the French archeologist and anthropologist André Leroi-Gourhan points to the “the uniquely human phenomenon of exteriorization of the organs involved in the carrying out of the techniques” (1993/1964, 257). In his view, what is characteristic of human beings is their continued endeavor to place outside what in the rest of the animal

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<sup>4</sup> For a rigorous examination of the phenomenon of declarative pointing with reference to Mead’s concept of the self, see Booth (2016, 244-248).

world is achieved inside.<sup>5</sup> Also for this reason Andy Clark has called our species ‘natural-born cyborgs’ for:

what best explains the distinctive features of human intelligence, is precisely their ability to enter into deep and complex relationships with nonbiological constructs, props, and aids. This ability, however, does not depend on physical wire-and-implant mergers, so much as on our openness to information-processing mergers. Such mergers may be consummated ... into flesh and blood, as anyone who has felt himself thinking via the act of writing already knows. The familiar theme of ‘man the toolmaker’ is thus taken one crucial step farther. Many of our tools are not just external props and aids, but they are deep and integral parts of the problem-solving systems we now identify as human intelligence. Such tools are best conceived as proper parts of the computational apparatus that constitutes our minds. (2003, 5-6)

As also this paper will argue below, the properties of the human brain, body, and their natural and artificial environments are products of their mutual co-evolution in which it is impossible to determine, once and for all, which one of these elements plays the primary role in the entire process. One of the consequences of this co-evolution is that material culture and artificial human environments can no longer be seen as mere epiphenomena of the development of the human brain structure. Rather they should be understood as one of the elements which drive such neural developments. As this paper would like to argue, the hand is, metaphorically speaking, in the center of these mutual co-constitutive relations because it mediates most of the relations between the brain, body, and the material world of physical objects and cultural artifacts.

### 3. Touch and the sense of reality – Mead on contact and distance experience

In order to be able to fully grasp Mead’s understanding of the role of the hand (and, more generally speaking, of touch), it will first be necessary to briefly elucidate his

<sup>5</sup> One of the most evident activities of this sort is, for instance, cooking. See Sterelny (2010).

theory of the act. As all other pragmatists, Mead understood human experience as a natural event taking place within the dialectical dynamics of organic means and ends. As opposed to Dewey (by whom Mead was, obviously, influenced to a crucial extent) Mead attempted to design a more stratified view of organic action than his older colleague and life-long friend. It is important to keep in mind that Mead’s theory of the act does not regard human action uniquely but can be applied in order to understand the behavior of any living organism: “We assume purposive acts in nature, plants, animals, etc., that are more than the energies constituting them, at least from the non-mechanical viewpoint. Such purposiveness is independent of any mind ... wherever we find living forms we find acts” (Mead 1982, 108). Mead designed his theory of the act within the conceptual playground delineated by its four functional phases, namely that of impulse and consummation (being fundamental<sup>6</sup>) and perception and manipulation (being what Mead called ‘mediatory’ phases of the act). Each act begins at the stage of an impulse which is defined by Mead as “a congenital tendency to respond in a specific manner to a certain sort of stimulus, under certain organic conditions” (Mead 1934/1967, 337). The most primitive examples of impulses might be hunger, anger, sexual attraction, and nurturing. In this basal set of embodied tendencies to act, the impulses mutually “reinforce themselves and expand and give expression to other impulses as well” (ibid. 385).<sup>7</sup> In fact, Mead was convinced that the entire human society is a product of such refinements and modifications of primitive impulses by individuals and

<sup>6</sup> In this context, the term ‘fundamental’ also means ‘necessary’, or ‘always present’. As we will see below, each act necessarily has to have an impulse and consummation. The mediatory phases of the act – perception and manipulation – are, according to Mead, contingent phases of the act, i.e., not every act needs to contain them in order to be called this way.

<sup>7</sup> In fact, Mead was convinced that the entire human society is a product of such refinements and modifications of primitive impulses by individuals and social groups. See, e.g., Mead (1918/1964, 214).

social groups. Depending on the homeostatic balance of an organism, an impulse can be understood as a concentration of energy which, at a certain point, requires a discharge. Depending on the environmental setting and the individual life history of the organism, various objects may serve as a stimulus for such a discharge.<sup>8</sup> By contrast, an act finds its completion in consummation which can be characterized as a successful achievement, or satisfaction, of the particular course of action (Mead 1938, 36). Mead agrees with Dewey who argued already in *The Reflex Arc Concept in Psychology* that each impulse contains in itself its goal (or end-in-view) that would, under ideal environmental conditions, lead the organism directly to the stage of consummation. At the same time, Mead was aware that in the case of higher-order organisms such a situation almost never takes place. Upon the appearance of an impulse the consummation almost always has to be postponed in favor of processes of an active search for appropriate stimuli. Exactly this is the reason for which he introduced into his concept of organic action the mediatory phases of *perception* and *manipulation*.

In the phase of perception, the organism actively brings into focus the appropriate characteristics of the environment with implicit reference to its goals. In other words: "The organism goes out and determines what it is going to respond to, and organizes [its] world" (Mead 1934/1967, 25). The appearance of the mediatory phases of the act is, therefore, co-extensive with the appearance of a problematic situation where the validity of certain aspect of the organism's environment is called into question. In the functional structure of organic action, the phase of perception and manipulation fulfill the task of reestablishing of this lost validity. As far perception is concerned, it is crucial to note that Mead by far does not belong to the tradition of what Matthew

Ratcliffe pertinently calls "epistemological voyeurism" (2013, 131), which conceives of our primary cognitive relationship with the world as sight-like, gaining maximally detached, or objective, 'view' of the world. On the contrary, *Mead grounds his entire theory of perception not on vision, but on touch*. Being fully aware of the initial anti-intuitiveness of such a view on the one hand, and of the need to do justice to the role of vision in the process of perception on the other, he introduces a distinction between what he calls *contact* and *distance experience*: "The human animal is sensitive with five channels for experience; but all of these reduce to distance experience and contact experience" (Mead 1982, 107). The justification of the thesis about the primordially of contact experience can be drawn on two paralleled and mutually reinforcing lines of argumentation: i) evolutionary and ii) epistemological. As for i) Mead correctly argues that in the process of evolution, the appearance of sensory receptors that reacted to stimuli which entered into immediate physical contact with the organism preceded the ones which detected distant stimuli. In an extremely simplified way we can, thus, argue that retina is an evolutionary descendant of skin. However, Mead was well aware that from a strictly logical point of view, the mere fact that touch evolutionarily precedes vision does not in any direct way imply its epistemological superiority over vision.

This is the reason why he tries to reinforce his thesis about the primordially of touch by what one could call an 'epistemological argument.' According to Mead, contact experience is the immediate presence of the environment as it appears in unmediated physical opposition to one's body. It is precisely in the active opposition, which the worldly objects often put up against our voluntary acts, where we find an ultimate confirmation of its independent reality. As Cornelis de Waal puts it: "Although contact experiences position the individual and its environment radically opposite of each other, they also reveal that they belong to the same class of things, namely those things that can affect each other

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<sup>8</sup> For instance, a stream of water will show up differently for someone who got lost in the mountains and is on the verge of death of thirst than to a traveler with appropriate supplies, who might perceive it purely in terms of aesthetic appreciation.

in that particular way" (2002, 23). The resistance which the outer world puts up against our acts of will, is in a certain way a *conditio sine qua non* for having a world at all. It is the *resistance* of a rock which allows us to climb it; it is the resistance of air which enables the birds to fly, etc.<sup>9</sup> The phenomenologist Matthew Ratcliffe puts the entire point very clearly when he writes that "[w]ithout vision or hearing, one would inhabit a very different experiential world, whereas one would not have a world at all without touch" (2013, 132). The touch ultimately informs us that our bodies belong to the same category of objects as physical things around us.<sup>10</sup> We experience the physical world by means of our own bodily effort, which can only exist over against the resistance offered by physical things around us. At this point we might recall the German phenomenologist Hans Jonas who argues that "[r]eality is primarily evidenced in resistance which is an ingredient in touch experience ... Touch is the sense, and the only sense, in which the perception of

quality is normally blended with the experience of force, which being reciprocal does not let the subject be passive; thus it is the sense in which the original encounter with reality as reality takes place" (1954, 516). By advocating this epistemological position, Mead unambiguously separates himself from the Modern epistemological paradigm based on vision, coming initially from Plato. Interestingly, Mead's contention that our experience always tends towards its confirmation in contact experience is conspicuously close to views held by Zeno of Citium, the founder of the Stoic school in ancient Greece. In his quarrel with representatives of skepticism of the Second (or Middle) Academy such as Arcesilaus, Zeno argued that we can, after all, comprehend reality with certainty. The cognitive means which enables us to confirm the objective reality of things is what he called the 'cataleptic [seizing/grasping – R.M.] impression' (*katalēptikē phantasia*). In Zeno's materialist philosophy, the validity of our beliefs about things around us can be dis-/proved by a direct physical contact with them.<sup>11</sup> Mead, on one hand, does not go as far as to contend that a mere sense experience can be the ultimate basis for the validity of our statements about it (myth of the given); on the other hand, however, by accentuating the primacy of contact experience in direct physical dealings with objects which resist our efforts, he lays out the conceptual fundamentals of the pragmatic theory of truth.<sup>12</sup> Thus, in Mead's opinion, contact experience serves as a sort of interface by means of which our beliefs and actions in the environment either find their ultimate confirmation, or are called for further correction.

By contrast, distance experience is the kind of experience we have of objects which are not within our reach. Distance experiences (being a later evolutionary development) provide the organism with significant advantages because they inform it about the events in its

<sup>9</sup> "The situation out of which this transfer arises is the co-operation of resistances offered by physical things to the organism and by the organism to physical things. Human posture in any position involves it. Manipulation of any sort is an expression of it. The floors and stairs of our buildings, the forms of our articles of furniture, and the handles of everything that we handle are but elaborations of it. It is impossible to exaggerate the fundamental nature of this co-operation of the human animal with his contact environment or his dependence upon it. He rests upon it, demands and beseeches it in every position and at every step. The solid earth is dependable, the bog is treacherous, the shaft or haft is inviting to the hand, and the balance of the weapon or tool is companionable" (Mead 1938, 187).

<sup>10</sup> In fact, there are sound reasons to assume that what we call here Mead's epistemological argument for the primordially of touch initially comes from Wilhelm Dilthey with whom Mead studied in Berlin in 1890s and who supervised Mead's unfinished doctoral thesis. In 1890 Dilthey published an article "Beiträge zur Lösung der Frage vom Ursprung unseres Glaubens an die Realität der Außenwelt und seinem Recht" [Contributions to Answering the Question About the Origin of Our Belief In the Outer World and Its Justification], where he presents a theory very similar to the one Mead presented in his work a couple of decades later. For a more detailed analysis of this theory of Dilthey's and its possible influence on Mead, see Madzia & Jung (2015).

<sup>11</sup> For a more detailed account of this concept, see, e.g. Hankinson (2003, 271-273).

<sup>12</sup> Mead's own version of the pragmatic theory of truth in Mead (1929/1964, 320-344).



surroundings even before the direct physical contact occurs. In this sense, they make our relations with the environment considerably richer since they present us with a whole array of possible future experiences. What distance experience presents us with are, therefore, mere *signs of future contact*, for it is ultimately only in terms of contact experiences that these distance experiences are to be understood, or as Mead laconically puts it: “[r]eality reduces to possible future experiences” (Mead 1982, 118). By referring to ‘possible future experiences’ Mead also points to the fact, that the existence of distance experience is one of the preconditions<sup>13</sup> for the emergence of temporality in our experience. By seeing a distant object (the meaning of which, we must remember, is always encoded in terms of possible contact experience), I simultaneously gain awareness of the distance which separates me from consuming that particular thing. What is far from one spatially, is also away from one temporally. In this way, distance experience brings the future into the present, thus introducing an element of time into perception. The spatial separation of a human body from objects which it is interested in is, then, a precondition for the emergence of temporality.<sup>14</sup> This idiosyncratic position of Mead implies two further points which will be important for our further discussion; i) the hypotheticality of the

reality which is out of our immediate reach, ii) the emergence of the possibility of choice. As for i) Mead’s pragmatist philosophy of perception unambiguously presents us with an image of a hypothetical nature of reality. The reason for this is that what distant experience reveals to us is merely a *possible* future experience. What now seems to me to be a hammer, lying on the floor on the other side of the room, might, after I approach it, turn out to be just a toy which my infant nephew left there a while ago. According to Mead, all distant objects are in this sense tentative and open. Consequently, all distant experiences are also fallible and hypothetical; what we see, smell, and hear, are in a way mere ‘images’ filled up with expectations coming from our past bodily experience:

Our environment exists in a certain sense as hypotheses. “The wall is over there,” means “We have certain visual experiences which promise to us certain contacts of hardness, roughness, coolness.” Everything that exists about us exists for us in this hypothetical fashion. Of course, the hypotheses are supported by conduct, by experiment, if you like. We put our feet down with an assurance born out of past experience, and we expect the customary result. We are occasionally subject to illusions, and then we realize that the world that exists about us does exist in a hypothetical fashion. (Mead 1934/1967, 247)

These words of Mead not only suggest, that organisms to a great extent create their own environment by means of creating specific ways of responding to the affordances this environment presents them with but also that *perception is an activity that needs to be learned*. In other words, perception is not something that happens to us but rather something we do – it is a way in which embodied beings with various sensorimotor make-ups negotiate their environment. It is, hence, hardly surprising that, according to Mead, the meaning of a distant object is completely laid out in terms of possible practical actions we can carry out toward it: “The object in perception is a distant object. It invites us to action with reference to it, and that action leads to results which generally accomplish the act as a

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<sup>13</sup> Along with the human capacity for thinking by Means of significant symbols. See, e.g., Eames (1973).

<sup>14</sup> Interestingly, Rafael Núñez, a mathematician and one of the most prominent proponents of embodied cognition, argues that it is characteristic of human cognition to stratify time in terms of space. This unconscious stratification has also been incorporated into virtually all human languages. In other words, according to Núñez, time events are mapped in our experience and language as events in space. For instance, we say the “session is *approaching*”, “the day *before yesterday*”, “the end is *near*”, “Christmas is *gone*”, etc. As he writes: “We simply don’t observe the conceptual structure of time flow based on domains of human experience such as tastes, flavors, or colors. Given this, the future can’t taste purple ... Human beings, no matter the culture, organize chronological experience and its conceptual structure in terms of a very specific family of experiences: the experience of things in space” (1999, 52).

biological undertaking" (Mead 1938, 12). In Mead's view, physical objects invite us<sup>15</sup> to get into direct tactile contact with them for it is only by means of direct physical manipulation with objects where their practical meaning reveals itself.

The necessity to deal with different environmental possibilities for action (affordances) with which distance experience necessarily presents us, also gives origin to the emergence of ii) choice-making in experience. Distance experience, by bringing to the present a number of possible alternatives to act, pushes the organism to develop effective strategies for choice-making. In organisms that only have contact experiences, the notion of alternatives, or choice does not even arise. The necessity of choosing among alternatives is very likely directly connected to the emergence of mental capacities such as consciousness and also attention, the shifting of which is a direct prerequisite for choice-making (Prinz 2009). For the purposes of the present paper, however, it is important to point out that in our 'handed' form of embodiment, the pressure of this entire process might have had even more significant consequences for the development of certain mental capacities in humans. As Raymond Tallis points out: "Herein lies the true genius of the hand: out of fractioned finger movements comes an infinite variety of grips and its combinations. And from this variety in turn comes choice – not only in what we do ... but in how we do it ... [and with – R.M.] choice comes consciousness of acting" (2003, 175). As opposed to most other animals where the organ of manipulation is identical to the one of consummation (mouth), the presence of the hand in human beings and its physiological structure enables us 1) to inhibit (or, at least, delay) our behavioral response towards these objects in favor of 2) the process of

discovering a whole array of their potentialities for action which would remain hidden for beings without an organ for their proper examination and/or transformation. In such a process of active inspection of a physical object – that object becomes what one calls in German a 'Gegen-stand', i.e. something that now stands over against us and is ready to be investigated. The multiplicity of properties of physical objects, which is revealed due to the presence of the hand, forces us to develop explicit awareness of our body and its specific intentions. It is not unreasonable to assume that, with this awareness, also the first sparks of self-consciousness might have emerged by our hominid ancestors.<sup>16</sup> As we will see below, also Mead believed that the development of the human intelligence and the sense of self are directly linked to the physiological structure of the hand.

#### 4. Manipulation – Body, Mind, and World Entangled

As we have seen earlier, in Mead's view, physical objects emerge due to the fact that they offer resistance to our bodily efforts. Consequently, as de Waal points out, "it would be impossible for entirely disembodied spirits, say, angels or extraterrestrial intelligent vapors, to develop the concept of a physical object, as we know it. For that, we need hands" (2002, 26). Even colors, odors, and sounds fundamentally make sense to us thanks to the fact that they are 'attached' to physical things. For instance, for a gardener, roses which grow in the yard are something to be watered, picked, dried, or pressed. However, if roses were objects that are so slick that they cannot be grasped, or so ephemeral that they could not be touched, they would not even be objects in the proper sense of that word. Similarly to rainbows or clouds, we might still be able to enjoy their aesthetic qualities but such sort of disconnected appreciation

<sup>15</sup> The theory that physical objects are encoded in our nervous system as 'invitations to action' has been put forth by the pioneers in mirror neuron research Giacomo Rizzolatti and Corrado Sinigaglia. As they themselves admit, Mead's theory of perception was a direct influence in their interpretation of the obtained data. See Rizzolatti & Sinigaglia (2008, 35, 50).

<sup>16</sup> Tallis, for instance, writes: "we may think of the emergence of distinctive capabilities of the human hand as lighting a fuse on a long process that entrained many other parts of the human body and many other faculties as it unfolded" (2003, 6).

would belong to a consummatory phase of the act and would bring nothing in principle to the development of human intelligence.

Hence, the structure of the organism's world is, to a crucial extent, determined by the particular form of its embodiment: "Our world, as a physical world, is built up of contact experience through the hand. The dog's world is built up of odors" (Mead 1982, 119). Since dogs use the nose-mouth coordination instead of the human hand-eye coordination, and thus completely lack the manipulatory phase of the act, they probably have a different understanding of objects altogether. We can encounter a somewhat similar situation in infants who tend to put all the graspable objects in their mouths. Seen from the perspective of Mead's theory of the act we can state that with infants the stage of manipulation is left out and after impulse and perception it is directly the consummatory phase of the act which takes place. Mead believed that this situation is caused by the fact that infants do not yet possess the fine motor skills of the hand which are essential for a proper manipulatory phase of the act to take place. However, isn't it the case that in the infant conduct, the hand is nevertheless involved, although it is mostly guided only by gross motor skills? To answer to this objection we might recall a point which was recently raised by Shaun Gallagher:

If you allow an infant to grasp your finger, it too will likely end up in the infant's mouth ... it's well known that the infant explores the world orally, but always with the hand involved. As the child learns to reach and grasp for itself, and the fine motor skills of the hand are improved, the manipulation becomes more haptic and the exploratory skills become finer (...). Hand-mouth coordination gives way to hand-eye coordination. (Gallagher 2013, 214)

It turns out, then, that the hand-mouth coordination is an inborn behavioral pattern<sup>17</sup> which, in the end effect,

leads to the establishment of proper hand-eye coordination. The hand-eye coordination seems to be a result of a process in which the child learns to explore its surroundings by means of enlarging the space of practical action. The process of such learning, however, starts already in the pre-natal period where the hand-mouth coordination originates. These sensorimotor patterns then seem to serve as a basis of various neural representations of space and objects in our brains. According to certain cognitive scientists, such as Rizzolatti and Sinigaglia "the cortical representation of space in both humans and monkeys appears to be based on the activation of distinct sensorimotor circuits, each of which organizes and controls motor acts (such as reaching) that require objects to be specifically located with respect to a given body part (hand, mouth, eyes, etc.)" (2008, 66). Similarly to Rizzolatti and Sinigaglia (and gaining inspiration from Mead), Gallagher comes to a similar conclusion:

[T]he hands help to define a pragmatic area around the body that has significance for movement, action, attention, and accomplishing tasks. George Herbert Mead called this reachable peripersonal space around the body the 'manipulatory area' and suggested that what is present in perception is not a copy of the perceived, but 'the readiness to grasp what is seen' (...). The perception of objects outside of the manipulatory area is always relative to 'the readiness of the organism to act toward them as they will be if they come within the manipulatory area ... We see objects as we will handle them ... We are only 'conscious of' that in the perceptual world which suggests confirmation, direct or indirect in fulfilled manipulation'. On this enactive account of perception, the manipulatory area defined in part by hands, is the index of how something pragmatically counts as percept. Perceptual consciousness arises in the spatial and temporal distances between a possibility of action in the manipulatory area and the distant object outside of that area. (Gallagher 2013, 214)<sup>18</sup>

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<sup>17</sup> It has been proved by contemporary ultra-sound techniques that unborn babies engage in various motor activities in the womb: for example, already after eighth weeks, they move their hands towards the face. In the sixth they are able to put their thumb in the mouth and

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suck it, etc. For more detailed account of such activities, see Rizzolatti & Sinigaglia (2008, 53-78).

<sup>18</sup> The relevance of Mead's concept of the 'manipulatory area' also discussed in Gallagher (2016).

As we have seen thus far, the hand plays an irreplaceable role in structuring the time- as well as space-dimensions of the world. Depending on the sensorimotor make-up of the perceiving body, various kinds of objects emerge within this space-time. Mead called the neurological events which pair particular images<sup>19</sup> of objects with particular sets of practical bodily responses toward them – attitudes. In contemporary jargon we might define attitudes as neurologically instantiated bodily dispositions encoding perceived sensory stimuli in terms of possible reactions toward them.<sup>20</sup> Mead holds that attitudes are goal-directed cognitive items detecting environmental affordances and constantly controlling the course of an act from the very beginning until its successful completion. In other words, attitudes are behavioral items encoding the world in instrumental terms as a space of *praxis*; as such they manage the behavior of an individual cognizer and can, on the most primitive levels, be analyzed without any regard to the social environment of the cognitive agent. However, from the point of view of profoundly socialized human beings – the social (or even better put – *symbolic*) milieu in which we always already find ourselves plays an absolutely crucial role in the process of cognition. The mutual co-constitution between the human body, and the social and symbolic world takes place in two opposite, and yet complementary, directions: In the bottom-up direction, the peculiar form of human embodiment (including the hand) enables the development of characteristically human forms of symbolic thinking and reflective intelligence. On the other hand, due to the profoundly modified behavioral dynamics, the symbolically structured human thinking transforms in a top-down manner our perception of the world of physical as well as social objects and events.

From Mead's point of view, in the human social conduct – certain attitudes (individual goal-directed sets

of responses toward perceptual objects) take up the form of significant symbols. A gesture (bodily movement, vocal gesture, or a visual sign) becomes a significant symbol, if it is responded to by two or more participants of a social act in the same functional way.<sup>21</sup> Significant symbols structure the perception of our environment (both physical as well as social) in the way that they encode its objects in terms of sets of practical responses which are normatively expected<sup>22</sup> from the individual by his/her community (or, in Mead's terminology, from the 'generalized other'). In this sense, the entire human mind is emergent social event which comes into being by systematically incorporating sets of normative expectations of one's community into one's own practical conduct. Consequently, our mind is an internalized conversation between our own attitudes (what Mead calls an *I*) and the attitudes of our community (*me*). If we read Mead from the point of view of enactive cognition, however, the mind is also a *capacity* which enables the human body to overcome problems in practical conduct: "all reflective thought arises out of real problems present in the immediate experience, and is occupied entirely with the solution of these problems" (Mead 1900/1964, 7).<sup>23</sup> In his opinion, if it weren't for the human hand, the reflective thinking, specific for humans, would never emerge; as de Waal puts it, for Mead "the hand ... is in many respects even

<sup>21</sup> For example, my sentence "Bring me a cup of coffee" (which, in this instance, would be a single gesture, even though it is syntactically quite a complex sentence) would become a significant symbol if the response of my partner in a given communicative act would correspond to a set of normative expectations, typical for this type of situations (i.e., when that person would bring me, e.g., an espresso, not a glass of water, etc.).

<sup>22</sup> For a very fine analysis of the concept of the 'normative' in Mead's thought, see Quéré (2011).

<sup>23</sup> It is important to underline, that Mead did not fall prey to what Lakoff and Johnson pertinently called 'the metaphor of the mind as a container' (1999). In other words, for Mead, the mind does not have a specified or stable spatial extension – it is not a place of any kind. Rather, the mind is a specific capacity of a social human body of taking part in social conduct and of solving problems.

<sup>19</sup> Here, by 'image' we mean any sensory stimulus (olfactory, tactile, ...).

<sup>20</sup> See also Mead (1934/1967, 8-12).

more characteristic of human intelligence than the brain” (2002, 26). Mead believed that – since the hand is the main organ of manipulation in human beings, and since the it finds itself ‘in the middle of the way’ between perceptual objects and the mouth (which is the organ of consummation) – humans have the natural tendency to inhibit, or at least delay, the consummatory phase of the act in favor of manipulation, disassembling, and/or creative rearranging of physical things, which capacity, in turn, gives them additional time to reflect upon possible affordances of the physical object:

There is ... another very important phase in the development of the human animal which is perhaps quite as essential as speech for the development of man’s peculiar intelligence, and that is the use of the hand for the isolation of physical things. Speech and the hand go along together in the development of the social human being. There has to arise self-consciousness for the whole flowering-out of intelligence. But there has to be some phase of the act which stops short of consummation if that act is to develop intelligently, and language and the hand provide the necessary mechanisms. (Mead 1934/1967, 237)

In Mead’s philosophy of embodiment, the human hand and the socially emergent language (significant symbols) mutually reinforce each other in the process of inhibition and enable the human body to analyze problematic objects in terms of new possible responses toward them. This entire process takes place in the manipulatory phase of the act, which is unique to socialized human beings with hands. How do significant symbols and hands reinforce each other? One could say, that whereas significant symbols encode environmental affordances in terms of possible bodily reactions toward them, by means of hands, novel ways of handling objects get tried out in practical conduct. In Mead’s philosophy of language, significant symbols refer to objects in two complementary ways – denotation and connotation, i.e., they have intension and extension at the same time.<sup>24</sup> From the one side, significant symbols always ‘denote’

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<sup>24</sup> See Mead (1922/1964, 246).

(or name) objects in the physical and social environment.

On the other side, significant symbols as signs, at the same time ‘connote’ sets of possible responses toward those objects. Mead held (contrary to most of analytic philosophers of language) that extension and intension are not mutually exclusive properties of linguistic signs, that is to say, if a significant symbol means anything, it has to be composed of both these elements. If we take a closer look at the logical structure of significant symbols, it turns out, that Mead’s account of language indeed comprises an embodied element in the logical structure of signs, or significant symbols (which is something which most other accounts of meaning do not have) : i) Denotation has to do with what one could call ‘perceptual content’ of significant symbols, which is essentially twofold a) the *acoustic* (or written, etc.) *gesture* (e.g. the English ‘dog’) which calls out a certain *mental image*. The denotative element of significant symbols enables us to receive, comprehend, and identify objects in the world. This identification takes place by ii) connoting the denotative element of a significant symbol with sets of different responses which we can carry out toward the object, referred to by the mental image: “Meanings, universals, therefore come into existence (as relations between the form and its environment) by virtue of an awareness of the responses, implicit or explicit, which they arouse” (Miller, 1973, 80).<sup>25</sup> While the mental image which gets called out by a vocal (acoustic or any sensible) gesture serves as sort of a ‘mental prototype’ which represents the successful achievement of action, it is the connotation, or practical bodily response towards objects in the world, which is, for Mead, the decisive factor for the objectivity of meaning. Why is this so? David L. Miller pertinently points out that if individuals (perceptual stimuli, mental images, etc.) gain meaning, it is because the response

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<sup>25</sup> Already in one of his earliest papers “Suggestions Towards a Theory of the Philosophical Disciplines” Mead talks about the ‘telological nature of the concept’ according to which “the meaning of the object is derived entirely from our reaction upon it, or ... our use of it” (Mead 1900/1964, 8).

towards them is social or universal (in principle shareable with others). Therefore we cannot say anything about individuals as individuals. This is so not because individuals are not perceived but because in order for the human experience (permeated by symbols with socially pre-determined meanings) to be meaningful, that experience must be shareable with others and since meaningful experience is only achievable by means of significant symbols, this meaning must consist in shareability of responses.<sup>26</sup>

The problematic situation emerges when certain worldly objects cease to respond to our ways of comportment in a way which enables us to achieve our practical goals. In such a situation, it is usually the element of connotation, i.e. the individual instance of a concept, that has to become an object of reflection. Now, if significant symbols encode objects in terms of possible sets of responses which we can carry out toward them and these objects become problematic, then in the reflective mind, the properties of an object (hardness, composition, etc.) get singled out, decontextualized, and analyzed. In other words, the conflict which originates in bodily conduct gets internalized and analyzed on the basis of an internal dialogue of a social mind with itself: "When you are reasoning you are indicating to yourself the characters that call out certain responses—and that is all you are doing" (Mead 1934/1967, 93). In the bottom-up direction, human behavior is unique thanks to the physiological structure of the hand, human beings are able to creatively enact the worldly structures in an unprecedented number of ways: "Intelligence is essentially the ability to solve the problems of present behavior in terms of its possible future consequences as implicated on the basis of past experience" (Mead

1934/1967, 100). In the top-down direction, however, it is unique because the utilization of significant symbols in the process of reconstruction of experience, enables us to 'off-load' the energetically demanding process of 'external' trial-and-error to the 'inner' process of, what Mead called, the internal conversation of gestures in which the social mind indicates socially shareable responses towards objects to itself and creatively reconstructs them.

At the same time, it is crucial to keep in mind that the process of reflective deliberation and reconstruction of the act by means of significant symbols is derivative of the embodied practice of transforming, manipulating, and exploiting the environmental structures by means of the human hand. From Mead's perspective, thinking is manipulation with, and creative rearrangement of, connotations of significant symbols. Thinking is also profoundly future-oriented and has a character of predictive inference: "When we speak of reflective conduct we very definitely refer to the presence of the future in terms of ideas ... it is the picture ... of what future is going to be ... that is the characteristic of human intelligence" (Mead 1934/1967, 119). Even though Mead understood reflective thinking as a process taking place thanks to significant symbols, it is of utmost importance to note that he did not by any means understand it as a pure computation taking place exclusively in the head. On the contrary, reconstruction of experience happens in the world by means of directly enacting its structures: "While the conflict of reactions takes place within the individual, the analysis takes place in the object. Mind is then a field that is not confined to the individual, much less is located in a brain" (Mead 1922/1964, 247). It seems, therefore, that for Mead – the mind was to be defined as a 'plastic' field which not only has originates in the interactions between the body and the environment but always also reaches out back to the world and works in a close collaboration with it: "Mind involves ... a relationship to the characters of things. Those characters are in the things, and while the stimuli

<sup>26</sup> It should be noted, that as opposed to analytic theories of meaning which, very counter-intuitively after all, understand 'meaning' as existing on the level of propositions. Mead does not have a problem with saying that it is already single words that have meaning since they evoke concrete mental images and sets of bodily responses.

call out the response which is in one sense present in the organism, the responses are to things out there. The whole process is not a mental product and you cannot put it inside of the brain" (Mead 1934/1967, 124-125). Once a novel way of responding to an object is developed, this way of conduct must immediately be tried out in practical conduct which is the only criteria of truth. In this respect, Mead would undoubtedly agree with Lambros Malafouris' statement contending that the "cognition has no location. The active mind cannot be contained. Cognition is not a 'within' property; it is a 'between' property" (2013, 85). Mind, therefore, is not extended in the proper sense of that word, for it is not a thing but rather it is a certain kind (or property) of conduct. Mind is everywhere, where there is behavior guided by bodily responses which are shareable by means of significant symbols.

When Mead speaks of the mutual inter-dependence between the development of the mind and the physiological structure of the human hand, he certainly does not mean ontogenesis only. The time-span of the human life is way too short to be able to produce more than extremely primitive forms of social interaction. Therefore, our account of the role of the human hand would be fatally incomplete without addressing the mutual relationship between the hand and culture. After all, Mead himself held that "the mechanism of human society is that of bodily selves who assist or hinder each other in their cooperative acts by the manipulation of physical things" (Mead 1932, 169). The development of the mind and the institutional forms is inextricably connected with the development of the material culture, in other words, with novel ways of interaction with and transformation of physical objects. Mead did not elaborate much on the issue of the mutual relation between humans and tools. However, it is certain that he understood tools as something which enhances the capacities of the hand. In his view, humans are tool-using beings that use "implements that can extend the length or power of the hand" (Mead 1982, 119). He suggests that by means of tools we can enlarge our body-schema and use

those tools as an actual extension of our limbs. If we take a strictly pragmatist and enactive perspective on tool-usage, we have to point out that enhancing the capacity of the hand means – at the same time – enhancing the capacities of the mind. If the liberation of the hand enhanced human cognitive capacities in the way described above, then it is reasonable to assume that these cognitive capacities plunge back to the world thus enhancing our fine motor skills which further help us develop material culture which makes us develop even better cognitive capacities, etc. Even though Mead barely talks about this, it seems that the same mechanisms which, according to him, enhance our cognitive capacities in solving problems (the hand and the object), have been in play in the course of the development of other cognitive capacities such as bodily awareness or even self-consciousness. As the cognitive archaeologist Lambros Malafouris points out "stone tools are not an accomplishment of the hominin brain; they are instead an opportunity for the hominin brain – that is, an opportunity for active material engagement" (2013, 169). As an example, Malafouris extensively describes the process by which pre-historic hand-axes were produced. The central activity in such a process was knapping. As he argues, one can hardly think of knapping as a process of materialization or externalization of pre-formed ideas. Much rather, knapping ought to be seen as an interaction (or even better – a transaction) between the producer and the tool in which "the tool guides the grip, the grip shapes the hand, the hand makes the tool, and engaging the tool shapes the mind" (ibid., 174). In other words, the knapper thinks through and with the stone and by means of being engaged in this process, he becomes more aware of himself – of his intentions and anticipations (what shape do I want to achieve), of his body (in which angle should I execute the next stroke), of his environment (how is the material behaving in comparison to other materials), etc. such a process of making is, then, a kind of dialogue between a physical object and cognitive agent in which both are deeply transformed.

In conclusion, Mead is undeniably to be praised for having shown to what extent the existence of the human hand enabled the emergence of specifically human ways of reflective thinking and intelligence in general. For Mead's speculative theory to be workable today, we need to place it in a bigger picture of human phylogenetic development. Partly, this paper has endeavored to do this by demonstrating the extent to which Mead's theory is in accordance with contemporary theories of human bipedalism. In his texts, Mead demonstrated that language and reflective thinking, which have their roots in the process of exchanging of unintentional bodily gestures, emerged thanks to our form of embodiment, and particularly due to the fact that we have the hands that we do. From today's point of view, it seems that the human upright bodily posture and handed interactions with the world enhanced their bodily awareness to such a degree that they were eventually able to develop self-consciousness in the process of social interaction. Only the bodies which are first aware of their *own* movement can take an external stance with regard to it and see it from the perspective of the other.<sup>27</sup> From today's point of view, we can assume that the mechanisms responsible for the increased bodily awareness might have been (among others) the upright posture, and the interaction with the first elements of what one might call the material culture.

<sup>27</sup> For an extended argumentation in favor of this position, see Madzia (2015).

## References

- Booth, Kelvin J. 2016. "Imitation and Taking the Attitude of the Other." In *Timeliness of G. H. Mead*, eds. Hans Joas, Daniel Huebner, 231–251. Chicago: Chicago University Press.
- Burke, Thomas F. 2013. *What Pragmatism Was*. Bloomington: Indiana University Press.
- Chemero, Anthony. 2011. *Radical Embodied Cognitive Science* (Reprint edition). Cambridge: A Bradford Book.
- Clark, Andy. 2003. *Natural-born Cyborgs. Minds, Technologies, and the Future of Human Intelligence*. Oxford, UK: Oxford University Press.
- Deloison, Yvette. 2004. *Préhistoire du piéton. Essai sur les nouvelles origines de l'homme*. Paris: Plon.
- Eames, Edward R. 1973. "Mead's Concept of Time." In *The Philosophy of George Herbert Mead*, ed. Walter R. Corti, 59–81. Winthertur: Amriswiller Bücherei.
- Focillon, Henri 1934/1981. "Éloge de la main." In *Vie des Formes*, 101–128. Paris: Presses Universitaires de France. 7th edition. [electronic version available: [http://kaioncharles.free.fr/ecs/gallery/dossier\\_professeurs/Philosophie/2008-2009/Eloge%20de%20la%20main.pdf](http://kaioncharles.free.fr/ecs/gallery/dossier_professeurs/Philosophie/2008-2009/Eloge%20de%20la%20main.pdf) accessed 28.09.2016].
- Gallagher, Shaun. 2005. *How the Body Shapes the Mind*. New York: Oxford University Press.
- Gallagher, Shaun, & Miyahara, Katsunori. 2012. "Neopragmatism and Enactive Intentionality." In: *Action, Perception and the Brain*, ed. Jay Schulkin, 117–147. Basingstoke, UK: Palgrave-Macmillan.
- Gallagher, Shaun. 2013. "The Enactive Hand." In *The Hand, an Organ of the Mind: What the Manual Tells the Mental*, ed. Zdravko Radman, 209–226. Cambridge/London: MIT Press.
- Gallagher, Shaun. 2014a. "Pragmatic Interventions into Enactive and Extended Conceptions of Cognition." *Philosophical Issues* 24: 110–126.
- Gallagher, Shaun. 2014b. Upright posture: A Current Standing. Presentation at Marsilius-Kolleg, 5th December 2016, Heidelberg, Germany. (oral presentation)
- Gallagher, Shaun. 2015. "Invasion of the Body Snatchers: How the Embodied Cognition is Being Disembodied," *The Philosopher's Magazine* 68: 96–102.
- Gallagher, Shaun. 2016. "Pragmatic Interventions into Enactive and Extended Conceptions of Cognition." In *Pragmatism and Embodied Cognitive Science: From Bodily Intersubjectivity to Symbolic Articulation*, eds. Roman Madzia, Matthias Jung, 17–34. Berlin/Boston: Walter De Gruyter.
- Hankinson, Robert J. 2003. "Academics and Pyrrhonists." In *The Blackwell Guide to Ancient Philosophy*, ed. Christopher Shields, 268–300. Oxford, UK: Blackwell Publishing.



- Jonas, Hans. 1954. "The Nobility of Sight." *Philosophy and Phenomenological Research* 14(4): 507–519.
- Johnson, Mark. 2008. *The Meaning of the Body: Aesthetics of Human Understanding*. University of Chicago Press.
- Jung, Matthias. 2009. *Der Bewusste Ausdruck. Anthropologie der Artikulation*. Berlin: Walter de Gruyter GmbH & Co.
- Lakoff, George; Johnson, Mark. 1999. *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*. New York, NY: Basic Books.
- Leroi-Gourhan, André. 1993/1964. *Gesture and Speech*. Cambridge/London: MIT Press.
- Lovejoy, C. Owen. 1981. "The origin of man," *Science* 211: 341–350.
- Madzia, Roman. 2013. "Chicago Pragmatism and the Extended Mind Theory: Mead and Dewey on the Nature of Cognition." *European Journal of Pragmatism and American Philosophy* 5(1): 279–297.
- Madzia, Roman. 2015. "Self-Construction and Self-Awareness: Which One Comes First?" *Pragmatism Today. The Journal of the Central-European Pragmatist Forum* 6(1): 76–87.
- Madzia, Roman; Jung, Matthias. 2015. Wilhelm Diltheys Philosophie der Verkörperung. *Deutsche Zeitschrift für Philosophie* 63(6): 1001–1021.
- Madzia, Roman, & Jung, Matthias. 2016. "Introduction: What a Pragmatist Cognitive Science Is and What It Should Be." In *Pragmatism and Embodied Cognitive Science: From Bodily Intersubjectivity to Symbolic Articulation*, eds. Roman Madzia, Matthias Jung, 1–16. Berlin/Boston: Walter De Gruyter.
- Malafouris, Lambros. 2013. *How Things Shape the Mind. A Theory of Material Engagement*. Cambridge–London: MIT Press.
- Menary, Richard. 2007. *Cognitive Integration: Mind and Cognition Unbounded*. Basingstoke: Palgrave Macmillan.
- Mead, George H. 1900. "Suggestions Toward a Theory of the Philosophical Disciplines." In *Selected Writings: George Herbert Mead*, ed. Andrew J. Reck, 6–24. Chicago: University of Chicago Press.
- Mead, George H. 1918/1964. "The Psychology of Punitive Justice." In *Selected Writings: George Herbert Mead*, ed. Andrew J. Reck, 212–239. Chicago: University of Chicago Press.
- Mead, George H. 1922/1964. "A Behavioristic Account of the Significant Symbol." In *Selected Writings: George Herbert Mead*, ed. Andrew J. Reck, 240–247. Chicago: University of Chicago Press.
- Mead, George H. 1929/1964. "A Pragmatic Theory of Truth." In *Selected Writings: George Herbert Mead*, ed. Andrew J. Reck, 320–344. Chicago: University of Chicago Press.
- Mead, George H. 1932. *The Philosophy of the Present*. A. E. Murphy (Ed.). Chicago, IL: Open Court.
- Mead, George H. 1934/1967. *Mind, Self, and Society: From the Standpoint of a Social Behaviorist*. Chicago: University of Chicago Press.
- Mead, George H. 1938. *Philosophy of the Act*. Chicago: University of Chicago Press.
- Mead, George H. 1982. *The Individual and The Social Self: Unpublished Work of George Herbert Mead*, ed. David L. Miller. Chicago: University of Chicago Press.
- Niemitz, Carsten. 2010. "The Evolution of The Upright Posture and Gait—A Review and a New Synthesis," *Naturwissenschaften* 97: 241–263.
- Núñez, Rafael. 1999. "Could the Future Taste Purple?" In *Reclaiming Cognition: The Primacy of Action, Intention and Emotion. Journal of Consciousness Studies* 6(12). 41–60. Bowling Green: Imprint Academic.
- Prinz, Jesse J. 2009. "Is Consciousness Embodied?" In *The Cambridge Handbook of Situated Cognition*, ed. Philip Robbins, Murat Aydede (Eds.), 419–438. New York: Cambridge University Press.
- Prinz, Jesse J. 2013. "Foreword: The Hand Manifesto." In *The Hand, an Organ of the Mind: What the Manual Tells the Mental*, ed. Zdravko Radman, ix–xviii. Cambridge/London: MIT Press.
- Quééré, Louis. 2011. "Towards a Social Externalism: Pragmatism and Ethnomethodology." *European Journal of Pragmatism and American Philosophy* 3(2): 148–166.
- Ratcliffe, Matthew. 2013. Touch and The Sense of Reality. In *The Hand, an Organ of the Mind: What the Manual Tells the Mental*, ed. Zdravko Radman, 131–158. Cambridge/London: MIT Press.
- Rizzolatti, Giacomo, & Sinigaglia, Corrado. 2008. *Mirrors in the Brain – How Our Minds Share Actions and Emotions*. Oxford: Oxford University Press.
- Rockwell, Teed. 2005. *Neither Brain nor Ghost: A Non-Dualist Alternative to the Mind-Brain Identity Theory*. Cambridge: MIT Press.
- Skoyles, John R. 2006. "Human Balance, the Evolution of Bipedalism and Dysequilibrium Syndrome," *Med Hypotheses* 66: 1060–1068.
- Solymosi, Tibor, Shook, John. 2013. "Neuropragmatism: A Neurophilosophical Manifesto." *European Journal of Pragmatism and American Philosophy* 5(1): 212–234.
- Sterelny, Kim. 2010. "Minds: Extended or Scaffolded?" *Phenomenology and the Cognitive Sciences* 9(4): 465–481.
- Tallis, Raymond. 2003. *The Hand: A Philosophical Inquiry into Human Being*. Edinburgh: Edinburgh University Press.
- Waal, Cornelis. 2002. *On Mead*. Belmont: Wadsworth.