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Table of Contents

INTRODUCTION:
PRAGMATISTS AND COGNITIVE SCIENTISTS IN PARIS

Roman Madzia & Matteo Santarelli

The problem of social cognition, its underlying structures as well as its genesis in the process of interaction of human beings has always occupied philosophers as well as psychologists and cognitive scientists. In the philosophical realm, the pragmatists take up one of the most significant positions with regard to social cognition because many of them (especially William James and George H. Mead) actually were psychologists to the same extent as they were philosophers. Pragmatism has, therefore, always been at the forefront of interdisciplinary investigations of the structure of inter-human behavior. Starting about 20 years ago, the sciences of the mind have undergone what might be called a *pragmatic turn* in which research has gradually shifted from understanding the mind as a sort of computer towards looking at our cognitive abilities as a result of strategies which our bodies have developed in the process of dealing with the material world around them. In other words, contemporary cognitive sciences have started to view the mind as embodied, embedded, enactive, and even extended (4E).

Given the growing number of researchers interested in social psychology and pragmatism, the well-known pragmatist scholars Pierre Steiner and Roberto Frega decided to hold a conference *Pragmatism, 4E Cognitive Science, and the Sociality of Human Conduct* dedicated to pragmatism and social cognition.[1] This conference took place at the end of the last year (more precisely between 7th and 9th of December) at the Ecole des Hautes Etudes en Sciences Sociales and the Centre National de la Recherche Scientifique (CNRS) in Paris. The conference was supported by the project CONNEX (call S2C3 2016) under the auspices of CNRS. The organizers had the liberty to choose the content of the conference not only from a considerable number of interesting abstracts they received after the call for papers, but also from the speakers who were invited thanks to their previous work in the field. In the end, the participants of the conference enjoyed entire three days of interesting presentations and discussions concerning the pragmatist outlook on various aspects of embodied social cognition. The present volume contains a peer-reviewed collection of original papers presented at the event and is divided into three thematic parts.

The first part entitled *The pragmatist view of embodiment* contains three papers which directly tackle the issue of the pragmatist take on social cognition from two different perspectives. In the first paper, Pierre Steiner tries to answer the following question: which among the several uses of the concept 'pragmatism' in contemporary cognitive science could be understood as legitimate? This analytical task hinges around the distinction between a *pragmatic* turn in cognitive science and *pragmatist* understanding of cognition. The confusion between these two approaches is analyzed by Steiner by means of focusing on the different conceptions of action they involve.

Kelvin J. Booth's paper offers some preliminary steps towards putting logic on an embodied basis, drawing on the work of John Dewey and George Herbert Mead. First, Booth shows how Dewey's idea of stimulus and response in 'The Reflex Arc Concept in Psychology', and what amounts to a logic of the body described in the second chapter of *Logic, the Theory of Inquiry*, are enactive and embodied. Subsequently, he turns to Mead's theory of symbolic communication to show how it is fundamentally embodied and enactive, and how it bridges a logic of the body and a logic of symbolic thought. In the last part of the paper, Booth looks at several logical relations discussed in Dewey's *Logic* to show how they are grounded in embodiment.

After Steiner's and Booth's conceptual investigations, Roman Madzia's paper on the role of the human hand in the cognitive construction of objects and material culture examines how deeply the fact of the human handed-nature transforms our experience of physical

[1] The guest editors want to thank the organizers of the conference Pierre Steiner and Roberto Frega for giving the possibility of publishing a collection of papers originally presented and discussed in Paris

and social objects. One of the goals of Madzia's paper is 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 George H. Mead's 'haptic philosophy'. The author endeavors to root this pragmatist viewpoint, first in contemporary theories of human bipedalism, subsequently, in current enactive views of the role of the hand in the development of human cognitive capacities and also of the phenomenon of material culture.

The second part of the volume (*The pragmatist cognitive science and the problem of social cognition*) contains pieces which focus exclusively on various aspects of social cognition as seen from the pragmatist viewpoint. Here, Charles Lenay aims at answering the question whether social interactions should be explained by individual cognitive capacities, or conversely, whether these capacities can be explained by social interactions? Lenay deals with this issue by adopting a social and pragmatic standpoint. By means of a minimalist experimental paradigm, Lenay shows the importance of the role of the so-called 'body-object' in the collective organization of interactions, and in the reconfiguration of individual structures.

Fausto Caruana discusses the well-established dichotomy between 'basic emotion theory' conceiving emotions as discrete mental entities localized in the brain, and psychological constructionism, which understands emotions as cognitive-based and culturally constructed phenomena, not natural kinds. Relying on empirical studies on electrical brain-stimulation and on the conceptual heritage of Dewey and Mead's criticisms of James's theory of emotion, Caruana expresses the need for a third theoretical way, overcoming both basic emotion theory and psychological constructionism with regard to emotions.

In her piece, Sabine Collardey discusses the issue of collective intentionality. Specifically, Collardey shows how the main theories of joint intentionality – e.g. Tomasello – rely on a causal theory of action and on a mentalist conception of intentionality which prove to be unsatisfactory. Conceptual resources from classical pragmatism are employed by the author in order to overcome the difficulties involved by mentalistic accounts of collective intentionality.

Mentalism and the problem of mental imagery lie in the center of Italo Testa's paper as well. Testa acknowledges the constitutive role that imagery plays for social action and cognition. He argues that such role can be fully grasped by endorsing a Deweyan understanding of habit. From this perspective, especially the motor and embodied character of imagery should be appreciated. Testa reconstructs Dewey's own notion of imaginative rehearsal, and shows how this model could reconcile competing standpoints such as embodied simulation theory and the narrative practice hypothesis.

Matteo Santarelli and Alessandro Talia's paper focuses on self-state knowledge. By analyzing communication of internal psychological states in psychotherapeutic sessions, the authors aim at showing the weaknesses of introspectionism. Elaborating strongly on Mead's and Peirce's communicative theories of the self, Santarelli and Talia single out three specific features of self-state knowledge: authority; non-inferentiality; incompleteness and investigate their reliability and overall psychological scope.

Martin Weichold tackles an intriguing question: is our self-conception as autonomous and moral agents compatible with the theoretical and experimental results of contemporary social and natural sciences? Or are we compelled to consider this self-conception as totally illusory in light of cognitive sciences? Weichold tries to provide an answer to this issue by developing a social account of the self, inspired by Mead, which takes into account contemporary enactivist social theories.

The papers of third part of the volume, called *Pragmatism, cognitive science, and culture*, deal with more general questions situated on the frontiers between pragmatism, cognitive sciences and culture. Tibor Solymosi discusses Richard Rorty's view of philosophy as cultural politics. His primary source for this challenge is Patricia Churchland's neurophilosophy, which is itself in part a product of cultural politics. In drawing on resources in neurophilosophy, he is critical of Rorty's core distinction between causal relations and the space of reasons. This criticism, moreover, affords further reflection on the Sellarsian game that both Rorty and Churchland play in their physicalisms. He concludes with considerations about a naturalism more Deweyan than Sellarsian and the Deweyan neurophilosophy of neuropragmatism.

In the final paper of the volume, Matthew Crippen's contribution focuses on the similarities between what he calls sensorimotor bodily organization and coordinations occuring in group contexts. Specifically, the author deals with group action, where he endeavors to creatively advance Colwyn Trevarthen's developmental research (especially the notion of 'social affordances') from the Deweyan perspective.

I. THE PRAGMATIST VIEW OF EMBODIMENT

PRAGMATISM IN COGNITIVE SCIENCE:
FROM THE PRAGMATIC TURN TO DEWEYAN ADVERBIALISM

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ABSTRACT: After having distinguished several uses of the concept "pragmatism" in contemporary cognitive science, the paper questions the legitimacy of these uses, by focusing on the understanding of action that is associated with them. It is then argued that a *pragmatic* turn in cognitive science is distinct from a *pragmatist* understanding of cognition, at least if we consider Dewey's adverbialist theory of cognitive phenomena.

Introduction

The philosopher Mark Johnson recently defined the relevance of pragmatism to cognitive science as follows:

> Pragmatism's greatest contribution to cognitive science is to construct the appropriate general philosophical context for understanding the empirical results about mind, consciousness, meaning, thoughts, and values. Second, pragmatism can identify and criticize limiting or mistaken methodological assumptions that define the various sciences of mind. Finally, beyond sketching the broadest possible framework for studying mind and language, pragmatism can show us how to interpret the relevant implications of cognitive science for our everyday lives. (Johnson 2010, 142)

The last sentence of the quotation mentions the existential implications of cognitive science, as pragmatism might develop them. The first sentence of the passage expresses a quite classical view of the role of philosophy in cognitive science. This view is shared by other philosophical systems, such as analytic philosophy or phenomenology[1]. They will of course disagree about the very conceptions of mind, consciousness and cognition they will put forward for interpreting empirical results. In recent years, there has been an increasing literature on what cognition and mental phenomena are from a pragmatist point of view[2]. This paper will not merely be an addition to this literature. Indeed, I will mostly focus here on the *methodological* implications of pragmatism for cognitive science, as they are defined by Johnson in the second sentence. Not unrelated to "pragmatist" models of cognition, there is now a recent and flourishing literature that claims or advertises the occurrence of a "pragmatic" or even "pragmatist" turn in cognitive science[3]. What does that mean? What kind of cognitive science (and not only of cognition) do we want when we argue for the need or the opportunity of a pragmatist turn? Is it the same as a pragmatic turn? The present paper will outline some answers to these pressing questions, from a pragmatist perspective. In section 1, I will have a look at the literature in order to see what various philosophers and cognitive scientists mean by *pragmatism* and *pragmatic* when they discuss the relations between pragmatism and cognitive science. I will then underline, in section 2, some ambiguities concerning *action*, making it impossible to equate "pragmatic" with "pragmatist" (in the expression "pragmatic turn") for philosophical reasons. In section 3, I will develop reflections on what a "turn" in cognitive science might amount to. Section 4 presents my own version of what the implications and prospects of a *pragmatist* (and not only pragmatic) turn in cognitive science should be, by relying on Dewey's adverbial theory of cognitive phenomena.

1. The current situation in cognitive science: is it to be called "pragmatic" or "pragmatist"? And are these labels legitimate?

It is common-place in the philosophical literature on cognitive science to observe that over the last 20 years or so, the theoretical foundations of cognitive science have undergone several changes. The conceptions of cognition have changed, but also the importance given to some issues or to some disciplines. Our primary question here is:

[1] See for instance Gallagher and Zahavi (2008).
[2] See for instance the collections of papers edited by Steiner (2013), Solymosi and Shook (2014), and Madzia and Jung (2016).
[3] Some authors can use "pragmatic" and "pragmatist" as synonyms. See for instance Gallagher (2014); Madzia (2013); or Roy (2010).

(1) *What is the situation in contemporary cognitive science to which one associates the terms "pragmatic" or "pragmatist"?*

This question is distinct from the question

(2) *Is the situation in contemporary cognitive science to which one associates the terms "pragmatic" or "pragmatist" a theoretically desirable situation?*

since that latter question is explicitly evaluative (one might regret, fear, despise, appreciate, or desire,… this current situation). What must be noticed is that, as we will see, "pragmatism" or "pragmatic" are names that are currently used by both proponents *and* opponents concerning the situation that is named "pragmatic" or "pragmatist".

These two questions also differ from another question:

(3) *Is it legitimate to associate the terms "pragmatist" or "pragmatic" to this situation?*

This last question is also evaluative, but unlike the former question it is not about the value of the current situation; it is about the value of *labeling* this situation (whether or not it is desirable) with the concepts "pragmatic" and "pragmatist". In order to answer this question, one must notably presuppose or express a normative definition of what pragmatism is, so that it might – or might not – be contrasted with the adjective "pragmatic", and be applied to the current situation in cognitive science that is described when one answers the question (1).

In order to give an answer to the first question, one must begin by looking at the literature. And, as we will see, there is not one but many possible answers to this question, provided one takes notice of the various meanings that are associated with "pragmatic" and "pragmatist". In this section, I will mainly focus on the first question. The answer to this first question will pass by an examination of three contemporary statements and theories. From this examination, I will then provide my own answer to the third question in the next section.

Our first contender here for an answer to the first question is Jerry Fodor. Fodor is a long-standing figure of classical cognitive science. For him, cognition consists in the processing of symbolic mental representations in virtue of rules whose study takes place independently of investigations of the neural level in which cognition may be implemented. Functionalism, computationalism and representationalism are theses strongly endorsed and defended by Fodor. In 1975, Fodor published one of his most successful books, *The Language of Thought*. This book is a paradigmatic reference in the cognitivist community, along with Marr's *Vision* (1982), Chomsky's *Syntactical Structures* (1957), Pylyshyn's *Computation and Cognition* (1984), or Newell and Simon's *Human Problem Solving* (1972). In 2008 – more than thirty years after the latter book – Fodor published *LOT 2. The Language of Thought Revisited*, both a continuation and a revision of his initial work. In the introduction to that book, Fodor writes:

> Cognitive science didn't, as it turned out, develop in the way that *LOT 1* thought it would. Rather, the mainstream view, not just in AI but in philosophy and cognitive psychology, is now a kind of pragmatism. What's essential to thought is not its relation to the things in the world that it represents but its relations to the actions (the 'behaviors') that it guides. (Fodor 2008, 8)

"Pragmatism" is here used for naming a *mainstream* situation in cognitive science. At the time of *The Language of Thought* (1975), the mainstream was an emerging view for which cognition is essentially defined as producing and using representations of the world in virtue of computational processes. In this model, action is a result of cognition. The 1975 book was written as a foundation, clarification and philosophical justification of this emerging mainstream situation. Now, Fodor says, the times have changed. Pragmatism is not a challenger

to the main view, or a minority. Pragmatism *is* the mainstream; it has taken the place of a view Fodor elsewhere calls[4] Cartesianism, and from which pragmatism is defined by contrast: « pragmatism is Cartesianism read from right to left » (Fodor, 2008, 12). And indeed, here is a summary of the main oppositions Fodor sees between Cartesianism and pragmatism:

Cartesianism	Pragmatism
The main use of minds is in thinking true thoughts about the world	Thinking is thinking what to do or where to go in the world
Truth is a matter of correspondence with the world	Truth is a matter of success
Knowing that is prior to knowing how	Abilities are prior to theories: knowing how is the paradigm cognitive state
Content is prior to competence	Competence is prior to content
Action is the externalization of thought	Thought is the internalization of action
Thought is prior to perception	Perception is prior to thought
Concepts are prior to percepts	Percepts are prior to concepts
Thought is prior to action	Action is prior to thought
Concept individuation is prior – in the order of analysis – to concept possession	Concept possession is prior to concept individuation
Thinking is primarily explained in terms of representing and knowing that, which are explanatorily prior to abilities to do things, competences, and know how.	Thinking is primarily explained in terms of abilities to do things, competences, and know how, which are explanatorily prior to representing, and knowing that.

The assimilation of pragmatism to anticartesianism assumes that pragmatism and Cartesianism share the same issues (but they propose different answers to these issues) *and* the same concepts (they diverge about the explanatory and ontological priority of these concepts for defining cognition and its study). As we will see in a moment, this is very debatable. Moreover, Fodor's characterization of pragmatist anticartesianism somehow misses the radicality of some of its claims. Indeed, for some proponents of pragmatism in cognitive science, it is not only the case that cognition is for action (a functional claim) or must be explained from action (a methodological claim): cognition *is* identical with action. For instance, Hans Joas and Erkki Kilpinen claim that « according to pragmatism, perception, cognition, emotions, etc., take place as *phases in* action, rather than as something outside it or preceding it » (2006, 324; their emphasis).

Still, even if anticartesianism were a crucial component of pragmatism, it is disputable that any anticartesianist position would *ipso facto* be pragmatist. But Fodor seems to think so, for its description of pragmatism includes authors such as James, Dewey, Putnam, Rorty and Brandom, but also Wittgenstein, Quine, Ryle, Sellars, Dummett, McDowell, Dreyfus, Vygotsky, Piaget, Bruner, the Churchlands, or Gibson.

Fodor despises pragmatism, and more precisely the situation in cognitive science that it is correct, for him, to label "pragmatism". In 2003, for instance, he wrote that “pragmatism has been the defining catastrophe of analytic philosophy of language and philosophy of mind in the last half of the twentieth century”[5], or in *LOT2* that pragmatism is “perhaps the worst idea that philosophy has ever had”[6]. Fodor’s main argument against pragmatism can be summarized as follows:

P1. Action is not identical with overt behavior, with what happens to us or with bodily movements;
P2. Unlike overt behavior or bodily movements, an action is always the result of the (previous or simultaneous) presence of an intention, a goal or a plan, which governs the occurring of the action[7];
P3. The formation or the exercise of an intention, a goal or a plan is a cognitive process which is not an action;

[4] With reference to Ryle.

[5] Fodor (2003, 73-74).
[6] Fodor (2008, 9).
[7] See Fodor (2008, 12-13).

C1. There is cognition which is not action, but which is the very possibility of action;
C2. Action is a product of cognition.

For Fodor, pragmatism is deeply flawed since it is taken by Fodor as accepting P1, P2 and P3 (those are common-sense truths, for Fodor), but simultaneously denies C1 and C2[8]. But as we will see, premises P1, P2 and P3 express a view of action that is *not* shared by pragmatists: if pragmatists deny Fodor's conclusions it is not because they (pragmatists) are poor logicians; it is because they do not endorse the premises of the reasoning.

Let us now turn to a second position on the relations between pragmatism and cognitive science.

Notably from his various collaborations with the linguist Georges Lakoff, the philosopher Mark Johnson has been an important figure in the development of an alternative to the computational and representational framework in cognitive science, especially concerning the topics of meaning and language. For more than ten years now, he has also paid attention to the relations between pragmatism and contemporary cognitive science. For him, pragmatism is not the mainstream situation in contemporary cognitive science. The situation is more complex: there is what Johnson calls a *first-generation cognitive science* (computational, functionalist, representationalist, internalist), notably exemplified by Fodor's work. This first-generation cognitive science is now progressively supplanted by a second-generation cognitive science. Works in linguistics, psychology, robotics, neurosciences,.. etc are now supporting a new view of cognitive processes, insisting on their embodied, situated, enactive and affective nature. For Johnson[9], there is a *convergence* between pragmatism and this recent second-generation cognitive science on an array of issues: non-dualism, cultural naturalism, non-reductionism, embodied views of meaning, emotion and reason,... "Convergence" implies that second-generation cognitive science did not initially use pragmatism in its emancipation from first-generation cognitive science. Most of its actors have probably never heard about pragmatism. Pragmatism and second-generation cognitive science are *now* converging (and some people perceive this convergence), but they have both existed and developed *before* that convergence. What pragmatism can bring is notably some additions to the 4E (embodied, enactive, embedded, extended) framework, turning it into a 6 or even 7-E paradigm: pragmatism reminds us how important cognition is also *emotional, evolutionary* and *exaptative*[10]. It also reminds us of the primacy of experience, and offers the best framework for interpreting the various results produced in second-generation cognitive science.

When Johnson speaks about pragmatism, he mostly refers to John Dewey. Even if Johnson and Fodor disagree on the appropriate character of the current situation in cognitive science, and on the way *pragmatism* might qualify it (convergence vs. mainstream), both of them use the label "pragmatism". But that does not mean they give the same meaning to this term: Fodor's use of the concept covers more authors than Johnson's, and Johnson is careful not to reduce pragmatism to a philosophy centered on the concept of action.

Let us now see an important use of the adjective "pragmatic" for qualifying the current situation in cognitive science. This use has been made by the neuroscientist Andreas K. Engel and his colleagues. This first fact is already interesting: a non-philosopher uses a concept originally developed in the philosophical tradition in order to describe a major trend in the

[8] To be true, in a footnote (2008, 14), Fodor accepts that for pragmatist theorists like Ryle, "planned behavior isn't construed as behavior that's the outcome of a mental process. Rather, it's behavior that's performed in certain ways (heedfully, or carefully, or with due consideration, or whatever)." Fodor sees this conceptual analysis as "failed", but does not tell why.

[9] Johnson (2006, 370).
[10] Johnson (2016).

theoretical evolutions of neuroscience and, more broadly, of cognitive science. The concept "pragmatic turn" was first used by Engel in a 2010 paper[11]. In an opinion paper published in 2013 in the journal *Trends in Cognitive Sciences*, Engel and colleagues also speak about a *pragmatic turn* that may be occurring in contemporary cognitive science:

> In cognitive science, we are currently witnessing a 'pragmatic turn', away from the traditional representation-centered framework towards a paradigm that focuses on understanding cognition as 'enactive', as skillful activity that involves ongoing interaction with the external world. The key premise of this view is that cognition should not be understood as providing models of the world, but as subserving action and being grounded in sensorimotor coupling. (Engel et al. 2013, 202)

The authors do not claim that the mainstream in cognitive science is *pragmatic* or *pragmatist*: the pragmatic turn is a move of emancipation from mainstream cognitive science, which is defined (in the quotation) as being overtly representationalist. This turn is oriented towards a new paradigm, variously named "enactive", "action-oriented" or "pragmatic". What the authors mean by "pragmatic" seems close to what Fodor means by "pragmatism": the pragmatic view understands cognition as a skillful activity, grounded in sensorimotor coupling, in the service of action. Still, as we have started to see with Fodor, different claims can be entangled here. Several basic distinctions must be considered for defining the scope of what is called the "pragmatic" turn[12].

First, does the pragmatic turn alter the *explanans* or the *explanandum* of cognitive science – or both? The *explanans*, in a scientific theory, consists in the sets of laws, propositions, models and definitions in virtue of which some phenomenon is explained. The *explanandum* is what has to be explained. It is not always clear whether the pragmatic turn reaches out the *explanantia*, the *explananda* of cognitive science – or both. Does the pragmatic turn claim that action itself must become an object of study for cognitive science, or does it argue that cognition (or some cognitive phenomena) must be explained in terms of action? It is one thing to consider that the performances cognitive science should explain are not intellectual or disembodied performances, and quite another that these performances should be explained in reference to the embodied engagements of an organism with its environment. Classical cognitive science has no problem accepting that action should be explained by cognitive science (for instance, how agents control, plan, or simulate actions) or even that cognitive faculties are geared to action, but it will resist the tendency to explain cognitive performances by referring to action, since this explanation will be seen as… begging the question: action presupposes control, intention, attention, coordination,… which are all cognitive performances.

Secondly, what are the relations that are posited between cognition and action, be it in the *explanans* or in the *explanandum* cognitive science? "Pragmatic turn" and "action-oriented perspective" are often used as synonyms[13]. But what is an "action-oriented" perspective on cognition? There are many differences between "cognition is for action" (a functional claim), "cognition and action co-influence each other" (a mutual dependency claim), "cognition is grounded on action" (a genetical claim) and "cognition is (a kind of) action" (a constituency claim). The latter claim is the more ambitious claim, but it is not often seen in the writings of proponents of the pragmatic turn; other claims and ideas (like "the action-relatedness of cognition"[14]) can be accepted quite easily by proponents of classical cognitive science, provided they are not seen as being true for *all* kinds of cognition. For instance, at the very beginning of their 2013 paper, Engel and colleagues define the "key

[11] Engel (2010).
[12] See also Roy (2010) for a *pragmatist* reading of the cognitive neuroscience of action, and for a distinction between different pragmatist claims in this context.
[13] See especially Dominey et al. (2016).
[14] Engel et al. (2013, 202).

premise" of the pragmatic turn as that "cognition should not be understood as providing models of the world, but as subserving action and being grounded in sensorimotor coupling" (2013, 202). Later on, they state that "the central premise of this new paradigm" could be phrased as "cognition is action" (2013, 203). The main premise of the pragmatic turn therefore oscillates between functional, genetical, and ontological claims (see also Engel 2010, 219).

Thirdly, if the pragmatic turn is "a direct antagonist of the cognitivist framework" (Engel 2010, 221), how does it relate itself to other non-cognitivist approaches to cognition, such as embodied, embedded, enactive or extended cognitive science? Should the pragmatic turn be defined as a species inside of the post- or anti-cognitivist genus? Or does it want to cover all these approaches? It seems it does, since Engel (2010, 224) considers authors such as Andy Clark, Francisco Varela and Alva Noë as proponents of this pragmatic turn, even if these authors themselves rarely use the adjective "pragmatic". This positive answer also presupposes that the pragmatic turn has the means to embrace the diversity of these theories, so that when one says that "cognition is (for) action", "action" does not only mean action; it is a shorthand for "embodied, embedded and extended interactions between organism and environment".

Let us now focus on the relations Engel and colleagues posit between this *pragmatic* view and the *pragmatist* tradition. On this issue, they write:

> The term 'pragmatic' is used here, first, to highlight our conjecture that cognition is a form of practice. *Second, we introduce the term to refer to action-oriented viewpoints, such as those developed by the founders of philosophical pragmatism, albeit without suggesting a return to exactly the positions put forward by these authors*. The central premise of this new paradigm could be phrased as 'cognition is action'. (Engel et al. 2013, 202; my emphasis)

The relation between the *pragmatic turn* and *philosophical pragmatism* is ambiguous: 'pragmatic' includes viewpoints developed by pragmatists, but *not exactly*. The devil is in the detail, and we will shortly see how these differences could or should be framed. For the moment, let me add that in another paper Engel and (other) colleagues remark that "action oriented" theories of embodied cognition are *prefigured* in pragmatism (Dominey et al. 2016). Pragmatism is here an ancestor, not a member of the pragmatic family in cognitive science. In other places[15], Engel includes in the *pragmatic* turn authors coming from the phenomenological tradition. The pragmatic turn is rooted in pragmatism, but also in European philosophy, especially in the phenomenological and hermeneutical tradition (Merleau-Ponty, Heidegger).

From all of this, I conclude that for Engel, "pragmatic" is carefully and deliberately used instead of "pragmatist", since the use of the latter one would express a narrower commitment to pragmatism that Engel wants to avoid, mainly for reasons of precision: Engel does not claim that the pragmatic turn is a return to pragmatist philosophy.

2. Action, pragmatism and the pragmatic turn

Let us now pass to question (3). The question is: *Is it legitimate to associate the terms "pragmatist" or "pragmatic" to this situation?*

My own answer to this question will go as follows: if one sticks to the idea that action is essential to cognition and cognitive science, it is wiser to restrict oneself to the use of "pragmatic", and not to the use of "pragmatist" for labeling the kind of cognitive science that endorses (or should endorse) this idea. This answer is therefore directed against the Fodorian use of "pragmatism", but it is also addressed to the Engelian use of "pragmatic": in the latter case, I consider that it is correct and wise on the part of Engel *not* to use "pragmatism" for labeling

[15] Engel (2010, 22).

the turn he observes (and defends) in cognitive science, but I think he underestimates the philosophical discrepancy there is (on my view) between a *pragmatic* view on cognition, and a *pragmatist* view. Engel does not provide exact reasons on why he considers that the "pragmatic turn" is "*not exactly*" a return to pragmatism, besides the fact that the pragmatic turn does not find its sole or even primary inspiration in the pragmatist tradition. In what follows, I will provide some other reasons; and these reasons suggest that the pragmatic turn is perhaps *precisely not* a pragmatist turn.

For one thing, the way Engel and colleagues conceive action makes it dubious to consider that it is this very same phenomenon that pragmatists valued in their definition of mind, knowledge or belief. In 2010, Engel wrote:

> The description of "acts" or "actions" typically makes references to goals that often the agent has adopted on the basis of an overall practical assessment of his options and opportunities. "Behavior", in contrast, can be described and explained (at least according to certain psychological schools) without making reference to mental events or to internal psychological processes. Clearly, therefore, the pragmatic turn cannot lead back to "behaviorism". (Engel 2010, 238)

It is certain that pragmatism would not endorse these classical descriptions of acts, actions, and behavior from which the pragmatic turn is defined. These descriptions converge in order to form an alternative for defining action: either action is accompanied by a mental process, or it is reduced to gross behavior. We will see in a moment how and why pragmatists refuse this alternative. In their 2013 paper, Engel and colleagues make clear that they do not see action as being coextensive with behavior or movement. Actions are rather driven by goals; they involve volitional control; they require planning and decisions; they involve prediction or anticipation of an intended outcome; are often associated with a sense of agency (Engel et al. 2013, 203). This characterization of action is a *mentalist* characterization: what makes a piece of behavior an action is the antecedence or the presence of a mental/cognitive factor (not necessarily conscious). It requires that action be preceded or accompanied by a mental (or cognitive) element or cause, which is not itself a component of action (since it makes the latter one possible). Interestingly, it shares some premises of Fodor's reasoning summarized above, namely premise 1 and premise 2. Therefore, as long as it is not supplemented by a non-mentalistic understanding of action, goals, intentions, and plans, the pragmatic turn will be symmetrical to cognitivism: it will merely reverse the priority between action and cognition.

The view that associates action with control, decision or intentions is an intellectualist view, grounded on a common philosophical fallacy well diagnosed by Dewey: converting eventual outcomes or functions of a phenomenon into antecedent conditions (Dewey, LW1:352), or more broadly of « reifying, hypostatizing that which in fact is functional » (LW16:337). For Dewey, motives, intentions, deliberations or volitions do not exist prior to actions: they are *qualities* of action, properties of interactional behavior (Dewey, MW14:45, 85, 139). It is our ways of acting that provide to our behavior mental qualities, and that make tokens of behavior describable as actions. Ends, targets and intentions are not fixed antecedently to action: every action is regulated and develops in and from an order that can be abstracted or justified in the forms of intentions or ends. More broadly, natural and acquired operations of the organisms, such as seeing, digesting, speech or reasoning are *functions* of the surroundings as truly as of organisms (MW14:15). They are functions of conduct. The same applies to consciousness (MW14:124, 128), or to "hunger", "fear", "sympathy", "imitation": they do not denote psychic or mental elements; they are about *ways of behavior* involving interactions between a creature and its environment and other creatures (MW14:45).

The point is to steer between three reefs: first, the mentalist reef, according to which any action is necessarily the immediate result of the execution of a mental process that goes with it or that goes before it; second, the reductionist reef, according to which action is nothing but an observable physiological event; and third, the pervasive idea *that these two reefs are the only possibilities that exist for describing what an action is*. One may think that a difference between a *pragmatic* and a *pragmatist* stance in cognitive science could consist in the fact that a *pragmatist* stance would explicitly start with a new philosophical conception of action, emphasizing its processual, historical, situated, evaluative, normative, qualitative, biological and social character (Jung 2010). Action is not a contingent and local product of individual cognition: it is rather our primary way of being and thinking in the world. *Intentional actions* are just a subspecies of this broader notion of action. This fact is so important, and "action" has been so much defined in a mentalistic and individualist framework in cognitive science, that the term "action" maybe needs to be replaced by a new term defining the basic building block of cognition and its relations to action: "habit", "practice", "skills", "organism-environment transactions", "act", "conduct" or "activities" are possible terms, not laden with the theoretical background associated to action in cognitive science. But these words also have special definitions or connotations in everyday parlance, in philosophy and/or in scientific inquiry. We could finally retain "action" and distort its meaning, moving it away from a pervasive mentalistic and cognitivist understanding, in the direction of a broader pragmatist meaning (Kilpinen 2008). For any of these terms (including action), a pragmatist stance would insist on the need to emancipate their understanding from dualities such as "means vs. ends", "reason vs. passion", "norms vs. facts", "repetition vs. creativity", "stimulus vs. response", "agency vs. receptivity' "subject vs. object", "organism vs. environment", "mechanical vs. spontaneous/living", since these terms are often associated with only one pole of these dualities. From a pragmatist point of view, these are not dualities but functional distinctions one can make from a primary single phenomenon, designated by the terms listed above, like for instance "transaction". For example, according to Dewey, « what has been completely divided in philosophical discourse into man *and* the world, inner *and* outer, self *and* not-self, subject *and* object, individual *and* social, private *and* public, etc, are in actuality parties in life-transactions » (LW16:248).

"Life" can also designate this primary concrete whole:

> These terms ['organism' and 'environment'] are as strictly correlative as are brother and sister, buyer and seller, stimulus and response. Wherever there are correlative terms, there is a third medium to which both refer. In the case of organism and environment, this more comprehensive matter is life as a self-conserving, expanding activity. Life is a process which includes environment as well as organism within itself... (MW6:437)

In 1930, in a text named "Conduct and Experience", Dewey proposed to define conduct as the object of study of psychology, instead of "experience" and "behavior". Already at Dewey's time, these latter concepts carried an important theoretical background: "experience" belonged mainly to the introspectionist school, while "behavior" was proper to the behaviorist tradition. If one wants to do justice to the transactional dimensions of experience and behavior, it is better, according to Dewey, to define these phenomena from *conduct*. Experience is understood in a transactional framework; it supervenes on the transactional relations between organisms and environments. These relations involve bodily and neural processes, but not only: « we are concerned with the fact as indicating that the structure of consciousness lies in a highly complex field outside of 'consciousness' itself, one that requires the help of objective science and apparatus to determine » (LW5:220).

This objective structure is spatially and temporally extended: behavior is continuous and serial. For Dewey, "experience" denotes all that is involved in the continuous reciprocal adjustment between the organism and the environment. Lived experience does not primarily involve awareness, knowledge or reflection. On the other hand, Dewey also noticed how much the definition of behavior as a succession of motors reactions is artificial; it is a laboratory artifact. "Conduct" is definitely a better word than "behavior", « for it clearly involves the facts both of direction (or a vector property) and of conveying or conducing. It includes the fact of passing through and passing along » (LW5:222).

Conduct is oriented: it has a history, and it is situated. It makes explicit reference to the *continuity* of action, and not to a mere addition of punctual motor events[16]. The situated character of conduct does not amount to the fact that any conduct would be *inside* of some place: for Dewey, a situation includes conduct as its basic constituent, since all conduct is interaction (or even better: transaction) between organism and the (social and natural) environment (MW14:9). Conduct is also more than a set of responses to environmental necessities or events: it includes responses to norms and meanings, and thus involves *responsibilities*. Eating, drinking, walking, or working differ from mere bodily moves or activities not because they are made with an explicit aim or a purpose, but because they can be done correctly or incorrectly: « conduct is always shared; this is the difference between it and a physiological process. It is not an ethical "ought" that conduct should be social. It is social, whether bad or good » (MW14:16).

Action is not a kind of conduct that would be characterized by a spiritual or material event that would come with or before the conduct; it is a way of conduct that we label with the concept "action", for instance when we insist on the normative dimension of conduct, or on the carefulness or attention by which it develops itself. Intentions are *expressed* in conduct (MW6:392). In order to insist on the historical, acquired, skillful, organized, and social dimensions of conduct, Dewey also redefined the notion of "habit", habit becoming a fundamental instrument and even determinant (MW14:153) of conduct, and the concept of "habit" being transformed into a basic concept referring to action-phenomena (Kilpinen 2016):

> The word habit may seem twisted somewhat from its customary use when employed as we have been using it. But we need a word to express that kind of human activity which is influenced by prior activity and in that sense acquired; which contains within itself a certain ordering or systematization of minor elements of action; which is projective, dynamic in quality, ready for overt manifestation; and which is operative in some subdued subordinate form even when not obviously dominating activity. Habit even in its ordinary usage comes nearer to denoting these facts than any other word. (MW14:31).

Classical pragmatists were thus already prone to distinguish their own views from other practice or action-oriented views. Let us take a last and brief example of this attitude: as a reader of Kant, Peirce wrote that he would have never called pragmatism "practicism" or "practicalism" (5.412): "practical", in Kant's lexicon (*praktisch*) refers to a domain in which principles of conduct are settled *a priori* by reason alone, regardless of the purpose of conduct or of its circumstances; whereas "pragmatic" refers to an experimental domain where beliefs, decisions, and rules of conducts are (fallibly) determined from peculiar human interests, and on the basis the contingency of experience, including objects and things (cf. the ancient Greek "*pragmata*"). In the same spirit, contemporary pragmatists can thus propose concrete differences between what a *pragmatic* turn in cognitive science amounts to, and what a *pragmatist* turn would be, and how a pragmatist stance could be of benefit to a pragmatic point of view. For instance, in a recent paper titled "Pragmatism and the pragmatic turn in cognitive science", Richard Menary (2016) has argued that classical

[16] LW (7:168).

pragmatism could offer conceptual grounds to the pragmatic turn in cognitive science, correcting and expanding its perspective: proponents of the pragmatic turn, Menary claims, probably overestimate the extent to which cognition is a matter of sensorimotor interactions with the environment. Their perspective can be enriched by *pragmatist* models and propositions according to which cognition develops and is structured by exploratory and world-involving inferences, including representations and norms[17]. What I have begun to suggest here is that the consequences of a consideration of pragmatism might be more radical than expected for the pragmatic turn in cognitive science: they should lead to a reconsideration of what action is and, by implication, of what the concept "cognition" means (since proponents of the pragmatic turn are sometimes prone to equate cognition with action). But this would only be a first step in the making of a *pragmatist* turn or even shift in cognitive science. The next sections outline the form and the timely nature of a second step.

3. A paradigm shift in cognitive science?

What would a pragmatist turn look like in cognitive science? And, especially, what would be its differences with a pragmatic turn? In order to develop an answer to this question, we must first better understand the nature and prospects of the pragmatic turn.

"Turn" can be understood in at least two senses. Firstly, a turn can be a bending in a road which is leading somewhere; in this sense, a turn makes a difference to where the road is leading, but it is continuous with that road. In the second sense, a turn is a change that can be *discontinuous* or even *contradictory* to the main road. In this latter sense, a turn is close to what Thomas Kuhn called a "paradigm shift". Is the pragmatic turn a paradigm shift in cognitive science? Engel and colleagues address that question. They write:

> Looking at the action-oriented view in cognitive science, it is difficult to argue that it constitutes one paradigm. Instead, we might say that there are a number of related paradigms which share common emphases on the role of action. Do we have a paradigm shift? Twenty years ago, not many people thought motor activity could influence perception. Now there is a consensus that the motor system contributes to understanding. Perhaps the important point is that to make progress from this proposed paradigm shift, we must focus not only on high-level definitions but also on how these concepts will lead to new *experimental paradigms* both in the natural sciences and medicine as well as in the engineering sciences. (Dominey et al. 2016, 337; authors' emphasis).

The answer is interesting and original[18]: no, the pragmatic turn does not consist in a *single* paradigm shift, but in a shift from one paradigm to many *paradigms* – the common premise of these paradigms being here the influence of action on perception and, more broadly, cognition. In comparison with other claims considered above about the relations between action and cognition (functional claims, genetical claims, constituency claims,...), this common premise is quite vague: is it original and strong enough for holding together different paradigms – and has cognitive science (especially classical cognitive science) ever doubted that action could influence perception ?[19] Moreover, is there not here a very liberal use of the concept of "paradigm", stating that there can be more than two paradigms in science during a time of paradigm shift? The authors say at the end of the quotation that the prospects of these paradigm shifts might be defined not only with reference to new definitions, but also with reference to practical experimental differences. In a footnote, the authors write that by "experimental paradigm", they mean "specific procedures and protocols". One can imagine some new practical implications of the pragmatic turn: a turn from controlled laboratory observations to an

[17] On this issue, see also Madzia and Jung (2016).

[18] In Engel (2013) and (2010), the answer is different: "the pragmatic turn presumably denotes more an agenda than a paradigm already in place" (2013, 207; 2010, 237).

[19] See for instance Aizawa (2007).

analysis of cognition (and action) in the wild, in real time and real life constraints and contexts.

As Engel already wrote in 2010, « the fans of the pragmatic turn should be the first to realize that the return of the active cognizer to the lab is, above all, a matter of practice, rather than of theory » (2010, 238). That sounds like a *pragmatist* attitude: theoretical differences, in order to be genuine differences, must make practical differences. But pragmatists traditionally dismissed the theory/practice distinction: theoretical changes are practical changes, and practical changes are theoretical changes. Changing the hierarchical relations between action and cognition, or defending the need of new methodologies in the study of cognition might not be sufficient for having a paradigm shift: in order to get the latter, a new definition of cognitive science (and not only of cognition) could be necessary. And perhaps pragmatism might provide it, in the context of an increasing (but not necessarily questioned) use of the concept of "paradigm" in cognitive science by challengers to the computational tradition[20].

Let us see that in further detail.

If one follows Kuhn's often ambiguous statements, a mature and normal science develops itself from and in one unique paradigm. It is only when the paradigm enters into crisis *and* that the possibility of a new paradigm (as a set of concepts, definitions, examplars, instruments, basic principles and laws, procedures, and epistemic values) is intelligible that a scientific *revolution* or paradigm shift *might* happen. When there are more than two competing paradigms, one is at the stage of pre-science. Saying that there is now a *new* emerging paradigm in cognitive science presupposes that there is now a paradigm which is in a stage of crisis. One must explain how and why there is such a crisis, without mistaking the inability of the computational paradigm to solve some *puzzles* for a state of crisis, defined by an accumulation of *anomalies* which are seen as *anomalies* by members of the paradigm themselves, and not only by outsiders. Talking about a new emerging paradigm is also assuming that amongst the many critical theories of computationalism, there is *one* theory which is already sufficiently structured and systematic for being a proto-paradigm, and not only a research program amongst others[21]. Against this assumption, many historians of science will also remark that the awareness of the birth of a paradigm is often *ex post facto*: stating that one is now creating a new paradigm is neither necessary nor sufficient for the actual birth of a paradigm.

Scientific changes, and changes inside of a same paradigm, often happen: what would be the changes that would entail the *defeat* of the computational paradigm, to the benefit of a new paradigm? Obviously, those changes cannot only be empirical or experimental, or consist in the transformation of one discipline: those changes must encompass methodological changes and conceptual changes, but also possibly a new articulation of the relations between the disciplines composing cognitive science. A new challenge appears: those changes must be sufficiently radical, coherent and huge for making up a positive (and not only critical) alternative to computationalism; but they must maintain some continuity with computationalism in order to be considered as producing a (new) theory of a common pre-theoretical object, namely *cognition*. Obviously, the old paradigm may consider itself as being the sole owner of what must be maintained or conserved so that one can talk about a *scientific* revolution about cognition. This strategy has already been used in the past by Fodor and Pylyshyn in their criticism of the ambition of connectionism to establish a new theory of *cognition*[22]. Must the new theory or paradigm answer the same questions that the old theory or paradigm, but with new answers and ways of answering? Or must it also get rid of, or overcome questions and founding problems of the

[20] See for instance the full title of the book edited by Stewart, Di Paolo and Gapenne (2010): *Enaction. Towards a New Paradigm in Cognitive Science.* Or Pfeifer and Bongard (2007).

[21] See for instance Shapiro (2011, 2-3).

[22] See Fodor and Pylyshyn (1988).

old theory, with the risk of being considered as being *unscientific* by proponents of the old theory? As Kuhn himself remarked, a paradigm always rewrites the history of its discipline, and always (re)defines the object(s) of its disciplines from its own conceptual, ontological and methodological commitments:

> The reception of a new paradigm often necessitates a redefinition of the corresponding science. Some old problems may be relegated to another science or declared entirely "unscientific". Others that were previously non-existent or trivial may, with a new paradigm, become the very archetypes of significant scientific achievement. And as the problems change, so, often, does the standard that distinguishes a real scientific solution from a mere metaphysical speculation, word game, or mathematical play. The normal-scientific tradition that emerges from a scientific revolution is not only incompatible but often actually incommensurable with that which has gone before. (Kuhn 1970, 103)

Consequently, a paradigm shift is not only a change in contents or theories *within* a science: it is also a change of science, including a change of questions, definitions and problems.

Even if the expression "cognitive science" only appeared in 1973 and the expression "cognitive studies" in 1960 (the very same year as Putnam's seminal essay "Minds and machines"), proponents of the computational paradigm often reduce the birth of cognitive science to the emergence of the computational paradigm[23]. Beside an institutional event such as the Hixon Symposium « Cerebral mechanisms in behavior » in 1948 which included various scientific personalities such as Von Neumann, McCulloch and Lashley, the *pre-history* of cognitive science is therefore supposed to consist mainly of the criticism of behaviourism, as it was developed by authors such as Tolman (1946), Lashley (1948) and, later on, Chomsky (1959). According to this common story, behaviourism considered that mental processes cannot have any role in the explanation of the performances of a subject. Watson rejected them because they are inner and subjective processes; Skinner refused them because they are forms of behaviour and cannot – on pain of circularity – be posited for explaining the behaviour of an agent. Still, Tolman, Lashley, and Chomsky are supposed to have *demonstrated* that it is necessary to posit the existence of *mental* processes mediating the relations between sensory stimuli and motor responses, since these responses cannot be completely explained by referring to the physical properties of sensory stimuli. Those processes are informational or representational processes, as Broadbent suggested already in 1954, and Miller in 1956 (it is during the summer of 1956 that two other founding events of the computational tradition took place: the *Symposium on Information Theory* at MIT, and a meeting on problem solving at Dartmouth College).

According to this computational story, the founding moment of cognitive science would be the fact of positing the existence of informational processes (not necessarily conscious) between inputs and outputs, and of studying their nature from an interdisciplinary perspective. In 1967, Ulric Neisser defined cognition as « all processes by which the sensory input is transformed, reduced, elaborated, stored, recovered, and used »[24]. It is at this moment that the following *tropism* appeared: any self-proclaimed theory of cognition which would refuse the existence of this informational mediation would *not* be a theory of *cognition*, and cannot be included in a *science* of cognition. The computational paradigm has not only proposed a definition of cognition; it has especially imposed a way of defining the object of cognitive science: before being neuronal, functional, extended, or social, the existence of cognition as a set of processes is acknowledged, this set of processes forming a *sui generis*[25] scientific domain.

[23] For another story, see Dupuy (2000).

[24] Neisser (1967, 4).

[25] *Sui generis*, here, is understood in an epistemological sense, not in an ontological sense: one defends the necessity of creating a specific science (or set of sciences) devoted to the study of cognition, even if one

This reminder is helpful when one considers the conditions in virtue of which one might speak of an alternative to the computational paradigm : one might think that this alternative should necessarily provide a new definition of the nature of cognition, avoiding or rejecting the importance of *informational* and *representational* processes when defining cognition ; but one might also imagine that the founding act of this alternative would be to get rid of the search for a scientific definition of cognition understood as a specific set of processes.

It is not very difficult to produce a nominal and extensional definition of cognition : cognition would be the set of operations by which knowledge (in its propositional, procedural, reflexive, practical, or collective modes) is acquired, transmitted, revised, exploited or transformed in situations such as perception, communication, learning, reasoning, memory or cooperation. This definition merely exploits etymological resources (*cognitio* = knowledge in its operatory mode), and will be suitable for a basic presentation of cognitive science. But philosophers and scientists generally want to go further, assuming that the aim of cognitive science is not only the study of the conditions of those operations that we name "cognitive", but especially to produce a theory or model of "cognition", "cognition" naming here what will be common or even essential to all the operations and phenomena that are named "cognitive". Defining the stakes of a transformation, of an overcoming or of a rejection of computation by retaining the necessity that cognitive science be the science of a distinct set of processes or *sui generis* domain is assuming that cognition *exists* as a *natural kind*, and not only as a *nominal kind*.

Those who admit their existence and their difference with nominal kinds generally define a natural kind as a set or order of objects naturally existing, i.e. independently of our descriptive and classificatory conventions ("natural", here, is not contrasted with "cultural" or "artificial", but with what would be an arbitrary choice or classification): acids, gold, tigers or electrons are alleged examples of natural kinds. They differ from nominal or conventional kinds (such as "all of those who have read and understood Heidegger's *Sein und Zeit*") because they can be the objects of fruitful inductive practices, discoveries or laws[26]. More basically, members of a natural kind are supposed to share some essence (substantial or relational) or, more modestly, instantiate a cluster of properties (this instantiation being underlain by causal processes which contribute to the maintaining of the presence of this cluster of properties)[27].

There are different strategies for realizing that a set of entities does not constitute a natural kind: the entities do not have common and specific properties, except those we use for including them in the set they compose; one can also show that there are no interesting generalizations that can made about those entities, or that the available generalizations are underlain by very heterogeneous causal processes[28].

What does it mean to assume that cognition is a natural kind[29]? One considers that cognitive science, *whatever its foundational definition of cognition* (cognition as the manipulation of symbols, cognition as structural coupling between organism and environment, cognition as sense-making, cognition as action, cognition as dynamics, cognition as a set of neural networks, etc…) is about a specific set of processes or properties, being present or activated every time one perceives, reasons, cooperates,… As a natural kind, cognition would unify the whole of cognitive phenomena, beneath their diversity and beneath our conventional descriptions:

can accept that cognition has a material nature.

[26] See for instance Quine (1969, essay 5).
[27] For essentialism on natural kinds, see Putnam (1975). For a non-essentialist realism, see Boyd (1999).
[28] Some researchers in cognitive science have begun to cast doubts on the idea that cognitive phenomena like emotions or concepts would be natural kinds. See Griffiths (2004), for emotions, and Machery (2009), for concepts.
[29] On this issue, see Churchland (1982).

"cognition" is something more than the nominalization of an adjective ("cognitive") that we use for qualifying some situations, phenomena and events when we describe how these situations, phenomena or events have relations with knowledge. Up to now, many self-proclaimed « alternative » theories of cognition share this assumption with the computational paradigm: they all start or end with a new definition of cognition conceived as a natural kind. These definitions can for instance take the form of a set of necessary and sufficient conditions that define a system (a bacterium, a sponge, a flower, a swampman, a computer, an insect robot...) as a cognitive (or non-cognitive) system. Embodiment, sensori-motor coupling, action, or sense-making are some conditions that can be invoked. These conditions are generally considered as *facts* whose existence is independent from our classificatory conventions. Our definitions of cognition must carve nature at its joints[30]; they are built and discussed independently of a consideration of the ordinary circumstances in which we say that *X* has a mind, is intelligent, or is a cognizer.

But the future of current controversies between different (self-proclaimed) paradigms in cognitive science will not necessarily be the continuation of controversies concerning the definition of cognition that should be given. This future might be the opportunity to reflect upon the relevance of proposing such a definition at all, especially when this definition is seen as being about a natural kind.

4. An example: Dewey's adverbialism

Pragmatism might not only introduce a new conception of action in the study of cognition; it could more radically suggest a new view of the relations there are between the concept of "cognition", cognitive science, and our forms of action. In order to develop this argument, I will now focus on ideas that were proposed by Dewey in « Conduct and experience », a text already quoted earlier in this paper. As we have seen, for Dewey in this text, the subject matter of *psychology* is not mind, consciousness, or the brain. Nor it is behaviour *as it is understood and studied by behaviorists*. It is rather behavior understood as *conduct*, as « the behavior of the organism so far as that is characterized by changes taking place in an activity that is serial and continuous in reference to changes in an environment that persists although changing in detail » (LW5:224).

Psychology notably investigates the objective conditions in which habits – as instruments of conduct – are formed and operate (MW14:61). Does this mean that psychology does *not* study memory, perception or reasoning? Well, it does not study memory, perception or reasoning as *faculties*, but as *modes of conduct*. Before being invented by psychologists as mental faculties or as parts of a substantial mind, "remembering", "imagining", "thinking", "judging" or "reasoning" stand for properties of activities open to observation and performed by agents[31].

We here reach Dewey's *adverbialism*. Up to now, it has been considerably underestimated in the literature emphasizing Dewey's relevance for cognitive science[32]. Dewey's adverbialism is at the crossroads of several dimensions of his philosophy. I will here briefly summarize three of these dimensions.

1) The criticism of what Dewey calls the "philosophical fallacy", which tends to *reify* the products or eventual functions of an historical process into substantial structures that govern that very same process. The

[30] This metaphor was famously proposed by Socrates. See Plato, *Phaedrus* (265d-266a).

[31] Dewey (2012, 207).

[32] An exception being Johnson (2007, 132): Johnson reminds us how the pragmatist reconception of mind is grounded on the refusal to treat percepts, concepts or thoughts as *objects*, and leads us to see them as "patterns of experiential interaction", and more precisely as "aspects or dimensions or structures of the patterns of organism-environment coupling that constitute experience".

philosophical fallacy consists in "reifying, hypostatizing that which in fact is functional" (LW16:337), or converting "consequences of interaction of events into causes of the occurrence of these consequences" (LW1:200). In order to avoid and cure this fallacy, one must continuously insist on how names such as "mind", "truth" or "values" do not stand for substances or ready-made properties; they rather describe eventual functions of continuous and situated processes of transactions between organisms and their environments. Hence, Dewey considers that the adverb "truly" is more fundamental than "true" or "truth". This adverb denotes a way of acting. An idea or proposition is not true; it guides us truly or falsely in some situation. "Truth" has no meaning outside of experienced relations of things. It is an abstract noun, summarizing a quality of experience (MW3:118; MW12:169). Similarly, moral values such as honesty, justice or learning are not fixed and determined ends; they are directions of change in the quality of experience, expressed in a process of improvement, growth and progress (MW12:181). The same applies to consciousness: consciousness is not a power which would modify natural events; it is "the meaning of events in course of remaking; its 'cause' is only the fact that this is one of the ways in which nature goes on" (LW1:233).

2) A metaphysics of qualities and situations. Dewey opens his important essay "Qualitative Thought" (1930) with the following lines: « The world in which we immediately live, that in which we strive, succeed, and are defeated is preeminently a qualitative world. What we act for, suffer, and enjoy are things in their qualitative determinations » (LW5:2423).

Qualities – how events and situations appear and matter for us – are real; they are not the results of imagination, abstraction or analysis. Thought, discourse and judgment emerge out of these qualitative situations. It is the same for predication. Predication is the transformation of a qualitative whole which is directly and non-reflectively experienced into an object of thought (LW5:253). Subject and predicate are correlative determinations of an undetermined complex quality. Qualities are not fixed properties of objects : the proposition "X is stoical" must not be interpreted as signifying that X is characterized by the property of stoicism, or that he belongs to the class of stoical objects. It rather expresses the fact that X is permeated throughout by a certain quality: he lives, acts, and endures stoically.

Some qualities can be mental qualities. In the essay « What are states of mind ? » (1912 ; MW7), Dewey explicitly defines « mental » and « psychic » properties as *qualities* of situated conduct[33]. Originally, these qualities are proper to organism-environment transactions; they appear when the organism responds to, or produces, meanings. Still, these qualities are (wrongly) understood as being *private* and *individual* for various reasons: the psychologist wants to predict their occurrence by associating them with simple and elemental causes of observable behavior; the moralist turns them into qualities that must be assessable by being attributed to an autonomous agent; the artist defines them as the seats of passion, inspiration, genius or feelings which resist to a total overt expression. However originally, memory, perception or reasoning are not mental faculties or conscious activities or states; they are « modes of behavior having their own discernible qualities, meaning by 'qualities' traits that enable one to discriminate and identify them as special modes of behavior » (LW5:226).

What is crucial, here, is that we discriminate and identify these modes of behavior from the *qualities* they express. We qualify a way of conduct as "reading", "recognizing someone's face", or "reasoning" by considering what the agent does, how she does it, and what she is ready to do in a situation where meanings are produced, transformed and shared.

[33] See also MW (10:58); LW (3:37).

3) A consideration of the practical circumstances and of the criteria, on the basis of which we attribute mental, psychological, or cognitive properties to a system (MW6:182; LW10:268). For instance, Dewey invites us to pay attention to the uses of the verb *to mind* (LW10:206-208). *Minding* involves *attending*, *purpose* and *caring* (including emotional *caring*), as special types of organic action: an organic action that is special not because of some experience or of some inner psychical activity that is supposed to produce it (attention, Dewey insists, *is attentive behavior*), but in virtue of the type of transactional situation it is a part of, namely a situation in which creatures are sensitive to meaningful qualities as instantiated in events and objects. These meaningful qualities are *publicly* shared; they presuppose participation and communication (LW3:49). Let us recall that, for Dewey, meaning involves *aboutness* (not only in thought or language, but also primarily in action and manipulation of objects) defined with reference to *rules* that are *shared* (LW1:147). It does not necessarily equate with written or spoken language (LW12:27).

These three dimensions can be combined for defining the outlines of an adverbial conception of mental phenomena. Having a mind or being a cognitive creature is instantiated in *situated* ways of acting. These ways of behaving can be described by adverbs. Typically, an adverb *qualifies* an activity (expressed by a verb); it expresses a way, a mode of acting (MW12:169).

"Mind" and "intelligence" do not mean or express things or activities, as expressed by nouns or verbs. As Dewey wrote in 1916, in *Democracy and Education*:

> Mind is not a name for something complete by itself; it is a name for a course of action in so far as that is intelligently directed; in so far, that is to say, as aims, ends, enter into it, with selection of means to further the attainment of aims. Intelligence is not a peculiar possession which a person owns; but a person is intelligent in so far as the activities in which he plays a part have the qualities mentioned. Nor are the activities in which a person engages, whether intelligently or not, exclusive properties of himself; they are something in which he engages and partakes. (MW9:139)

And as he wrote in *Experience and Nature* (1925):

> "Thought", reason, intelligence, whatever word we choose to use, is existentially an adjective (or better an adverb), not a noun. It is a disposition of activity, a quality of that conduct which foresees consequences of existing events, and which uses what is foreseen as a plan and method of administering affairs. (LW1:126)

For adverbialism, verbs like "think", "reason", or "remember" do not denote specific *activities*. Thinking, reasoning or remembering are not processes or activities that would accompany other activities like walking, cooking, manipulating symbols, or playing tennis. They are ways of achieving these activities: one can walk, cook, play tennis or manipulate symbols *carefully, purposively,* or *with attention*. For Dewey, when we speak about "mind", the problem arises when the adverb ("mentally") gets transformed into an adjective ("mental") denoting a *special* property, and then into a noun ("mind") denoting an entity at the source of behavior (see also LW1:66). By doing this, we commit the philosophical fallacy: "the arbitrary conversion of an eventual natural function of unification into a causal antecedent reality" (LW1:34). Initially, the adverb denotes a specific mode of situated interaction. Already in 1907, Dewey argued that ideas were not psychical pieces or entities, but modes of action in the environment: interpretations of the environment in reference to absent portions, for the purpose of action (MW4:83-84). In some passages of Dewey's works, "mind" is seen as a *verb*, but this verb does not correspond to a specific activity, but to a way of acting:

> In short "to mind" denotes an activity that is intellectual, to note something; affectional, as caring and liking, and volitional, practical, acting in a purposive way. Mind is primarily a verb. It denotes all the ways in which we deal consciously and expressly with the situations in which we find ourselves. (*Art as Experience*, 1934, LW10:268)

"Consciously", in the previous passage, must not be understood as referring to a mode of intellectual reflexivity, or to a subjective experience. "Consciously", here, involves attention and sensitivity to the qualities of a situation. There is no mind or mental items; there are specific ways of interacting with the environment, by displaying a sensitivity to meaningful qualities proper to a situation or transaction (MW7:37-38, 54-55; MW10:58; LW3:37), from habitual capacities (MW14:124), from customs (LW6:12), and from some enacted biography (LW3:34). "Mental" qualities emerge out of organism-environment transactions, when the latter ones involve social and linguistic conditions: « mental phenomena represent life-functions of a physiological order transformed by interaction with social conditions involving language and its cultural products » (Dewey 2012, 318; see also 321).

Mental predicates such as "believes that *p*", "thinks that *q*", or "intends to do *v*" do not designate or do not refer to something (events, states, processes, activities, operations): they qualify situated modes of conduct that we can describe using adverbs. It is the same for cognitive adjectives and verbs: being a cognitive creature, having a cognitive life, is not harboring or producing specific sets of processes that would be separable from action, but neither is it *identical* with conduct.

As said above, Dewey invites us to notice *how* and *when* we say of someone that he or she is mindful. Typically, we do not consider the mechanisms that causally allow the creature to display capacities such as reasoning, reading or conversing. The same could apply to "cognition" or "cognitive": what makes an agent a system we label with the adjective "cognitive" is the way it acts and can act; what makes a performance a "cognitive" performance is the way it is achieved. "Cognition" is not a process that would underlie these performances or the ways they are achieved; it rather consists in the ways these performances are achieved and, more broadly, in the way agents interact with their environment. This idea can sometimes reemerge today, notably in some passages of Dan Hutto and Erik Myin's enactivism, when they for instance write that « mentality is in *all* cases concretely constituted by, and thus literally consists in, the extensive ways in which organisms interact with their environments » (Hutto & Myin 2013, 7; authors' emphasis).

From a Deweyan perspective, one should add that this realization of mentality into ways of interacting (and not in interactions themselves) is observer-dependent: it depends on our ways of discriminating and identifying mental life or cognitive life on the basis of conduct. Mentality is never *directly* (i.e. independent of our descriptive practices) realized into ways of interacting. Moreover, these ways of interacting are deeply normative: as we have seen, for Dewey, conduct is normative right from the start. Finally, this picture of adverbial life should make clear how it conceives the explanatory target of cognitive science. Here too, we can find inspiration in the way Dewey redefined the object of psychology: cognitive science does not study conduct, or the way we label conduct by using psychological or cognitive concepts. What cognitive science investigates are the structures, conditions and the mechanisms of those modes of behaviour, modes that are *already known and labeled as "mental"* (or "cognitive"). To put it otherwise: cognitive science does not study "the mind", "cognition", or "the mental". It does not begin or end with a definition of what mind or cognition *are* (symbol processing, action, coupling,...). It focuses on how some modes of behavior we already describe with psychological predicates are mechanically possible. Outside our activities and ways of acting, "cognitive" is not a label for a specific process, a kind of content, or a state[34].

In this sense, the *radical* import of pragmatism in contemporary cognitive science could lead us to realize that the important matter is not to change our definition of cognition, but to change the very issue: cognitive science is not the science of a *sui generis* object that it

[34] See also Osbeck (2009, 29).

would try to capture and decompose from a referentialist prejudice. Cognitive science studies the processes – neuronal, cultural, social, technical,… – which condition and enable the behaviours that we name 'cognitive' from *criteria* which do not aim – and do not need to aim – to be in direct correspondence with those processes as they are scientifically studied. To put it otherwise: cognitive science studies the conditions of production and realization of phenomena and behaviours we name "cognitive", and produces models and definitions of these conditions, but it is not sure that there is something common which would unify these conditions… beyond or beneath our (context-dependent) descriptive practices.

Conclusion

"Pragmatism" can be said and used in a variety of ways in contemporary cognitive science. In this essay, I have surveyed some of these uses, and have argued that it is important to maintain and cultivate a distinction between "pragmatic" and "pragmatist" when one wants to label the current situation in cognitive science. The distinction is not only historical: it relates to different conceptions of action which should be contrasted: what pragmatists mean by "action" is not what proponents or opponents of pragmatic cognitive science mean by "action". This should impact the definitions of cognition that are proposed (since many researchers, today, want to ground cognition on action, or even to equate cognition with action), but not only: I have also argued that a pragmatist interpretation of what a paradigm shift in cognitive science might be could lead to the surrender of a search for a foundational definition of cognition.

If all of this is correct, then pragmatism faces a choice when it meets the possibility of being developed and used in contemporary cognitive science for developing a post-cognitivist framework. *Either* it chooses to be *continuous* with cognitive science in general and it is used and developed from some unquestioned assumptions concerning action in order to criticize the cognitivist paradigm, *or* it is exploited for questioning the foundational assumptions of both cognitivism and post-cognitivism concerning action and, more demandingly, the very object of cognitive science itself.

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DEWEY'S EMBODIED LOGIC

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ABSTRACT: This paper offers some preliminary steps towards putting logic on an embodied basis, drawing on the work of John Dewey and George Herbert Mead. The first two sections show how Dewey's idea of stimulus and response in "The Reflex Arc Concept in Psychology" (1972/EW5), and what amounts to a logic of the body described in the second chapter of *Logic, the Theory of Inquiry* (1986/ LW12), are enactive and embodied. The third section turns to Mead's theory of symbolic communication to show how it is fundamentally embodied and enactive, and how it bridges a logic of the body and a logic of symbolic thought. The last two sections look at several logical relations discussed in Dewey's *Logic* to show how they are grounded in embodiment.

The biggest challenge in developing an embodied and enactive approach to cognition is being able to account for our abstract intellectual abilities. Some critics of embodied cognition may admit that it can help us understand more basic abilities, but they think that it cannot help us adequately understand complex symbolic communication and cognition (Shapiro 2011, Madzia and Jung 2016; Madzia 2016). Fortunately, the groundwork for an embodied and enactive approach to understanding higher level cognition has already been laid by the American pragmatist philosophers John Dewey and George Herbert Mead. Combining Mead's social theory of symbolic communication with Dewey's reconstruction of logic gives us a view of higher order cognition that is embodied, enactive, and social. Recognizing the importance of Dewey and Mead to 4e cognition is not new, nor is recognizing that pragmatism sees higher order cognition as embodied. For instance, Mark Johnson (2007), drawing on James, sees logic as grounded in embodied feeling. However, it is rare that detailed attention is directed specifically to Dewey and Mead's contribution to an embodied understanding of higher order cognition. The present paper focuses on one aspect of higher order thought, the function of propositions in the logic of forming judgments, with a view to eventually putting logic on an embodied basis. I can only offer a small beginning of such a project. However, if logic can be put on an embodied footing, it would signal the possibility of putting other higher order cognitive abilities on an embodied basis as well. Moreover, showing how the logic of propositions is fundamentally embodied directly challenges the dominant view in analytic philosophy that sees meaning as fundamentally propositional. An embodied logic turns this notion on its head.

Before getting to the discussion of judgments and propositions, some preliminary work is required. Dewey makes clear in the second chapter of *Logic, The Theory of Inquiry* that the pattern of reflective inquiry is based on the basic patterns of life activity (LW12). In this chapter Dewey is describing the organizing activities of the body. We can call the structure of these organizing activities a logic of the body. I pick out a few key features of Dewey's logic of the body that are particularly relevant to an embodied theory of propositions. Turning to Mead, we see how his theory of meaning and communication offers a way understanding symbolic thought as embodied thought, and symbolic meaning as embodied meaning. Mead's ideas are crucial to any understanding of the continuity of conceptual meaning with more basic embodied meaning, and for clarifying how a logic of propositions is continuous with Dewey's logic of the body. The beginning of Dewey's enactive view of cognition can be found in his early article "The Reflex Arc Concept in Psychology" (EW5). The ideas he develops in that seminal paper appear throughout his writings, from his organismal view of human behavior and experience, to his later work on logic. So, we will start there.

1. An Enactive View of Stimulus and Response

In "The Reflex Arc Concept in Psychology" Dewey developed an enactive theory of mind long before the cognitive revolution in psychology, and even long before the ascendency of the behaviorism that the cognitive revolution replaced. Dewey had effectively anticipated the problems of contemporary cognitivism that motivates the growing movement toward a 4e approach. Then, as now, a

stimulus was viewed as something independent and outside of the organism, while the response was the act of the organism that followed the occasion of the external stimulus. Mediating between these two events is an internal factor. This might be conceived physiologically as a process of the central nervous system, or it might be conceived in mentalistic terms such as a motivational state, an idea, or a mental representation. Nowadays we have such things as cognitive modules or massive parallel processing that sometimes does the job of mediation.

Dewey rejected the assumption that stimulus and response were separate existences, mediated by a third process inside the organism. Instead, he saw stimulus and response as functional factors or "divisions of labour" within a developing coordination (EW5, 97). The stimulus is the developing coordination as it falls away from an established equilibrium. The response is the same coordination moving toward a new equilibrium under new conditions. Stimulus and response are, he said, "strictly correlative and contemporaneous" (109). They occur simultaneously, with the stimulus persisting through the response. Elements that are falling away from equilibrium continue in an unstable condition during the response until a new equilibrium is achieved. Stimulus and response are mutually determining, and herein lies Dewey's enactivism. The stimulus, of course, determines the nature of the response, but the response also determines the nature of the stimulus. When conditions are uncertain and it is not clear what the response should be, then it is also uncertain what the stimulus is. As Dewey says, the problem may be equally well stated as discovering and constituting the right stimulus, or discovering and constituting the successful response (106). To put it another way, to determine the nature of the response requires determining the nature of the stimulus, and determining the nature of the stimulus is part of the response. Indeed, says Dewey, the response "is only for the sake of determining the stimulus" (102). The stimulus is fully determined only when the response is complete.

In terms of an embodied logic, any stimulus, and any occasion of a percept, is particular. It is just that thing, quality, or situation that it is at the present moment. The response to that particular is general. The response generalizes a particular stimulus as the kind of stimulus which evokes that response. Though every stimulus situation or percept is unique, one is similar to another if it evokes the same response. Before we overtly respond to an object, we take an *attitude* or readiness to act toward it. An attitude, in Mead's terms, is the beginning of a response, and it is general because it has not yet been expressed as a particular action. Mead (1934, 83) gives the example of missing a hammer and looking around for something that would serve in its stead. The attitude of hammering is the general element in the response, while the actual tool used and the blow struck are aspects of the response answering to particulars of the stimulus. The general attitude of response determines the meaning of the particulars of the stimulus. This is embodied and enactive meaning at its most basic level, as the felt anticipated outcomes of action. Those anticipations are bodily attitudes.

Three points of similarity between Dewey and Mead's view of stimulus and response, and an embodied and enactive view of mind are worth noting before proceeding further. One is that the response *enacts* the stimulus. In an enactive view, a percept is not something existing independently and prior to an active response. We perceive through our active engagement with the world. Perception not only guides action, it is itself an action and so it is part of the response as it moves toward determination. The percept clearly emerges only through the active response. As Alva Noë writes, "Perception is not something that happens to us. It is something we do" (Noë 2004, 1). Our perception is "determined by *what we do* (or what we know how to do); it is determined by what we are *ready* to do" (1). It is a form of 'skillful activity on the part of the animal as a whole" (2). Dewey and Mead would agree completely.

The second point of similarity is that organism and environment are two poles of a unified relationship. Though they can be distinguished, they can never be separated. This is more than just organism-environment coupling, a term often used in 4e cognition to describe inseparability (e.g. Varela et al. 1993; Johnson 2007) but suggests two things "coupled" together. Properly speaking, we do not have organisms *and* an environment, but organism-environment relationships *within which* we can distinguish organisms and their respective environments. The organism as well as the environment is part of the stimulus, and the environment is part of the response. The stimulus is the entire organism-environment relationship in a condition of disequilibrium, and the response is the entire relationship moving toward recovery. We can, however, place an emphasis on one side or the other. On one side, the environment sets the problem by not meeting the current needs of the organism. On the other side, the movement toward recovery is centered in and organized by the body. Though we might shift our emphasis according to our interests, it is a mistake to see the stimulus as located only outside the body and the response as an activity only of the body.

The third point of congruence between Dewey's view and today's enactive approach to cognition is that both Dewey and enactivism reject the idea of a third process mediating between stimulus and response, or between perception and action (e.g. Noë 2004; Thompson 2007: Chemero 2009). Because stimulus and response are, in Dewey's view, functioning factors rather than separate existences, and because each involves both organism and environment, no mediating process such as mental representation or information processing is necessary. Similarly, an enactive view does not require mental representations or internal cognitive processing to come between perception and action. Dewey's view is *enactive* in the mutual determination of stimulus and response; it is *embodied* because thinking is always an activity of the organic body, not a disembodied "mind"; and it is *embedded* and *extended* (Madzia 2013) because cognition is always an organism-environment relationship.

2. The Logic of the Body

Stimulus and response are, says Dewey, "teleological functions." The end to which they are directed is the maintenance of an integrated organism-environment relationship. The living body is a self-maintaining integration, where every part of the body serves to support the function of all the others as an integrated whole. To maintain its integrity, the body has certain *requirements* that must be met by *availabilities* in the environment. Requirements and availabilities, like stimulus and response, are mutually determining. Requirements grow out of previous availabilities, while something is an availability because it is required by the organism. While relations inside the organism are highly organized and stable, relations outside the organism are highly contingent. Environmental conditions are brought into organized relations with each other through the organized requirements of the living body. In terms of a logic of the body, we could say that organic requirements *specify* features of the environment that are required to maintain an integration. Later we will see this same kind of relationship between universal and existential propositions.

Conditions change, and environmental availabilities cease to meet organic requirements. The result is what Dewey calls a condition of need (LW12, 34; LW1, 195). Need is a felt bodily tension and a felt indeterminacy in the situation. It acts as a stimulus for the movement toward a re-determination. This responsive movement Dewey calls search or effort, which includes determining what the need is, and determining what activities are necessary to satisfy the need. When requirements are met and a new equilibrium is established, the need is satisfied. This is the "satisfaction" or "consummatory" phase. A satisfaction helps establish in the body the

pattern of effort that led up to it, thus shaping subsequent search activities. The pattern of need, search or effort, and satisfaction is the embodied basis for the pattern of inquiry, with need as the basis of the problem, effort as inquiry, and satisfaction for the resolution of the problem and the enactment of judgment.

Like the enactive relationship of stimulus and response, need and search are cotemporaneous and mutually determining. They are functional factors in maintaining an integration. The state of need, functioning as the stimulus, persists through the effort so that behavior is not just a succession of independent events, but a series with "one act growing out of another and leading cumulatively to a further act until the consummatory fully integrated activity occurs" (LW12, 37). The persistence of need through the response allows the response to both satisfy the need and adapt to changes in the need along the way. The persistence of need all the way to the satisfaction makes the satisfaction actually satisfying rather than just a bare event. Based on past experience and bodily memory, the satisfaction is anticipated and prepared for in the search. This enables search behavior to be directed *toward* a satisfaction. The interpenetration of need, search, and satisfaction is what makes them mutually determining. It is also how the search enacts the need, in the sense that it determines the need and is an outflowing or actualization of the need.

The interpenetration of need, search, and satisfaction gives behavior and experience their temporal and teleological organization, and results in genuine embodied temporality. Covert attitudes of the body are temporally organized so that one response can prepare the way for the next. Consequences are incorporated into the body as habits and conserved as embodied memories, which provide the means to prepare for future consequences. Acting toward restoring an equilibrium opens the temporal horizon into the future, with the search activities of the body reaching out into the environment both temporally and spatially. This embodied temporality grounds the temporal transformation of subject-matters in the continuum of inquiry.

To satisfy bodily requirements, the organism selects *things* out of its environing field. "Thing" is used here in a very broad sense as any relatively stable feature of the environment that the organism must deal with in some way. It is part of a percept, and is constituted through the organization of sensorimotor activities. Perceived qualities are unified into a specific thing through the unifying bodily activities of perception, both as overt interaction and as covert attitudes. Mead (1938, 121) refers to a thing or object as a "collapsed act." When an action begins, other phases of the act are mobilized in the body as an organization of attitudes. The object is perceived in relation to the entirety of that organization. A coin on a table at a distance, says Mead, looks round because we remember and anticipate handling it as round as it stimulates a complex of attitudes that cluster around our daily dealings with coins. These are embodied meanings of the coin. Similarly, a house viewed from the front is seen to have a back because we anticipate that we can go around back if we want. We perceive the house through the complex of attitudes and meanings that this kind of house has for us. Selection and organization of things, perceptions, and meanings pre-figures on a pre-reflective level the organization of existential materials in reflective inquiry. Things enter into inquiry as potential existential means and as potential evidence toward the resolution of a problem.

In the simplest of organisms, things are experienced through contact activities alone. When distance receptors and locomotion are involved, response is directed toward things distant in space and time (LW12, 35-36). Distant objects are perceived as signs or affordances for action toward a consummation. However, the actual consummation for most activities is still experienced in contact activities---through touching, tasting, eating, sitting, and the like. In other words, satisfaction of a need is a genuine bodily consummation. The flexibility of the human hand has introduced an extended manipulation phase between distance

perception and consummation (Mead 1938, 24; Madzia, this volume). Hands can pull things apart, put things together, and move things from here to there. Mead and Dewey conceive manipulation in a broader sense than just doing something with the hands. It is any activity that makes use of (manipulates) some object in the natural or cultural environment toward an end not intrinsically connected with that thing. With manipulation, a definite relationship of means to ends emerges. Things become instrumental means, or tools, to remote ends. Embodied cognition is comprised of actual or imagined manipulations of instrumental means toward a satisfactory resolution of a situation.

Though things have connections to each other, they are more or less scattered in the environment. They are not organized. Things that are selected out of an environing field are organized, in proper sense of the word, with respect to each other through the organizing activities of the body. In the logic of the lived body, they are organized through the integration of the organic requirements of the body that specify them. Thus, for a thing to be a thing is to exist always in relation to other things and to the directed activities of organic bodies. Things are elements of organic relatedness.

Embodied thinking occurs when habitual ways of acting are blocked due to changing environmental conditions and undergo a re-organization in the body (MW14, 127, 133). Blocked modes of response reach out into the environment as attitudes to distinguish affordances that will enable their release as overt activity, or to uncover obstacles to that release. Distinguishing these affordances constitutes the organization of the stimulus. Bodily attitudes undergo a re-organization as they make their selections. This constitutes the organization of the response with respect to the particulars of the environment. This response effects a re-organization of perceived relationships in the selected materials, increasing the definiteness in the stimulus, which in turn suggests new avenues of response until there is a definite overt action. The body uses existing conditions and its repertoire of responses as *intermediate means* toward establishing a new integration. When a response is conceived before its execution, it is an idea. It is conceived as a possible way of action to be carried out on existential conditions. Reflective thinking proper occurs when responses are delayed, when avenues of possible responses are tried out in imagination, and possible ways of acting are given linguistic formulation as ideas.

Dewey refers to embodied thought as "qualitative thought" (MW5). The body lives a life of immediate quality, and the transformations that constitute its life are transformations of immediate quality. Dewey insists that no verbal symbols can do justice to the fullness and richness of the qualitative. The qualitative dimension of thinking has a controlling and directing influence on our verbal formulations (LW5). Thinking begins in the qualitative bodily tension of need that is pre-cognitive and directly had. The thinking that follows the original feeling consists of the ideational and conceptual transformation *of* that feeling. Immediate qualities stop the thinker "when he enters the wrong path and send him ahead when he hits the right one" (LW1, 125). Dewey says that whenever an idea loses its immediate felt quality, "it ceases to be an idea and becomes, like an algebraic symbol, a mere stimulus to execute an operation without the need of thinking (125)." When thinking loses a sense of immediate quality it ceases to be thinking in the true sense of the word.

Every situation is characterized and permeated by a pervasive and unique quality undergoing transformation. As the situation develops, this quality is differentiated into things and relations. The differentiated qualities "hang together; there is a great variety of them but they are saturated with a pervasive quality" (MW5, 322). They hang together because they are differentiations within the experience of an organized body. The pervasive quality has a controlling influence on the selected and differentiated features within it. It enters into all the minute adjustments of the organism, and all the

operations and observations of inquiry. Selecting, relating and associating are carried out in reference to the pervasive quality. It is this quality that allows any particular element of an inquiry to feel that it fits well with the transformations that are going on. The pervasive quality also sets the limits from which and to which organization moves. It carries a feeling of whence the movement comes and a whither it is going. It sets the limits on "enough."

The bodily impulsion toward re-integration that propels thought is emotional. Emotion is both propulsive and anticipatory—propulsive in that it seeks an outlet in overt activity, and anticipatory in that it comes with want and expectation. Without this propulsive emotion, reflective thought is undirected and goes nowhere. As anticipatory, emotions give qualities their significance toward an expected outcome (LW1, 48). Things have significance because of felt emotional anticipations that go with them and that are characteristics *of* them. Bodily emotion is the selecting and relating "force" giving a qualitative unity to otherwise distributed elements of a situation (49). The reorganization of the situation is the reorganization and articulation of the moving emotion; it is emotion differentiated into objects and relations. The organization and reintegration of meanings is the transformation of emotional quality. Even the most intellectual thinkers "press forward toward some end dimly and imprecisely prefigured, groping their way as they are lured on by the identity of an aura in which their observations and reflections swim" (LW1, 80).

3. Social Embodiment and the Gesture

The mutually determining relationship of stimulus and response that is found in the relationship of living bodies to their world also holds for communication between individuals in what Mead calls the "conversation of gestures" (Mead 1934). Mead is well known to sociologists for his social theory of mind and self. What is less appreciated is how his theory is an embodied and enactive theory of mind. Throughout the 4e literature, the social aspect of human embodiment has not yet received the treatment it deserves (Booth 2016; see Franks 2010, Madzia 2013 for exceptions). Mead's work offers a rich resource for developing a social 4e approach to cognition.

A gesture is any movement of one organism that is responded to by another. If a movement of one organism does not arouse a response in another, that movement is not a gesture. Viewed from the point of view of the second organism, the gesture of the first organism is part of a stimulus in Dewey's understanding of that term. It is that part of a developing coordination of the second individual that is falling away from an equilibrium and that demands a recovery through a response. The response of the second organism determines the meaning of the gesture for that second organism. In Mead's theory, the meaning of the gesture is in its relationship to the outcome of the social act for the responding organism. Its meaning is in its function as a sign of an anticipated outcome. A gesture of the first organism means a later phase of the act to the second organism, so that the second individual is responding not only to the present movement, but also to what the gesture portends. We can name this kind of social meaning *gestural meaning*. Gestural meaning is a social form of embodied meaning. It is not something "mental"; it is inter-corporeal. It is embodied both in the movement of the first individual and in the response of the second individual. Gestural meaning is found in the relationship of the bodily movements of two organisms to other elements of their social act, including elements (things) of the environment.

A conversation of gestures involves the mutual adjustment of at least two organisms to the movements of each other. A gesture in this case is not a whole act or movement of the gesturing individual; it is the *beginning* of a movement, an attitude, of the first organism that evokes the response in the other. As one organism begins a movement, the second organism adjusts itself as it anticipates the full movement. The beginning of the second organism's response then evokes an adjustment

on the part of the first organism, which then stimulates a further adjustment by the second organism, and so on. Each organism responds to the attitudes of the other. The metaphor of a conversation is not strictly accurate, for there is no taking of turns as in an actual conversation. It is more like a dance that develops as a single dynamical system of communication and embodied meaning (King 2004). It is reciprocal enactment. It is impossible to separate stimulus and response in this dance of gestural meaning. Rather, they are functional factors in a developing relationship of mutual adjustment, with any movement having aspects of both stimulus and response.

This conversation or dance of gestures does not require self-consciousness (Mead 1934, 78-81). In non-human animals, both individuals are focused completely on the movements of the other, not their own movements. They are not conscious of the meaning that their own gestures have for the other. This is the case for gestural communication throughout the animal kingdom, and it is the case for much our own gestures as well, often much to our embarrassment and dismay when we discover what we have unintentionally communicated gesturally to others.

We humans (unlike other animals, as far as we know) have the ability to indicate the meaning of our gestures to ourselves. We are self-conscious. We become self-conscious by learning to respond to our own gestures as others respond to them. By taking the position of others toward our own gestures, we gain an understanding of the meaning they have for others, and consequently for ourselves. As Mead puts it, not only is there meaning, but there is now also consciousness of meaning (Mead 1910/1964). With the ability to take the position of the other, we can also indicate meanings to other humans as we would indicate them to ourselves. In this way, gestures come to have intentionally shared meanings. That is, they become symbols with *symbolic meaning*. A symbol, whether a vocalization, a bodily movement, or a physical mark or object, carries the same generalized meaning for a social group as it does for the individual using the symbol.

Symbolic or linguistic meaning is not a separate kind of meaning appearing on the evolutionary scene. It is still gestural meaning, but now those gestural meanings are shared among members of a group. Since gestural meaning is embodied meaning, symbolic meaning is also a form of embodied meaning. Symbolic meanings are still bodily attitudes. With James, Mead says that there is even a "but" attitude, an "if" attitude, and a "though" attitude (James 1912, 95; Mead 1934, 86; Johnson 2007, 94-98). These form the basis of the logical relations of conjunction, disjunction, affirmation, negation, and hypothesis.

Language is the primary carrier of symbolic meanings. Its reference, according to Mead, becomes general and objective because its meanings are shared. The linguistic sound or mark acquires meaning in a community of shared use and shared consequences. With language, the conversation of gestures becomes an actual conversation where every meaning is a slight beginning of a response represented and evoked by a linguistic symbol. Though linguistic symbols have reference to things in the world, the primary function of language is not to "represent" the world, but to direct attention and evoke action. For pragmatists, language is a tool for evoking meaning, and as a tool it is part of the intermediate or effort phase of movement toward a consummation.

By taking the position of the other toward our own meanings we are able to internalize into our bodies the conversation of gestures. Thinking, in Mead's embodied theory of mind, is nothing other than an internal conversation of gestures trying out in imagination various actions and influencing oneself as we would be influenced by others. "When you are reasoning, you are indicating to yourself the characters that call out certain responses—that is all you are doing" (Mead 1934, 93). Internalizing the conversation of gestures is internalizing the mutual determination of stimulus and response.

When you are acting in a rational fashion, "you are indicating to yourself what the stimuli are that will call out a complex response, and by the order of the stimuli you are determining what the whole of the response will be" (94). Bodily attitudes become ideas in relationship to other ideas. One idea functions as the stimulus and another idea functions as the response in an internal conversation of gestures. This response then can serve as a stimulus to further ideas. One's response to one's own attitudes determines the meaning of those attitudes and determines how they function in the role of the stimulus. The dynamics of the overt conversation of gestures and the mutual determination of stimulation and response is played out in thought and imagination. This is an embodied view of reasoning.

Reflective thought has the same structure as the pre-reflective organization of attitudes. It moves from an indeterminate stage of need, through the intermediate stage of search or effort, to a determined satisfaction or consummation, with the condition of need and the anticipation of satisfaction persisting through the effort phase of thought. The difference is that reflective thought involves symbol-meanings, not just immediate meanings. Blocked habits reaching out into the environment become alternative courses of action that stand out as ideas and possibilities. The complexity of the central nervous system enables the covert initiation of various possible responses before the completion of an act. This "makes possible the exercise of intelligent or reflective choice" (Mead 1934, 98). Through indicating responses to ourselves and to others, we can break up our potential responses and recombine them in new ways that offer new possibilities. We analyze and synthesize. Things selected out from the environment become named objects, and settled objects become sources of ideas that can used in further thinking.

In abstract thought, the individual takes the attitude of the "generalized other" rather than one other individual. The generalized other is a community, and the attitude of the generalized other is the generalized attitude or response of the community. Mead emphasizes that it is only by taking the position of the generalized other that a person can think at all (Mead 1934, 155-156). The meaning of an abstract idea or symbol is the meaning given by the generalized other. Abstract meanings are stated in terms of the generalized attitudes of the entire social group (155-156n). The more abstract the thinking, the more removed from particular responses it is. Though abstract, these concepts are still rooted in the bodies of the social group because they are shared attitudes, and attitudes are always attitudes of the body. Because concepts are based on the attitudes of an entire group, them may seem to float unmoored to any particular body, therefore to any bodies at all. But they are always embodied in the attitudes of the group, and they are embodied in the responses of particular individuals as they express or respond to the generalized other.

Mead calls symbols *universals*. A universal is a symbolized attitude of the generalized other in response to the particulars of a developing situation. A universal generalizes the different perspectives of multiple individuals within a social group. The wider the group, the more universal the symbol. Because a universal's reference is objective and general, it is not attached to any particular thing. Dewey reminds us that smoke is a natural sign of fire due to an existential connection between the smoke and fire (LW12, 57). As a natural sign, smoke is evidence of fire. On the other hand, the word "smoke" is a symbol or universal, though it represents actual smoke in general, is not evidence of anything. As a universal, it is removed from actual existence. Removed from existence, universals make ordered, and re-ordered, discourse possible (58). Symbols can be related in ways not tied to the actual connections between things. This allows new meanings to be created and possible outcomes to be rehearsed in imagination before engaging in action. Imaginative rehearsal, reasoning, and language can be developed without limit and can themselves come under the examination of reasoning. One result is logical theory.

In Dewey's terminology, symbols or universals have *reference* to existential things, and they have *relations* with other symbols. The relations that symbols or universals have to each other are formally expressed as non-existential or *universal propositions*, which include definitions. Definitions express the relations of symbol meanings to each other. Existential things have *connections* with each other, and these connections allow one thing to serve as evidence of another thing. The connections that things have to each other are formally expressed as *existential propositions*. Universal and existential propositions have mutually determining roles within the pattern of inquiry toward the construction of judgment.

4. Enactive and Embodied Judgment

Inquiry begins with an indeterminate situation. Indeterminacy is first experienced on a pre-reflective, purely embodied level. No matter how abstract the subject-matter, it is experienced on the level of feeling. The feeling of indeterminacy stimulates a response toward a re-determination. This response becomes inquiry, says Dewey, when conditions are consciously examined for their potentialities, and action is taken to realize some potentialities rather than others (LW12, 111).

The first step toward a resolution is to determine the nature of the problem. Observation looks for things that are settled in order to enactively determine preliminary facts and bring the nature of the problem into better focus. This begins the determination of the stimulus of inquiry. The initial lack of organization of factual materials is why the situation is problematic. Organizing the facts of a situation requires the organization of meanings as possible operations (attitudes) that pick them out. Initial facts suggest and stimulate further operations of observation to determine further facts, which in turn suggest further observation, and so on. In this way, facts control and determine observation at the same time that operations of observation control the determination of facts. This is the enactive relationship of stimulus and response played out as the enactive relationship of factual materials on one hand, and operations of observation and test on the other. Possible modes of response are conceived as ideas, which we saw are linguistically represented attitudes of the body. Ideas guide the direction of further operations and further determination of facts.

Determining the factual materials locates and describes the problem. Ideas and conceptual materials represent possible movements toward a solution. Factual materials and conceptual materials develop correlatively as "functional divisions in the work of inquiry" (LW12, 116). Both are operational, thus enactive and embodied. Ideas are operational by directing further operations of observation and test. They enact the factual materials that are their subject-matter. Facts are operational by being selected in such a way that they can function as evidence and suggest ways of acting toward a solution. Those that do not fulfill these roles are set aside.

Examining the relationship between facts and possible courses of action constitutes reasoning. As we saw, reasoning in Mead's embodied view is an internalized conversation of gestures trying out in imagination possible modes of response. Reasoning can anticipate potential changes before action is taken, and thus direct action in a controlled manner. However, reasoning by itself does not resolve the existential situation. The actual resolution of the problem must involve action in the world. At some point inquiry ends and definite action begins.

The end of inquiry is judgment. End is intended here in two senses: as the ending or termination of an inquiry, and as the objective of inquiry. Judgments are pivots between inquiry and action. They are the result of an inquiry and the beginning of action. Because judgments initiate action, they are individual and have real existential import. Dewey uses a legal judgment to

illustrate the function of any judgment. A legal judgment is the end of an inquiry and it prescribes certain actions. A judgment of guilty or not guilty means that either some recompense or punishment is required, or that a person goes free. The action then resolves, or does not resolve, the actual existential situation. Value judgments, if they are judgments in the logical sense and not just unconsidered opinions, are the ends of a process of evaluation and indicate the preparation or willingness to take certain actions (LW12, 123-5).

Judgments are stated in a subject-predicate form. The subject of judgment is a determined object, a specific *this.* An object is subject-matter that has been settled though inquiry. Once settled objects are available as means for subsequent inquiries. In the development of an inquiry, the determinate subject of a judgment emerges from the factual materials that set the problem and that provide evidence toward a solution. As a definite object, it invites predication; and any settled object can serve as the subject of predication. The predicate of judgment anticipates a possible solution to the problem set by the subject, and specifies actions to be taken toward the solution.

The subject and predicate of judgment are mutually determined through the process of inquiry. This mutual determination is an extension of the embodied and enactive relationship of stimulus and response. Again echoing his Reflex Arc article, Dewey in *Logic* refers to the relationship between subject and predicate as a "division of labor" in the distribution of active factors toward a desired consequence (LW12, 136). Existential materials that set the problem and constitute the subject are an extension of the stimulus. The conceptual formulations that offer a possible solution and that constitute the predicate are an extension of the response. Just as the response determines the nature of the stimulus, the conceptual materials involved in predication determine the nature of the subject. For instance, the judgment "this is sugar" conjoins an existential "this" to the conceptual predicate "is sugar" (131). This predicate is an *anticipation* of the resolved situation. To determine that something is sugar means that it will sweeten something, or if tasted we will experience sweetness. As an anticipation, it is a bodily attitude, a mode of response. The predicate "is sugar," as a mode of response, determines the nature of the subject. The word "sugar" is a universal. It represents attitudes of the generalized other toward a certain substance. That is, it represents the organization of a nexus of social responses toward a specific kind of thing.

Judgments are always in some degree provisional. They develop through phases of partial judgments, which Dewey calls "appraisals" or "estimates" (LW12, 136). These partial judgments, when used in further inquiries, are expressed as propositions. Propositions are provisional means toward final judgments. They are evaluated according to their effectiveness in moving inquiry to a judgment. The formal subject-predicate structure of a proposition is the same as that of a judgment. On their face, propositions and judgments look the same. The difference is their place and function within inquiry. A proposition is an intermediate means toward a judgment, while a judgment is the end of an inquiry and the beginning of action. Judgments are expressed as propositions in further inquiries in what Dewey calls the continuum of judgment. The continuum of judgment is the ongoing mutual determination of facts and concepts within the continuum of inquiry and experience.

The development of a judgment is a temporal event within the continuum of embodied experience. We saw that experience is temporally organized through the interpenetration of need, search, and satisfaction so that previous experience is carried into the present and toward a future integration. Similarly, every judgment is rooted in previous judgments and appraisals, and looks toward the actual resolution of the problem in the future. The development of judgment involves the transformation of existential and conceptual materials, where the results of prior inquiries become available for future inquiries. Dewey criticizes traditional logic for being removed from the temporal continuum of

experience and inquiry. It is, as it were, a disembodied logic. Dewey wants to situate logical forms within the continuum of inquiry, which means within the embodied activities of inquirers. Without the lived body, there is no whole to give an inquiry meaning. Without an account of the lived body in an actual world there is no temporal development, but only haphazard wandering, mechanical routine, or the application of external means without regard to actual consequences.

The temporal and spatial dimensions of inquiry are expressed in *narration and description* (LW12, 186 and 220-243). Thinking about existential situations involves organizing ideas in a temporal sequence, giving thought a narrative structure. At the same time, whatever exists temporally does so in relation to other existences. Co-existing conditions are expressed linguistically as description. Every narration has a background that can be the subject of description, and every description of events that occur as part of an ongoing transformation can be the subject of narration (220). The embodied basis of narration is the temporality that is fundamental to the living organism. The embodied basis of description is found in the relation that selected things have to each other through the organized requirements of the body.

When we take the position of the generalized other to our felt temporality it becomes objective time, and events are located within a definite narrative structure. In daily life as in art, this structure can take on a dramatic quality, including anticipation and fear as well as joy, relief, and regret. While those emotional qualities are disregarded in most scientific inquiries, narrative structure remains fundamental to the organization of existential and factual subject-matters. There is always some sense of dramatic anticipation and resolution in any inquiry.

Fundamental to the development of any judgment is the activity of *comparison and contrast*. Comparison is a re-qualification of existential materials so that qualities serve as signs for a potential resolution. It is thus primarily directed toward determining the subject of judgment. Some qualities or objects stand out as more important or relevant than others for the purposes at hand. This happens on both a reflective and pre-reflective level. Pre-reflectively, things *feel* similar or not similar in relation to the development of the unique pervasive quality of the situation. "Similarity is the *product of assimilating* different things with respect to their functional value in inference and reasoning" (LW12, 186-187). Unique immediate qualities are assimilated to the pervasive quality, and they are assimilated to one another when the same mode of response yields similar consequences. When this embodied feeling of similarity is socialized and symbolized it becomes comparison and contrast. Within the temporal continuum of judgment, comparison is prospective as it involves anticipated consequences, and it is retrospective as it involves recollections of past conditions and consequences.

Comparison and contrast grow out of the embodied process of selection and rejection. We saw that the existence of a thing *as* thing depends on the selection process that determines it. Similarly, in the activity of comparison the qualities that are compared depend on the operations and purposes of the comparison. Objects are constituted and determined in comparative relationships to other objects. This is an enactive view, in that objects do not exist ready-made to enter comparative relationships but rather are constituted in those relationships through embodied operations of inquiry. The organic process of selection and rejection, and relating thing to thing, becomes comparison when humans can indicate to themselves through social symbols the potential responses and the anticipated consequences of things in their relationships with each other. Responses are compared in imagination as possibilities. Comparison and contrast are formalized in propositions of conjunction and disjunctions, based on feelings of *and*, *but*, and *not*.

The logical operations of *analysis and synthesis* are based in comparison and contrast. Through comparing things with each other, analysis locates facts and

identifies obstructions and resources for inquiry. It works toward determining factual materials and defining the subject of judgment, and is part of the determination of the stimulus within the developing judgment. Correlatively, synthesis is a re-arrangement of analyzed elements toward a unified situation. It is prospective in character. It works toward predication in judgment and is part of the determination of the response. Synthesis also works toward the determination of settled objects, which become available to serve as the subjects of judgments and propositions. The embodied basis of analysis and synthesis is found in the relationship between whole and part, and differentiation and integration. It is also found in the flexibility of the human hand and its ability to rearrange elements of the world into new relationships, and to extend the temporal range of inquiry (Madzia, this volume). Facts are analyzed, determined, and re-qualified through manipulation, either directly with the hands, indirectly through material tools, or conceptually through conceptual tools.

Analysis is not the discovery of pre-existing and independent elements of a situation. It is the determining of factual matters as signs toward a resolution. The sign function is found in the connections that things have with each other, and in the import these connections have for the requirements of the inquiring organism and the resolution of the problem. Analysis discovers the way in which elements of a situation can serve as means to meet those requirements. As means toward a judgment, established facts, information, and data are "things *by which* we know rather than things known" (MW5, 346). The real object of knowledge is the conclusion or judgment. Facts are evidential means toward the conclusion. Synthesis is the integration of factual and conceptual materials into an object of knowledge, and into a judgment.

Also based in comparison and contrast are *affirmation and negation* (LW12, 182-199). Affirmations and negations are propositions of inclusion and exclusion according to relevance of existences and concepts to the problem at hand. Affirmative propositions represent the agreement of different subject-matters in their capacities to function as evidence. They point in the same direction toward a resolution. The word "only" in an affirmation indicates that other possibilities have been eliminated through observation and experiment (189). Negative propositions represent subject-matters to be eliminated because of their irrelevancy to their evidential function toward a solution. Selecting some things always involves simultaneously rejecting others, thus the relationship of affirmation and negation is a conjugate relationship. Affirmation and negation are based in the selections and rejections of the lived body. Organic selection and rejection becomes affirmation-negation when they are named and objectified, and when actions are deferred until their functional capacity is determined in inquiry and the actions are expressed as propositions. Affirmations gain logical status when they are subjected to the social act of *con*firmation—to affirm *with* others in a cooperative social act (188).

Comparison and contrast also underlie statements of *quantity*. All comparison involves measurement; informally there is more or less of this or that quality. This does not require representation in term of numbers, but it does require that objects and events be analyzed into parts or constituent qualitative elements. Quantity and measurement are based on qualitative experiences, such as too much, too many, enough, and not enough, relative to the determination of a solution. In commercial, scientific, or technological inquiries definite numerical scales are used to achieve a greater degree of objectivity, which can appeal to a wider generalized other. However, this objectivity is always based in a qualitative relationship, which is grounded in the comparative activities of the body.

Since comparison and contrast are qualitative transformations of the situation in relation to a situation's unique pervasive quality, so are the logical relationships that are based in them. Thus, analysis and synthesis, affirmation and negation, and relations of quantity are all grounded in and controlled by the development of the pervasive quality moving toward a

felt resolution. This movement is, in turn, nothing other than the embodied and enactive maintenance of an integrated organism-environment relationship on the level of symbolic thought.

5. Embodied and Enactive Propositions

The subject and predicate of judgment are determined through the two corresponding kinds of propositions previously mentioned, existential and non-existential. Existential propositions are concerned with ordering factual materials toward the determination of the *subject* of judgment. Non-existential (purely conceptual) propositions are concerned with the organization of possible bodily operations, and are aimed at determining the *predicate* of judgment. Non-existential propositions are proposals to enact operations that make existential materials more determinate. The two kinds of propositions are mutually determining, again as functional divisions of labour. Existential propositions fulfil the function of the stimulus becoming more determinate, while non-existential propositions correspond to the response that determines the stimulus. This is an enactive view of propositions.

5.1. Existential propositions

Existential propositions are narrative and descriptive, and are concerned with the determination of conditions that lead to a solution to the problem at hand. They help organize existential materials as *potentialities* or powers to affect conditions through the involvements of things with each other. Dewey divides existential propositions into particular, singular, and generic forms.

Particular propositions describe (but do not yet categorize) a singular *this* that is present here and now (LW12, 289-290). As descriptive, they express direct sense perceptions. They occupy the first stage in the determination of the problem and the facts of the case. Particular propositions describe something in its present condition, but also signify potential qualities of what it could be or what it could affect. The predicate of a particular proposition (such as in "this is sweet" or "this will sweeten") represents potentialities that could be actualized if certain operations are performed. For instance, "This is sweet" indicates that something has been tasted or that it would taste sweet if the act of tasting is carried out. The role of the particular proposition is to identify a quality in its function as a sign of other qualities if the operations are enacted. A description, for Dewey, is always tied to an operation, a way of acting; and ways of acting always involve the anticipation of consequences. The pre-reflective embodied basis of particular propositions is found in the organism responding to certain qualities in its environment with a bodily anticipation that other qualities will follow its response.

Singular propositions determine and identify a singular *this* to be of a certain kind ("this is refined sugar") (LW12, 290-293). They relate a particular object or event to a general idea. This represents a further step in determining the facts of a situation. A singular as a mere *this* presents a problem as to what kind of thing it is. The resolution is the determination of it being a thing of a certain kind. Members of a kind share what Dewey calls *characteristic traits* that are reliably connected with each other. So, when some characteristic traits indicate that something of a certain kind, such as sugar, these traits become signs of other traits of that kind that are not immediately present but would be discovered upon investigation. This gives a present trait or quality a representative capacity. "This is sugar" represents other qualities, such as easily dissolvable in hot coffee.

Singular propositions depend on knowledge of involvements that enacted things have with each other (like sugar and coffee), which are the result of prior inquiries. Certain immediate qualities are so conjoined with potential qualities that those latter can be *inferred* from the former. From "This is refined sugar" several inferences can be made, such as it is white, granular,

dissolves easily in hot coffee, has a certain specific gravity, and poses certain health risks if consumed in large amounts over long periods of time. In this way, a singular object is a set of qualities treated as *potentialities* for specified consequences. If an object is determined to be of the kind "apple" because of its shape, which is one of its characteristic traits, then there will be certain consequences expected from biting into it. If the consequences are not what were expected, a question is raised about the kind of thing it is and what other traits it has. Propositions relating particulars to kinds are necessary for inference from one case to another. Any particular case must be determined to be a case of a certain kind, so that we can conclude that what worked in other cases of that kind will work in the present case.

The bodily basis of identifying singulars as members of kinds is found in the response of the organism in determining certain things to be foods, poisons, dangers, pathways, etc. and in the anticipation of regularly ensuing consequences. The embodied basis of inference is anticipation. Expectation of something absent based on something present becomes inference when it is symbolized in terms of existential propositions. Human culture affords control over this process through symbols and propositions that are socially embodied in the generalized other. In the initial phases of an inquiry, elements of a situation are represented by an unorganized collection of singular and particular propositions. Organizing these propositions is done by enactive operations of comparison and contrast, analysis and synthesis, and affirmation and negation---all activities of the lived body.

Generic propositions are propositions concerning the relationships of kinds to each other (LW12, 293-298). They are general existential propositions. A system of related kinds greatly expands the range of inferences that can be made when a singular thing is determined to be of a kind. Operations of inclusion-exclusion determine some kinds to be members of a more inclusive kind. For instance, the kind dog is within the kind mammal. It is also within the kind domestic animal and overlaps with the kind pet. Ideally, relationships of inclusion and exclusion can be ordered until the most inclusive kind is reached. The more inclusive the kind, the wider the application to a variety of circumstances. Kinds are related systematically by a system of affirmations and negations.

But what determines a kind? Dewey dismisses the idea that kinds are based on the recurrence of pre-existing common attributes of things in the world (which would be a non-enative view of kinds). A mere succession of particular instances cannot determine a kind. Every existence is like any other in some respects and unique in others, with no *a priori* grounds for comparison. Recognizing a recurrence or a commonality already presupposes a kind that enables an event to be understood as recurring, or a set of objects as having a common quality—just as for something to be a stimulus there must be an existing mode of response. Commonalities among members of a kind are not found by extracting common features, but by enacting operations that have specified consequences. "Common" refers to a mode of response, not qualities. Any group of traits can serve to distinguish a kind, such as (suggests Dewey) cross-eyed bald shoemakers. But such a kind has no use in inference and no evidential value for predicting other traits (LW12, 267). A kind emerges and is determined through practical use.

As we saw earlier, an anticipated consequence or attitude is already, on a pre-reflective level, a general to a particular stimulus. But on this level it is not yet a kind. Kinds emerge when a reliably coherent set of consequences are socially objectified through language, and a definite relationship between existential qualities of objects is established. A readiness to act may be a potential logical generality. When a potential logical generality is actualized in the form of existential propositions accepted by a community of inquirers, it becomes a kind.

Dewey identifies two other types of existential propositions (LW12, 298-300). *Contingent disjunctive*

propositions are existential propositions of inclusion and exclusion necessary for identifying and ordering kinds, and locating singulars within a kind. *Contingent conditional propositions* are linguistically hypothetical, thus seem like they might be non-existential. However, they refer to singulars. "If you leave that out in the sun, it will melt." This proposition identifies a singular as one of a certain kind, the kind of easily melted things. Thus, it is a variant of a singular proposition. The antecedent and consequent in the *if-then* form in this case have literal temporal meaning. The connection between them is contingent with some degree of probability.

5.2. Universal Propositions

Propositions that determine the predicate of judgment are about operations and methods used to determine factual materials that are the subject of judgment (LW12, 300-305). Because they formulate methods that *could* be used, they are about possibilities and are thus non-existential. General non-existential propositions Dewey calls *universal propositions*. Universal propositions are definitional (as opposed to descriptive or narrative). They are concerned with the relation of concepts to each other, regardless of whether they correspond to actual existences. In Dewey's enactive view, they are formulations of possible ways of acting so as to discriminate and organize existential materials in their function as evidence. They propose a *method* of solution, not an actual solution. That can only be achieved by action.

It is a mistake to think of conceptual subject-matter to constitute a realm of abstract possibility taken as complete in itself. Possibilities can never be divorced from actualities because they refer to possible operations, which gain meaning only by actually carrying them out. Executing the operation tests the relevancy of the proposition as a means for resolution of the problem. Careful observation of the consequences in comparison to what is hypothetically anticipated tests the validity and relevancy of the propositional formulation of the operation.

Even though universal propositions are non-temporal, they still have a basis in embodiment. That basis is in modes of action, or habits. Habits, when inhibited and expressed in symbols and propositions, become possible ways of acting and *suggested* ways of solving a problem. Possibilities are inhibited responses that can be indicated to oneself as they would be indicated by others. Represented by symbols, they are abstract and conceptual, but like all symbols their meaning is based in the bodily attitudes of the generalized other. They become more than just suggestions when they are developed in relation to other symbol-meanings formulated as a system of interrelated universal propositions.

While generic propositions are concerned with the relations of kinds to each other, universal propositions are concerned with the relations between abstract *categories*. The systematic organization of categories of meanings make possible ordered discourse. A category, says Dewey, "is the logical equivalent of what practically is an attitude. It constitutes a point of view, a schedule, a program, a heading or caption, an orientation, a possible *mode of predication*; as, in Aristotle, to categorize is to predicate" (LW12, 272). While an ordered system of kinds enables inference, an ordered system of categories enables logical *implication*, which is the intellectual movement from one category to another through ordered thought and discourse. The cultural basis of categories is found in practical groupings of things that are useful, enjoyable, or dangerous, as well as activities allowed or prohibited, lauded or shamed. These foreshadow the logical operations of inclusion and exclusion.

A universal proposition can be expressed in hypothetical (conditional) form (LW12, 305-307). These are *universal hypothetical propositions.* For example, by definition, if something is a triangle, then it is a plane figure with three sides. Unlike conditional existential propositions, which express a temporal and contingent relationship, universal hypotheticals express a non-

temporal and logically necessary relationship. As a possible operation, this proposition directs inquiry to determine if the figure in question is a plane figure with three sides. If so, it fulfills the definition a triangle. *Disjunctive universal propositions* determine what is included in a definition of a category. For instance, we could ask what constitutes the definition of wealth or intelligence. This is not a matter of examining existential kinds, but determining how such definitions will change which particulars fall into which kinds. As a definition, it is maintained as long as it remains useful and relevant in directing operations on existential materials. In universal propositions, to include or exclude is to determine what is to be an integral part of an operative rule or way of acting.

5.3. The Mutual Determination of Universal and Generic Propositions

Generic and universal propositions have the same enactive relationship to each other as do material and procedural means in the institution of judgment, and thus the same enactive relationship of mutual determination as stimulus and response, as well as environmental availabilities and organic requirements. Generic propositions organize material means, while universal propositions organize procedural means for the determination of materials. Generic propositions organize evidence based on existential connections, while universal propositions specify the conditions to be satisfied by existential materials. Generic propositions formulate the nature of the stimulus, while universal propositions formulate modes of response. Success in determining materials as evidence determines the suitability of universal propositions to the inquiry at hand. Systematic inference based on an ordered system of kinds depends on an ordered system of universals specifying the operations used to determine kinds. Moving easily from kind to kind in inference requires the ability to move easily from category to category by implication. Movement from one existential proposition to another through inference depends on non-existential universal propositions as instrumental intermediaries.

No grounded generic propositions can be formed unless they are products of operations formulated by universal propositions (LW12, 274). Facts cannot be re-organized without the re-organization of ideas as possible operations that pick them out. However, no amount of reasoning can itself determine matters of fact. That requires their application to materials. Similarly, existential data cannot prove a universal. They can *suggest* it. Proof or validation requires the transformation of existential conditions into a unified situation though operations presented in the hypothetical universal proposition. This is accomplished through the actual execution of the operations that the propositions formulate. When successful, the executed operation renders existential materials more indicative or significant.

6. Conclusion

The proximal aim of this paper been to show how logical relations and formal structures of inquiry are grounded in the activities of the lived body, and in the enactive transformation of an indeterminate situation of felt ambiguity or conflict into a felt resolution. The keys to understanding how the formal structures of inquiry are embodied is in understanding how they grow out of the enactive mutual determination of stimulus and response, and out of the basic structure of organic activity, and in Mead's idea of thinking as the internalization of the conversation of gestures. Through taking the role of the other, embodied gestural meaning becomes symbolic meaning, which is still a form of embodied meaning. Pre-reflected "things" become settled objects, existential potentiality becomes logical possibility, anticipations become ideas and suggestions, and the readiness to act can be formulated as propositions.

The ultimate aim of this paper is to support the idea that an embodied and enactive approach to human cognition can account for and shed light on the nature of

human cognition in its most abstract and complex forms. If an embodied and enactive approach can account for logical forms—and I am offering little more than a suggestion as to how this can be done—it should be able to account for other abstract forms of human cognition. If such an account is successful, it will have the potential to bring together the logic of our most technical inquiries with an embodied "logic of experience."

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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.[1] (Focillon 1934, 3-4)

[1] 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 blinds 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 pragmatistically informed 4EA (embodied, extended, enactive, embedded, affective) accounts of cognition[2] 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, 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

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.]

[2] 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.

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.[3] 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

[3] 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 speculativness 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.[4] 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

[4] 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.[5] 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 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[6]) 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).[7] In fact, Mead was convinced that the entire human society is a product of such refinements and modifications of primitive impulses by individuals and

[5] One of the most evident activities of this sort is, for instance, cooking. See Sterelny (2010).

[6] 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.

[7] 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.[8] 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 primordiality 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 primordiality 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

[8] 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.[9] 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.[10] 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.[11] 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 fundaments of the pragmatic theory of truth.[12] 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

[9] "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).

[10] In fact, there are sound reasons to assume that what we call here Mead's epistemological argument for the primordiality 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).

[11] For a more detailed account of this concept, see, e.g. Hankinson (2003, 271-273).

[12] 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[13] 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.[14] 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

[13] Along with the human capacity for thinking by Means of significant symbols. See, e.g., Eames (1973).
[14] 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[15] 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.[16] 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

[15] 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).

[16] 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[17] 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 sensorymotor 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 Siniglaglia (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)[18]

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

[18] 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[19] 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.[20] 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.[21] 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[22] 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).[23] 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

[19] Here, by 'image' we mean any sensory stimulus (olfactory, tactile, …).
[20] See also Mead (1934/1967, 8-12).

[21] 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.).
[22] For a very fine analysis of the concept of the 'normative' in Mead's thought, see Quéré (2011).
[23] 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.

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.[24] From the one side, significant symbols always 'denote' (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 idenfitication 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).[25] 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

[24] See Mead (1922/1964, 246).

[25] 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.[26]

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

[26] 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.[27] 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.

[27] For an extended argumentation in favor of this position, see Madzia (2015).

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II. PRAGMATIST COGNITIVE SCIENCE AND THE PROBLEM OF SOCIAL COGNITION

EXPLANATORY SCHEMES FOR SOCIAL COGNITION – A MINIMALIST INTERACTION-BASED APPROACH

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ABSTRACT: Should social interactions be explained by individual cognitive capacities? - or conversely, can these capacities be explained by social interactions? In order to answer this question we adopt a pragmatic perspective for which the cognitive activity cannot be understood as detached from the social milieu, which precedes the relations which it makes possible. In addition, if one takes the view that inter-individual interactions participate in the constitution of phenomena of social cognition, one must provide explanatory schemes making it possible to *account* for abilities such as the recognition of other subjects, the perception of their intentions or the imitation of their facial expressions, rather than presupposing them as given from the start. We contribute here to the search for such schemes by proposing a minimalist experimental paradigm in which one can observe the genesis or the functioning of such abilities. These observational situations, which are extremely simple, should then enable a precise discussion of the mechanisms at work by proposing a way of disentangling what explains what in the relation between individual abilities and social dynamics. In the framework of an enactive approach we will then be able to demonstrate the role of the body-object in the collective organisation of interactions and in the reconfiguration of individual structures.

1. Introduction

There is a general debate in current research in cognitive science between approaches which base their explanations solely on internal individual abilities (either by a system of symbolic representations or by neuronal structures and activities), and a multitude of approaches which, in a pragmatic perspective, seek to take into account the bodily, technical and social conditions of cognitive phenomena. The debate takes a particularly acute form when research bears on the nature and mechanisms of "social cognition", i.e. abilities such as the recognition of other subjects, understanding their intentions, the imitation of their behaviour and their facial expressions, joint attention, empathy, learning, language, and so on. Should one start from individual abilities to explain social phenomena, or should one start from social interactions in order to explain individual abilities?

On the one hand, in the form of classical methodological individualism in psychology, philosophy of mind or neuroscience, one considers that the cognition at the origin of social interactions is constituted solely by abilities possessed by the individual organism. Whether it be by inference based on internal representations (Theory Theory) or by the internal simulation of observed behaviours (Simulation Theory), it is a question of understanding how a given individual can guess the hidden intentions of another subject. Thus, for these approaches, the behaviour of intentional subjects is to be explained by internal mental states which are hidden to an external observer. Henceforth, the basis of social relations resides in the "mind-reading", i.e. the art of guessing the mental states of other subjects (Baron-Cohen 1997). It is only afterwards that joint attention and the construction of a social world can be achieved (Tomasello et al. 2005).

On the alternative view that we defend here, it is rather a question of taking into account social structures in the explanation of individual cognition. Thus, in this pragmatic framework, the so-called "4E" approaches posit that cognition is Embodied, Embedded, Extended and Enactive, i.e. that cognition cannot be explained without taking into account the concrete conditions of human action. The accent is then put on three related features:

i) There are always material, bodily and technical conditions for social relations. Interactions unfold in a context which is concretely structured and which defines the possibilities for the various actors to perceive, to act and to interact.

ii) Social relations are generally reciprocal, and engage the individuals concerned in a dynamic of interactions. The situation of an uncommitted external observer is secondary and must actually be artificially constructed.

iii) Cognitive or perceptual activities are accomplished by means of bodily engagement and sensori-motor coupling with the environment. They can thus potentially be perceived at the level of the activity itself (and do not have to be inferred indirectly via an internal reconstruction involving inference or simulation) (Gallagher 2008).

In this framework, it can be held that the social environment is not only a context for individual action, but that inter-individual interactions are a necessary condition for achieving social cognition or even, in a yet stronger version, that these interactions actually constitute such cognition (De Jaegher et al. 2010). A central role of this sort is attributed to inter-personal interactions in developmental science (Trevarthen 1979, 1993, Reddy 2008), in social neuroscience (Dumas 2011, 2014, Schilbach et al. 2013), in a dynamic systems approach to cognition (Thelen and Smith 1996), and certain enactivist approaches (De Jaegher et al. 2007, Froese 2016).

Already, in the pragmatic perspective developed by John Dewey cognition and perception should not be separated from the possibility of acting. What Dewey called the "reflex arc" is accomplished at different levels of "sensori-motor coordination". He writes for example : “we begin in perception not with a sensory stimulus, but with a sensorimotor coordination … it is the movement which is primary, and the sensation which is secondary, the movement of body, head and eye muscles determining the quality of what is experienced” (Dewey 1896, 358). Similarly in conception of active perception and in particular for enactive approaches, perception does not result from an internal treatment of sensory information, but is produced in the dynamics of the coupling between an autonomous agent and its environment (Varela 1991). By this activity, the agent brings forth, or “enacts”, the content of its experience which corresponds to the invariants of the sensorimotor dynamics (Kevin O’Reagan and A. Noe 2001). Ezequiel Di Paolo and Hanne De Jaegher (2016) therefore speak of “sense making” achieved in the regulation of the coupling between an autonomous adaptive system and its environment. The perception of an object corresponds to mastery of sensorimotor coupling with that object (and not in a mental representation distinct from the represented objects). The intentional content of a perception is constructed in this coupling. If we now consider a social perception as the recognition of another subject, of their intentions or expressions, such perception should be explained by a form of coupling with another subject, their intentions and expressions. Its intentional content should thus be constructed in a social coupling.

If one admits a sensorimotor approach to cognitive activity, we can understand that the encounter between the coupling activities of several organisms can form relational patterns whose behaviour and history surpass what each individual brings to it (Di Paolo and De Jaegher 2016). Shaun Gallagher proposes the term “Strong Interaction: a mutually engaged co-regulated coupling between at least two autonomous agents where the co-regulation and the coupling mutually affect each other, constituting a self-sustaining organization in the domain of relational dynamics." (Gallagher 2013, 59). This co-ordination leads to the emergence of a new domain of objects, actions and meanings for the subjects engaged in it. One can then define "participatory sense-making" as “the coordination of intentional activity in interaction, whereby individual sense-making processes are affected and new domains of social sense-making can be generated that were not available to each individual on her own” (De Jaegher and Di Paolo 2007, 497). Social interactions play a constitutive role in the sense that the dynamics of interaction itself produces the performance of social cognition, as for example in the dance of a couple, a gesture of exchange, collaborative work or the attention of a new-born baby for her mother in the course of a proto-conversation.

In this sort of approach, phenomena of social cognition can be explained by calling on the notion of “*intercorporeity*”, i.e. a form of concrete inter-individual

community in the situated processes of interaction, a community which precedes the constitution of individual intentions (Merleau-Ponty 1968, Gallagher 2013). For example, work in developmental science tends to demonstrate the existence, right from the earliest years of life, of a "Primary intersubjectivity", i.e. a pragmatic mutual understanding which comes about it the dynamics of the embodied emotional interactions of the proto-conversation between the infant and her caregiver (Trevarthen 1979, 1993, Trevarthen and Reddy 2007). The actions and perceptions of different organisms are harmonized in a "cross-modal sensorimotor system" (Gallagher and Meltzoff 1996); by mutual adjustment they give rise to a "common bodily intentionality that is shared across the perceiving subjects" (Gallagher 2013, 61). This inter-individual embodiment of primary intersubjectivity appears to be the substrate on which a "*secondary intersubjectivity*" can appear (from one year onwards), explaining for example the phenomena of joint attention and then *Communicative and narrative competencies* (from 2 to 4 years).

From the point of view of neurosciences, the discovery of the "Mirror Neuron System" (MNS) can be considered as providing a mechanism which explains the formation of this *intercorporeity*. Thus, these neuronal structures are activated *both* when the subject performs a certain action, *and* also when (s)he perceives the same action performed by another subject. They make it possible to understand the phenomena of imitation, in particular the unconscious imitation of movements, postures and expressions ("chameleon effect"). In the same vein, these neuronal structures seem to be involved in our capacity to share emotions by means of facial expressions and bodily postures (Gallese 2009). In this interaction-based framework, the Mirror Neuron System provides the sub-personal substrate of intercorporeity by explaining the engagement of organisms in behavioural adjustments before any conscious awareness or even distinction self and other (Gallese 2001). "It appears therefore that there is a we-centric dimension in the experience of a given emotional / affective state, and that it is underpinned by the activity of a common neural substrate." (Gallese 2009, 30). In this case, the neuronal structures do not pretend to underlie mental representations or even internal simulations; they serve rather to explain a set of practical interactions and inter-individual perceptions: "Mirror activation, on this interpretation, is not the initiation of simulation; it is part of an enactive intersubjective perception of what the other is doing" (Gallagher 2013, 64).

The work presented here is situated in this sort of interaction-based perspective, and aims at resolving a general difficulty that these approaches run up against. This difficulty concerns the initial capacities that one attributes to individuals in order to explain their engagement in meaningful social interactions. Are they capacities for social cognition that are necessary for the functioning of these interactions, or are they rather the products of such interactions? But if they are necessary, might they not also be sufficient? And if they are the product of such interactions, what is the mechanism that produces them and for what role?

In the interaction-based approaches that we have rapidly surveyed above, the fact is that one attributes substantial initial abilities to individual organisms in order to explain their participation in the interactions. In the case of "primary intersubjectivity", one admits from the outset that "innate or early developing sensory-motor capacities" include the capacities to recognize the face of another subject, to perceive their intentions and to participate in games of imitation and emotional regulation. All these capacities for what is called "social cognition" are considered as pre-given at the individual level, *before* the interactions that they allow actually occur.

But if these capacities dedicated to social cognition are necessary for setting up the interactions, may they not also be sufficient? If there is a need for specific internal structures in order to explain social cognition, is it not possible to interpret these structures in one form or another of internal individualism? These initial capacities would be sufficient to construct a system of personal individual representation or simulation, without

any need to confer on the actual occurrence inter-individual interactions any real explanatory role. This is indeed what on observes in certain interpretations of the MNS. Thus, these neuronal structures can very well be mobilized in an internalist framework to defend the "Simulation Theory": a form of mind-reading could start with a purely internal phase, independent of the environment, in which the intentions of another subject could be guessed at by imagining what one would experience if one performed oneself the behaviours that one perceives (Rizzolatti et al., 2002). This would amount to admitting that the social meaning of these capacities could be contained in purely *individual* internal structures.

If on the other hand one wishes to maintain an approach which is interaction-based, pragmatic or enactive, the social meaning of cognition should rather be deployed in the actual occurrence of inter-individual relations themselves. However, if the meaning of the individual structures which are mobilized in the interactions is only produced in these external relations, one runs the risk of a dangerous circularity: the capacities which participate in social interactions should be produced by the interactions themselves! If one wishes to avoid giving oneself in advance the individual capacities for social cognition, how can one interpret and explain the individual structures whose role is observed in inter-individual interactions?

This difficulty comes up repeatedly in the various approaches which refuse methodological individualism. One can understand that in "strong interactionnism" the capacities for the resolution of social tasks can be explained by the dynamics of the interaction present between the different subjects. But the individual capacities that are mobilized are presupposed as already established, since they are the condition for the interactions to occur. If intercorporeity is explained on the basis of pre-existing internal structures, we already have the entire explanation. The *explanans* is individual and the social is only the *explanandum*.

In the case of participatory sense making, this difficulty takes the form of a tension between the autonomy of the individual organisms and the autonomy of the collective (De Jaegher and Di Paolo 2007). One considers that the dynamics of the interaction can, as such, account for a situated social activity for each participant. But if one grants a form of autonomy to this collective dynamics, with its own properties and its own history, that means precisely that it evolves sufficiently independently of the individuals who participate in it. To the extent that the individual capacities are not affected, the emergent structures of the collective dynamics have no existence at the individual level. How then can one account for the existence of social meaning in personal sense-making activity? It seems that one is faced with an alternative: either the dynamics of the interaction modifies in a heteronomous fashion the sensorimotor activity of each organism; otherwise the dynamics of the interaction remains in a different domain from the activities that each individual pursues for himself.

The aim of this article is to defend an interaction-based approach, in a truly strong sense, in which the social participates in the formation or the modification of individual cognitive activities. For that, it is necessary to propose explanatory schemes which make it possible to account for the way in which individual capacities could, at least in part, be genuinely *produced* by the social dynamics[1]. We must face up to a complex entanglement between the collective and the individual. There is a triple difficulty.

1. To be fully rigorous, it must be possible to define first of all the *non social* capacities which make it possible for a subject to engage in a coupling with the world (for example a perceptual coupling).

[1] One finds an aim of the same order in the "Interactive brain hypothesis » proposed by Di Paolo et De Jaegher (2012); but we shall see, our proposal is substantially different..

2. One must then explain how the engagement of these couplings in a dynamic of relatively autonomous inter-individual interactions allows for the appearance of collective properties that are genuinely social.

3. And finally, it must be shown how these collective properties can account for the formation, within each of the organisms in interaction, of what will then appear to be "individual" capacities for social cognition, i.e. capacities which make it possible for the individuals to engage in a coupling whose meaning is social, and which allow for inter-individual interactions which are richer than before.

To do this, we propose a minimalist experimental method which makes it possible to clarify as precisely as possible the articulations between individual and collective components of this interaction dynamics, their causal order and their logical relation as explanans or explandum.

These studies are based on the experimental paradigm of "perceptual crossing", and have already been used and taken up in the framework of various theoretical and philosophical discussions[2]. We will present them again here, in a systematic way, in order to bring out the general principles and the explanatory schemes that they make it possible to propose. We shall see in particular the importance of bodily engagement in the dynamics of perceptual interaction for the emergence of collective forms of social cognition; the meaning of a distinction between perceiving-body and body-object for understanding the processes of imitation and more generally the individual appropriation of social dynamics; and finally the role of a link between definite properties of the body-object and the social dynamics for the construction of individual associative structures.

In the following chapter, we shall describe the origin and the principles of the experimental method (ch.2). Then in a series of three chapter we shall present successively the experimental situations which make it possible to elaborate explanatory schemes for the recognition of other subjects (ch.3), the perception of his/her intentions (ch.4), and the imitation of her facial expression (ch.5). In the discussion (ch.6), we shall come back to the methodology employed, and we shall attempt to bring out some of the principles mobilized by these modes of explanation.

2. Minimalist experimental paradigm

The background to the minimalist method that we shall present is the general research programme centred on the thesis that "Technology is Anthropologically Constitutive" (the TAC thesis) (Stiegler 1998). In the framework of embodied, embedded and extended approaches, taking into account the technological dimension – tools, machines, environments – is a way of incorporating the role of culture and social history in the constitution of individual and collective cognitive activities. There again, there are weaker and stronger versions, going from a conception of the technical environment as a simple context or mode of deployment of a cognitive activity that remains essentially internal, up to the strong idea of a constitutive role for technology which creates the possibility of cognitive or perceptual operations which would simply not exist without it (Leroi-Gourhan 1964, Goody 1977, Clark 1998, 2004).

[2] The articles marked with an asterisk in the bibliography make explicit use of the results of this minimalsit approach, whether it be for spatial perception or social cognition.

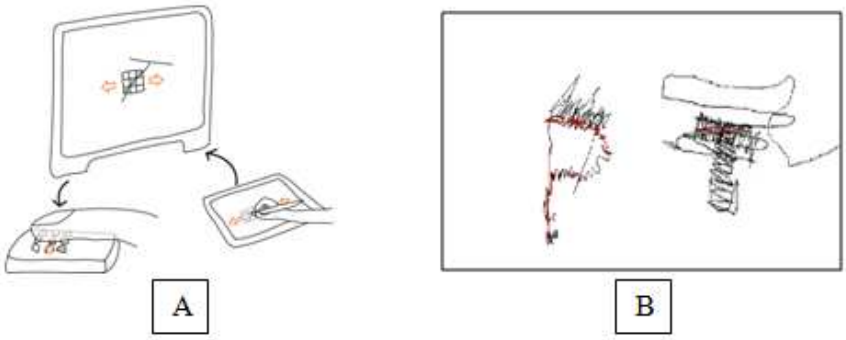

Fig. 1A. TACTOS system. The meeting between the matrix of 9 receptor fields and a form controls the activation of the 9 pins of two Braille cells. The forms recorded in the digital space of the screen are perceived by touch. **Fig. 1B**. Examples of perceptual trajectories. Here, we use just one receptor field, and a single all-or-nothing stimulation. We have coloured in red the points where the subject received a tactile stimulation. We see the perceptual trajectory when the subject recognizes a P or a T.

In order to systematically study the ways in which various technological mediations underlie specific domains of activity, one can start by examining the meaning of grasping a tool. An enactive approach is particularly useful here. Indeed, if cognition and perception arise in the coupling between an autonomous agent and its environment, the domain of possible operations will depend on the sensorimotor invariants that are available and hence on the possibilities of the agent for acting and sensing (Varela 1991). A tool that is taken up and grasped will modify the repertoire of these actions and sensations, and hence give rise to a specific field of possible operations. Here, the "technological constitution of cognitive operations" does not mean that these operations could be performed in a purely external manner on artificial machines, but rather that technological artifacts play a constitutive role by their participation in the coupling between organisms and their environment. The experimental study of this coupling consists of using the technological mediation in order to systematically control the sensory inputs and possible actions, and to observe the cognitive or perceptual operations which become possible.

We started by simplifying to the extreme the technological mediations in order to elucidate the minimal conditions necessary for the perception of spatial localization (Lenay et al. 1997, O'Regan and Noe 2001, Lenay and Steiner 2010) and for the recognition of shapes (Lenay et al. 2003). Here, it is only necessary to present briefly the technological device which was used for the recognition of shapes in a two-dimensional space, since this same device will serve as the basis for our experiments on social cognition.

The "Tactos system" we have developed makes it possible to "touch" digital shapes on the computer screen. The cursor, which the user controls with his mouse, is now replaced by a single receptor field. When this receptor field crosses the colored pixels of a shape, an all-or-nothing tactile stimulation is triggered under the index finger of the free hand. Even in this case, the users (whether blind persons or blindfolded adults) can learn to localize and recognize simple shapes. The perception is necessarily active because there is no intrinsic spatiality in the sensory input. It is thus realized essentially through a perceptual trajectory that can easily be recorded, analyzed, and modeled (Stewart and Gapenne 2004). We say that by its highly restrictive conditions, the device forces a spatial and temporal deployment of the perceptual activity.

We can now apply this minimalist method to the study of social cognition. Indeed, when the Tactos device made it possible to "touch" digital forms on the computer screen, it became evident that this space could be shared between several users. However, in order for a perceptual interaction to be possible it is necessary to add something essential: the "perceiving-body" in the

space of interaction, which corresponds here to the receptor field, must be linked to a "body-object", i.e. a shape which can be perceived by the other participants. We can then construct situations of minimalist inter-individual interactions, simplifying as much as possible the complexity of the shared context of interaction and the repertoires of actions and sensations of the participants. We can then observe the functioning of the collective coupling and the capacities for social cognition which it allows. We have applied this method to study the phenomena of the recognition of another subject, the perception of her intentions, or the imitation of facial expressions. Our hope is that the mechanisms elucidated in these artificially simplified conditions will subsequently serve as explanatory schemes accounting for the far more complex cases of ordinary daily social interactions.

We may note that studying social cognition by way of technological mediation makes it possible to propose a simple definition of what we mean by "social cognition". Since the participants are distant from each other, the conditions of their interaction must be completely specified, without ambiguity, by the information transmitted for their actions and perceptions. Thus, they share a common space of interaction if but only if the actions of one participant animate in real-time a body-object that can be perceived in the space of action of the other participant, and *vice versa*. For such a definition, simply technological, there can be forms of inter-individual interaction even if the subjects are not engaged in an activity which is explicitly co-ordinated. This makes it possible to avoid the difficulties and ambiguities that lie in store if one is looking for cognitivist definitions such as the one proposed by Schoenherr and Westra (2017, 7) : "When two or more conscious human beings mutually and knowingly affect one another's actions, they are engaged in a social interaction". Introducing notions of "consciousness" and "knowledge", right from the very definition of social interaction, makes it impossible in advance to understand how the interactions can *account* for this social consciousness or knowledge.

3. Perceptual crossing and the Recognition of Others

This study on the recognition of others will be presented relatively briefly since it has already been the object of many discussions (Auvray and Rohde 2012) and has led to complementary experiments and modelling.

Classically, in the framework of the philosophy of mind and the representationalist paradigm in cognitive science, one considers that the problem of the recognition of another subject comes down to the question of the adoption of an "intentional stance". The question is to determine the criteria and mechanisms used by the subjects in deciding to treat the perceived objects, either as simple "things" which obey a mechanical causality, or else as "intentional agents" who act on the basis of internal representations and goals. In a coherent manner, experimental studies carried out in this framework establish a strict separation between the observing subject and the scene that is observed. As behind a one-way mirror, the observer is in the very artificial position of a voyeur observing the potential other subject.

If instead we adopt an interactionist perspective, it is clear that living organisms are always already engaged in relations with others. It follows that the question of the recognition of others must fundamentally be mutual. The recognition of an intentional subject ought to take place during an interaction where the perceived subject can reciprocally recognize the observer himself as an intentional subject. We therefore wished to study these situations where two perceptual activities meet, as for example in mutual touching, looks where both subjects "catch each other's eyes", or proto-conversation between mother and infant. We designate them by the term "perceptual crossing" (Lenay et al. 2006, Auvray et al. 2009). Our hypothesis was that perceptual crossing allows the mutual recognition of the two subjects, not as the cognitive attribution of intentionality but as a direct experience, the experience of "seeing the other seeing me" (Gallagher 2014, 3).

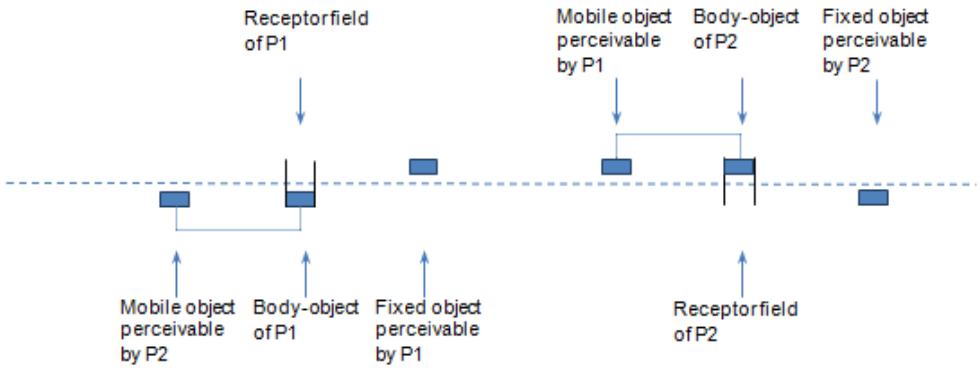

Fig. 2. The participants P1and P2 share a one-dimensional space without edges (the two ends join up to form a torus). They move their receptor field (identical with their object-body) from left to right by the computer mouse. When the receptor field of one participant encounters a black pixel, she receives a tactile stimulus on the finger of her free hand. The participants are instructed to click when they consider that they encounter their partner.

3.1. Experimental setup for perceptual crossing

In order to study this situation we have used the minimalist experimental paradigm that we have just described so as to set up an elementary form of perceptual crossing. If the perceiving-body and the body-object coincide, when the receptor field of one participant encounters the body-object of another participant, the receptor field of this second participant will necessarily encounter the body-object of the first participant. There will be perceptual crossing.

In order to facilitate precise analysis of the dynamics of perception and interaction, the space of action of the participants is reduced to a shared one-dimensional space (i.e. a straight line; left-right movements of their receptor field are commanded by the computer mouse); and the repertoire of sensory feedback is reduced to a single all-or-nothing stimulus (a tactile stimulus is delivered to a finger of the free hand) when the receptor field passes over a black pixel. The participants are blind-folded and can only interact via the experimental device. For each subject, three objects are present:

- The body-object of the other participant (which corresponds exactly to her receptor field), 4 pixels wide. When the two participants are in the same position, each receives an all-or-nothing tactile stimulation. This is the situation of "perceptual crossing".
- A fixed object (4 pixels wide). The fixed objet for the participant 1 is invisible for participant 2, and is placed in a different position.
- A moving object (4 pixels wide) that we call the "mobile lure". In order to ensure that the mobile lure would have the same richness of movement as the body-object of the other participant, but without being responsive to perceptual crossings, we attached it by a rigid virtual link to the receptor field of the partner. The mobile lure thus follows exactly, but at a constant distance, all the movements performed by the partner.

The participants are informed that there are these three objects, but they do not know that the mobile lure is attached to the receptor field of their partner. They are instructed to click when they consider that they have encountered their partner.

This experimental configuration makes it possible to test our theoretical hypothesis: even though the mobile lure and the body-object of the partner have objectively exactly the same movements, will the participants be able to distinguish them on the sole basis that the receptor field of the partner is sensitive and animated by a perceptual activity turned towards their own perceptual movements?

The results are rich and apparently contradictory (Auvray et al. 2009). On one hand, it is a success : the results for all the participants and all the sessions showed that the majority of clicks (63%) occurred when the two partners were indeed in front of each other, i.e. in a situation of perceptual crossing (cf. Fig. 3). These results seem to show that the subjects succeed in distinguishing the receptor field of their partner, which is surprising since by construction the mobile lure has exactly the same objective movement as this receptor field. Here again, the reduction of the sensory input forces a spatial and temporal deployment of the perceptual activities, which can be easily recorded for analysis. The interest of the minimalist method is that we can know everything that happened to the subjects during their interaction, that is to say all their actions and the sensory feedback they received.

Now closer analysis of the stimulations received by each partner reveals that behind this collective success there is hidden a failure at the individual level. 52% of the stimulations received come from a perceptual crossing, 33% come from encounters with the fixed object and only 15% from encounters with the mobile lure. If we now calculate the *ratio* between sensory stimuli and clicks, we find 0.33 for the fixed object, 1.26 for the perceptual crossing and 1.51 for the mobile lure (Table 1).

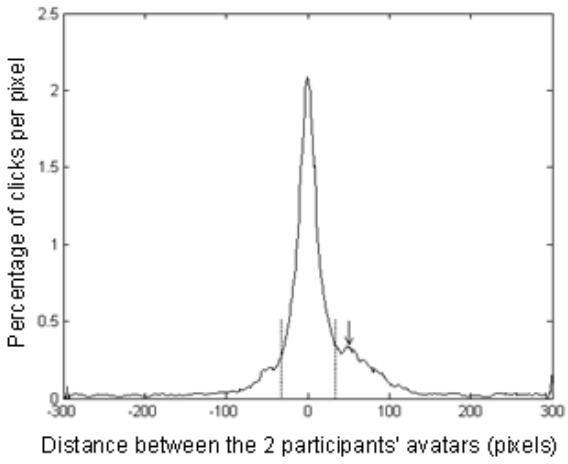

Fig. 3. If we look at the distribution of frequencies of clicks as a function of the distance between the receptor fields of the two participants we observe a very sharp peak for zero, when the participants are actually face to face, and a small peak at 50 pixels corresponding to clicks made on the mobile lure.

The relatively low ratio of 0.33 shows that that the fixed object was usually (although not always) recognized as such because the subjects almost did not often click although they encountered it frequently. However, the ratio between clicks and stimuli shows that overall the participants do not seem to distinguish between stimuli due to perceptual crossing and stimuli due to the mobile lure (1.26 vs. 1.51). The difference in clicks on the mobile lure and on the receptor field of their partner (23% vs. 66%) can be explained entirely by strategies of movement which are such that encounters with the mobile lure are much less frequent than encounters due to perceptual crossing (15% vs. 52%).

In this first experiment where the aim is to discriminate the presence of another subject, the individuals fail whereas the collective action succeeds. Individuals fail to recognize another subject in terms of a sensory input, which shows that the collective dynamics is established independently of any such recognition. The collective success is not explained by an individual capacity to recognize another subject by means of a particular sensation. The collective success of the participants is explained entirely by their capacity to find each other face-to-face, and not because they were able to recognize in the pattern of stimuli a clue allowing them to distinguish between the presence of the partner and that of the mobile lure. The only difference resides in the interaction itself.

	Receptor field		Mobile lure		Fixed object	
Percentage of clicks	**65.9 %**	± 3.9	**23.0 %**	± 10.4	**11.0 %**	± 8.9
Percentage of stimuli	52.2 %	± 15.2	15.2 %	± 6.2	32.7 %	± 11.8
Ratio clicks / stimuli	1.26		1.51		0.33	

Table 1. Ratio between clicks and stimuli, for each sort of stimulus.

It is easy to understand how perceptual trajectories cling to one another during perceptual crossings (Lenay et al. 2011), and this has also been confirmed by various forms of robotic modelling (Di Paolo et al. 2008, Iizuka and Di Paolo 2007). We may note to start with that there is a very general perceptual strategy employed by each agent: when a participant encounters a stimulation, and in particular when she meets her partner, she will invert her movement while the latter will do the same. The two receptor fields will thus enter into a sort of dance. The only difference between the receptor field of the other participant and the mobile lure attached to it is that only the former is sensitive to my presence; and this sensitivity is linked to a perceptual activity which constantly aims at remaining in the vicinity of a singularity. This is precisely a sufficient condition for the formation of an attractor in the joint dynamics which tends to augment the probability that the partner will be present.

Here the social interaction is constitutive of the recognition of another subject, to the extent that the corresponding task (clicking on the partner) is collectively solved, independently of individual judgements. We can also say that the dynamics of the interaction facilitates the individual task of discriminating the other subject, by bringing the partners face to face (Di Paolo 2016). However, this collective solution is not accessible as such to the individual participants, since they did not succeed in associating the presence of the other subject with this or that sensory stimulation (Froese and Di Paolo 2011, Michael and Overgaard 2012)[3]. This collective capacity does not therefore allow each individual to engage in more complex activities or relations which would be based on full, specific recognition of the other subject.

If we now wish to account for the formation of an individual recognition of the presence of the partner, we must envisage a second step. But we may note that we have a good starting position. If one wishes to propose an explanatory scheme for the constitution of individual social cognition, it is necessary to give oneself an initial situation in which it is sufficiently absent, while social (i.e. collective) properties are present. Our hypothesis is that it is only subsequently, by the individual appropriation of the emergent properties of the collective dynamics that one can account for the constitution of individual social cognition. In order to understand this, two new experiments were carried out.

3.2. A new experiment, a collaborative task

Tom Froese has taken up the perceptual crossing experiment, bring to it just two subtle adjustments (Froese et al. 2014): he placed the pairs of subjects in the spirit of a collaborative task (they consider themselves as forming a team which must gather more correct clicks than the other teams); and above all he asked each subject to click only once for each one-

[3] "While the behavior of the participants is, unbeknownst to them, guided by the global dynamics of the interaction process to an appropriate solution to the given task, their individual sense-making remains qualitatively unaffected with respect to its solitary point of reference" (Froese and Di Paolo 2011, 20).

minute session, which reinforces the collaborative attention. These apparently minor changes in the instructions had a striking effect: there were now 88,5% correct clicks on the partner, 8,6% on the mobile lure and 2,9% on the fixed object. With 73% of stimulations due to the receptor field of the partner, 13% due to the mobile lure and 14% to the fixed object, these results show that, even at the individual level, the probability of clicking is greater for a stimulation due to the receptor field of the partner than for the mobile lure.

Examination of the trajectories for perceptual crossing shows that the subjects succeeded in the task because they set up a richer dynamics of interaction. The great difference with the first experiment is that now the shared aim with the partner is to avoid “false-friends” (i.e. periods of encounter with the mobile lure that can lead to error because unluckily the lure appears to be attached to a subject). It is only after a sufficiently long period of interaction that the subjects risk making a click. For that, they have to determine the position of a sensory singularity having the maximum likelihood of corresponding to the partner.

It is most interesting to note that the trajectories show the emergence of a quite general organisation involving a strategy of "turn taking": one of the two participants remains immobile for a few moments, offering herself as a localizable object for the perception of her partner and receiving stimuli passively; then resuming her active perceptual movements while the partner remains immobile to offer herself as an object in turn. In this way there comes into play a sort of dialogue or competition between two subjects each trying to objectify the other, and only succeeding by alternating the roles of subject and object (Sartre 1943). We will come back to this explanatory scheme in the discussion.

Before that, we will now see how one can obtain the same result with another experiment where there is a clear distinction between the determinate component of the other subject, and the dynamic component of the interaction.

3.3. Experiment with auditory discrimination

In this variation, we again use the initial experimental protocol of perceptual crossing, but this time there is no tactile stimulation: the three objects (fixed object, mobile lure, receptor field of the partner) are associated with three different sounds that are easily distinguished (Lenay and Stewart 2012). The precise association between the three sounds and the three objects is changed in random fashion for each experimental session. The task is to determine, for each session, which sound is associated with the receptor field of the partner. In these conditions, the subjects are highly successful: 85% correct identification of the partner from the 4th session of two minutes onwards.

Examination of the perceptual trajectories allows us to explain this result: as in the first experiment, there is an attractor of perceptual activities of the two partners. The difference is that now the sensory returns can be differentiated; it is then relatively easy for the subjects to recognize when they are indeed in contact with their partner. Thus, the perceptual crossing is characterized for the subject by frequent sensory stimulation combined with an indeterminate position, contrary to the fixed object which can give frequent sensory stimulation but with a well-defined position, and contrary to the moving object which gives no frequent sensory stimulation.

We will return later to this explanatory scheme. Before that, let us see how the same method makes it possible to address other aspects of social cognition.

4. Perception of intentions of others

Many studies in neuroscience and experimental psychology aim at demonstrating and explaining the perception of the intentions of others (Meltzoff 2005, Pacherie 2005). The discovery of neuronal structures such as the mirror neuron system (MNS), which are activated in specific fashion both on the occasion of perception of an intentional action by another subject

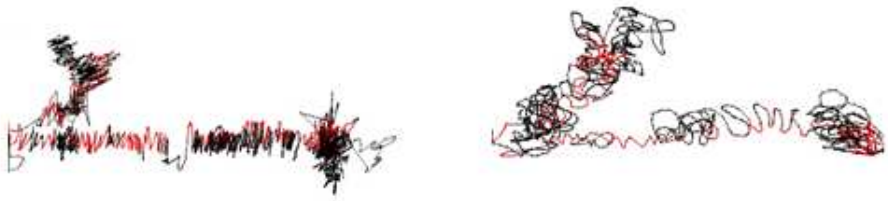

Fig. 4. The trajectories of the two participants (which were superposed) are shown here separately. In this experiment the "guide" (trajectory on the right) received the paradoxical instruction to follow the "follower" (trajectory on the left). Through the dynamics of interaction there is the emergence of a shared intention. The participants invent together the orientations of a path, here to go left and then go back up diagonally to the right.

and when the subject herself executes the same action, has been invoked as an explanation: the intention behind a perceived movement is interpreted by the intention that the observer would have if she performed the same movement (Gallese et al. 2004). Thus these structures appear to give each individual the capacity for a direct understanding, without any explicit reasoning, of the intentions of others. These structures clearly have a social meaning; but the question remains as to whether this meaning is in the last resort an internal construction, or is it the product of social interactions? In the former case one could come back to an internalist conception of cognition, and concrete social interactions would only be the secondary consequence of these individual internal capacities. In the latter case, it would be the social interactions which explain the genesis of these internal structures, and not the other way round. In order to find the means to envisage this second possibility, we can propose a new minimalist experiment.

In this experiment, participants share a bi-dimensional space. Each participant has only one receptor field coupled to a single tactile stimulator. The body-image is a square of the same surface as the receptor field. As with touch, the perception is exactly reciprocal: I cannot touch another person without being touched by him. There is neither a fixed object, nor a mobile lure. One of the two participants is given a very simple mission that the other must guess: "go to the top right", "go left", and so on. The follower tries to find his guide and to keep contact as much as possible. The guide should be collaborative and try as much as possible to help his partner guess his intention. They have no other means of interaction than the system itself. Most of participants succeed in this task, which is not easy since there is no spatial information in the sensory input: the receptor field is only a point (it is not a retina which could give a local indication of a movement). At each moment the follower has no means of guessing the direction of the movement of the guide other than allowing a loss of contact (for example by a small sweeping movement around the guide), and then engaging in a certain direction in the hope of managing to find the guide again. Progressively, with care and attention, the follower manages to anticipate the direction of the movement indicated by the guide. The extreme technical restrictions of this interactional situation produce an equivalent between perceiving the gesture of the other subject and accomplishing the gesture oneself. There is no perception of the movements of the partner prior to imitating or simulating it, but rather hitching the perceptual activity of the follower to the movements of the guide.

We may add that the minimalist conditions of the interaction are such that the perception of the movement of the guide can only be the perception of the *intention* behind this movement, since at each moment the follower must make a bet on the intention. There is an understanding of the intentions of others by sharing his intentions. This can clearly be seen when one introduces a new and tricky mission to the guide which is… "follow your partner". The dynamics of the interaction in this situation, where the participants follow each other mutually, leads to the emergence of collective dimensions which seem to be intentional even though no intentional direction pre-exists.

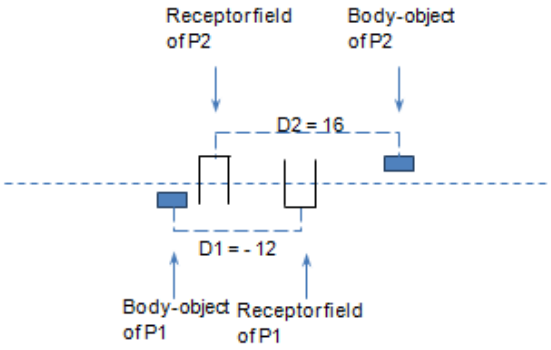

Fig. 5. The participants share a one-dimensional space (a torus) in which they move their receptor field together with their object-body (which is linked at a distance D). When the receptor field of one participant encounters the object-body of the other participant, she receives a tactile stimulus under the finger of the free hand. Here D2 > D1; if the participants seek a perceptual crossing, they will be carried in a collective drift towards the right.

In this situation, there is only understanding of the intention of the other subject by *sharing* the emergent intentions (Merleau-Ponty 1945, Wilkerson 1999). We will examine later in the general discussion whether this extreme situation can shed light on the question of the status of capacities for the perception of intentions. Before that, we will present a third experiment about the imitation of facial expressions (Lenay and Stewart 2012, Froese et al. 2012).

5. Imitation of facial expressions

How is it possible to explain the initial capacity for the imitation of gestures and expressions by the new-born infant? How can we understand that in the first days after birth, the infant can establish a relation of equivalence between the movements she observes and the motor and proprioceptive data concerning her own actions? In order to solve this "correspondence problem" (Brass and Heyes, 2005), it would seem difficult to invoke a learning process, especially when it is a question of *opaque actions* such as her own facial movements that she cannot see herself. Meltzoff and Moore (1977) therefore invoke the existence of innate individual capacities, an "Active Intermodal Matching" system (AIM) which is supposed to perform a supra-modal representation of bodily actions which are seen or performed. In the same way, one can also postulate the existence of an "innate mirror-neuron system" which participates in a neuronal cabling between perceived facial expressions and the expressions that are produced (Rizzolatti et al. 2002).

We have seen that in an interaction-based framework, this neonatal imitation is considered to be an initial capacity allowing the appearance of a "primary intersubjectivity", i.e. a very early process that pulls the infant into a dyadic interaction with the other (Trevarthen 1979). The cross-modal integration of vision and proprioception allows the infant to make some kind of pragmatic sense of the other's expression, in a way that calls forth a response (Gallagher and Meltzoff 1996). This makes it possible to understand the advent of a dynamics of reciprocal interaction between the new-born infant and her caregiver, a dynamics which produces various forms of synchronization in sequences which escape in part from the control of one or other participant.

However, here again, if one were to accept an innate "Active Intermodal Matching" system or an "innate mirror-neuron system", the interaction-based perspective would be weakened. In this case, the social cognition is not explained primarily by the inter-individual interactions themselves, but rather by the functioning of internal structures. The question remains to understand the origin or the genesis of these structures.

The path we propose to explore here consists of seeking the conditions for the appearance of "mimetic phenomena" in the very dynamics of the perceptual interactions, i.e. to create a situation where it is not the imitation that explains the interaction but the dynamics of interaction which produces the imitation. We have thus taken up our experiment of minimalist perceptual crossing; but this time, the participants can modify what is presented to their partner. In accordance with our approach, we have chosen as a minimal modification of the body: the relative distance between the body-object and the receptor field. The receptor field is no longer directly perceivable by the partner. All that is perceivable is the body-object that is attached to the receptor field. The distance between his receptor field and his own body-object can be actively modified by the participant. By clicking on the right or left button of the mouse, he can displace his body-object to the right or to the left relatively to his receptor field, 2 pixels at a time for each click. With their computer mouse the participants move their receptor field in a shared one-dimensional space, and seek to mutually perceive each other. However, they do not know the position of their body-object, relatively to their own receptor field.

The objective external description of "imitation" will be a similarity in the relative distances between receptor field and body-objects of the two subjects. We call D1 the position of the body-object of participant 1 with respect to his receptor field, and D2 for participant 2. When (D1 + D2) = 0, the receptor field of the first participant is exactly in front of the body-object of the second participant and the receptor field of this participant is also directly in front of the body-object of the first. In this configuration, there should be no problem for achieving perceptual crossing since the two partners perceive each other mutually at the same time. However, if (D1 + D2) < 0, the perceptual crossing is unbalanced, each participant moving to the left to find his partner. Similarly, if (D1+D2) > 0, the perceptual crossing should drift to the right. In the course of their interaction, the participants will likely feel this drift, and use the clicks of the computer mouse to alter D1 and D2 such as to stabilize their perceptual crossing.

Overall, there was clearly a convergence towards the situation where (D1 + D2) = 0, that we may identify as a situation of imitation. Even though the participants do not know the position of their body-object, either at the beginning or at the end, their joint search for a situation of balanced perceptual crossing rapidly leads to a similarity in these positions. In 3 minutes, the disequilibria in (D1+D2) are reduced to less than 30% of their initial values. The clicks of both participants act on a common spatial variable, the relative distance (D1+D2), which determines the balance of the perceptual interaction. By bringing this common variable to zero, they produce a stabilisation of the perceptual crossing which, from the point of view of an external observer, corresponds to a mirror-resemblance of the images that are presented to the partner. We may note that there are an infinite number of possible solutions to this "resemblance" between the participants, i.e. pairs of values such that (D1 + D2) = 0, and indeed the variance of the solutions increases over the course of interaction sequences (Lenay and Stewart 2012).

Analysis of the experimental results indicated that participants succeed in matching their bodies by responding to the relative stability of the interaction process, because mismatches in relative bodily configuration introduce systematic sideward drifts into the flow of the interaction. This drift cannot be reduced to actions of one of the participants; on the contrary, it emerges out of their interaction. Mimicry was therefore enabled by a collective property of the interaction process as a whole. It is explained because the tuning of the synchronization of the perceptual crossing is realized by the spatial variables of the form of the bodies of the participants.

In this experiment, "imitation" is the result and not the cause. Mimicry cannot be achieved by comparing external perception of the other's body configuration with external self-monitoring, or by comparing external perception of the other's body configuration with

internal self-observation. However, in a second phase, this *de facto* imitation should allow for learning of this sort. We will come back to this point.

6. Discussion

6.1. On methodology: Schematism and minimalism

The radicality of the minimalism of the experiments we have just presented forces an externalist approach to perception. The perceptual activities were externalised in the form of perceptual trajectories which can be easily recorded, permitting a complete analysis of the sensorimotor relations. This is what we called a spatial and temporal deployment of perceptual activity. Conversely, it is also possible to study the effect of an increase in the number of receptor fields. If, rather than a single receptor field, the user controls the displacements of a retina composed of a matrix of unit receptor fields (for example 4 x 4 receptor fields), there is a parallelism in the simultaneous sensory inputs corresponding to the surface covered by the retina. We have studied the way in which the perceptual trajectories are modified when this parallelism increases. One then observes an economy of movements, and hence a sort of internalization of the perceptual or cognitive processes (Sribunruangrit 2004). Parallelism in the sensory input leads to a relative separation between perception and action, even if active movements of the retina remain necessary.

In the case of social interactions, it is particularly revealing to employ a situation where the externalization is maximal, by attributing only a single bit of information at each moment and restricting the space of action to one or two translational dimensions. The resulting dynamics, unveiled before our eyes, seem to realize the empirical conditions for a theoretical discussion by reducing conceptual ambiguities to a minimum. This should allow for a precise discussion of the individual or social components of human cognition.

There is of course a huge gap between this kind of artificial experimental conditions and natural realization of human activities. The spaces of action and sensation are reduced to a minimum, there is no pre-existing general social structure and, worst of all, the interactions only concern a single pair of two subjects. But I would like to make two remarks.

i) The first is that my aim is only to propose methods for understanding phenomena, ways of explaining, what I call explanatory schemes. It is not a question of totally resolving all the issues of human social cognition in all its complexity, but only to propose schemes which might serve as models for explanations adapted to real situations. A structure of the dynamics of interaction highlighted in minimalist conditions to explain the constitution of a capacity for social cognition can perhaps be applied in the complex conditions of "natural" situations to explain a similar ability. It is then a purely empirical question to verify if this schema still works and if it proposes a sufficiently parsimonious understanding of the phenomena. Thus, we hope that the explanatory scheme established under minimalist conditions is a tool that can be used to capture phenomena, a tool that works or does not work depending on the situation.

ii) The second point is that such an explanatory approach is not reductionist. It is not a matter of bringing an observed phenomenon back to simpler and different causes that would only explain its appearance, as when we pretend to reduce a cognitive phenomenon to a neuronal dynamics. Rather, it is a question of building a world that works, even if it is a very simple world. Success is measured by the viability of an enaction, and not by the adequacy of a representation. It is a technological mode of validation, in the fashion of what Francisco Varela called “validation by construction” in the field of artificial life (Varela 1997). Here, even if the modes of interaction and the structures of the environment are as simple as possible, they still allow us to understand the enaction of a world shared between the subjects in interaction. We may add that this type of

experimental situation is sufficiently simple that examination of the coupled activities of the various subjects can be the basis for an abduction leading to the construction of minimal hypotheses concerning the underlying strategies of action.

6.2. Social approach to social cognition

We remarked in the introduction that in order to overcome the difficulties involved in "mind reading", one should start by recognizing that the majority of intentional activities can be perceived directly at the level of behaviours, without any need for inference concerning mental representations. However, that is not sufficient.

If the mechanisms of this perception of behaviours were themselves essential internal, we would come back to the problem of hidden intentions. This is the great risk involved in supposing from the start that there are individual capacities for recognizing faces, recognizing intentions or imitating expressions (Gallagher 2013, 61). The intentions of others with whom one considers entering in relation in a pre-reflexive coupling concern precisely in the first place the orientation of their perceptual activity. It is therefore necessary to add that the perceptual activity itself must be sufficiently embodied and expressed in the behaviour. This is what is accomplished with the minimalist conditions we have adopted.

But even that is not yet sufficient. If one wishes that in social cognition the sense-making of individual perceptual activity bears on the inter-individual interactions, it is necessary that this perceptual activity itself can be configured by means of the dynamics of interaction. At any rate, that is one of the specificities of the explanatory schemes proposed here.

Those three experiments that we have presented correspond to three explanatory schemes for the recognition of others, for the perception of their intentions, and for the imitation of facial expressions (we have also conducted the same sort of experiment for the study of joint attention (Deschamps 2016)). The interest of these explanatory schemes is that these phenomena of social cognition are not explained by individual capacities that would precede them. On the contrary, it is the dynamics of social interaction that explains the emergence of these phenomena and, possibly secondarily, the formation or modification of individual capacities.

The initial individual capacities that are mobilized do not have any social meaning in advance. They consist simply in the maintenance of individual autonomy by the search for sensorimotor invariants in a stable coupling. Following on, the logical order of our explanatory schemes consists of starting with the *de facto* social interactions resulting from the coupling of these simple individual capacities, by means of a minimal structure of the physical and social environment that is already there (ch. 6.2.1). We then observe the emergence of an organization of interaction which concretely instantiates the phenomenon of social cognition which is of interest (recognition of other subjects, perception of their intentions, imitation of their expressions). Then, the individual capacity to mobilize the result of the collective dynamics can be achieved by a link between this dynamics and perceivable properties or forms of the body-object of the partner (ch. 6.2.2), a link which then creates the conditions for associative learning (ch. 6.2.3). In this way one can understand the stabilization of new individual structures which will allow for new types of social engagements. We shall spell out in detail these three steps for each of our three situations of social cognition, and indicate their general consequences (ch. 6.2.4.); and we will then examine the conditions for the application of this approach to social cognition (ch. 6.3 and 6.4).

6.2.1. Initial capacities and dynamics of interaction

For the **recognition of others** we saw that it was accomplished collectively even though each partner is incapable of recognizing the presence of another behind a particular stimulation. The initial non-social capacities that are necessary are really very simple. It is essentially a question of maintaining a perceptual coupling, by reversing the direction of movement following a variation in sensory input. That is sufficient to explain the emergent dynamics of perceptual coupling, and hence the collective resolution of the task (identify one's partner).

For the **perception of the intentions** the initial individual capacities consist in the know-how for following a target in a two-dimensional space. The coupling of the individual perceptual activities produces *de facto* a shared intentional movement.

For the **imitation of facial expressions**, the necessary initial capacities are barely more complex. It is a question of being able to maintain a perceptual coupling, and to perceive its drift, in order to take the appropriate corrective measures. A very simple, basic "imitation" results directly from the dynamics of the interaction, even while participants ignore what they provide to the perception of their partner. They do not proceed by comparison between a perceived shape or behaviour and the shape or behaviour that is produced. The "imitation" is produced in the search for an equilibrium in the perceptual coupling, achieved by the twin spatial adjustment of the links between receptor fields and body-object.

This experimental setup may seem to be so minimal and artificial that it is difficult to relate it to the strong correspondence problem of neonatal imitation. However, if one employs this explanatory scheme to describe the games of imitation in proto-conversation, we understand that the new-born infant may have the capacity to recognize an agreement in the interaction *without* needing to know whether her facial expressions are more or less correct reproductions of those of the adult (Reddy 2003, Trevarthen and Reddy 2007).

6.2.2. Link between the social dynamics with determinate properties of the body-object of the partner

For the **recognition of others**, we have seen in two complementary experiments that the individual capacity to recognize the other subject requires a sufficient determination of the body-object of the partner. Either (ch. 3.2) because a pattern of turn-taking allows each partner in turn to present herself as an object in a sufficiently determinate position to be designated at the end of the trial; or (ch. 3.3) by differential auditory features of the object-bodies. In both cases, the subjects are able to recognize and designate the other subject by linking this determinate body-object to the interactional dynamics of the perceptual crossing.

If we deploy this explanatory scheme to account for a rich and complex real-life situation such as mother-child proto-conversation (Trevarthen 1979, 1993), we can understand that it is indeed a form of perceptual crossing, and that conversely its absence (as in the case of an interaction with a recording) can be recognized and felt as disturbing. In this natural situation there are of course a multitude of properties for the infant that she perceives in a determinate manner, in particular, the distinction between the mother's face and other objects in the environment. There is every chance that the dynamics of perceptual crossing be linked with the competing perception of this face.

We may note that this capacity does not correspond to the result of an individual "contingency detector", but simply the association between the dynamics of the perceptual crossing and clues (the sound-coded properties of the objects). The emergent collective dynamics can be appropriated by the subject, by associating the indetermination of the position of the partner with a sufficiently distinctive sensory property. In this situation again, it seems that the perceptual crossing does play a constitutive role for the perception of the other subject to the extent that what the perception of the other subject is, in the limits of this minimalist experiment, is indeed the presence of the characteristic

dynamics of perceptual crossing linked with the perceived property.

For the **perception of the intentions** the dynamics of interaction directly link the movements of the two partners. The recognition of the gesture of the other subject has to be linked to the recognition of the gesture produced in order to perceive.

For the **imitation of facial expressions**, we have seen that the agreement between the partners can arise on the basis of a *de facto* imitation which has an infinite number of solutions. If one wishes that the individuals can appropriate the imitation of a particular expression it would be necessary, in addition to the actual conditions of the experiment, to give them perceptual access to the particular form of the "face" of the partner (here the length of the link between the receptor field and the body-object). In natural situations that means linking the interactional dynamics instantiating *de facto* mimicry, to the perception of a particular facial expression.

6.2.3. Associative learning in a situation of interaction

The link established in the social situation between the emergent organization of the dynamics of interaction on one hand, and determinate properties of the body-object of the partner on the other hand, should then allow for an individual associative learning of this correlation.

For the **recognition of others,** the stabilization of the interaction in the perceptual crossing allows the establishment of a link with the position of the body-object of the partner, or with a sensory feedback sound that can take the meaning of an encounter with another subject. Thus, an individual learning of the association between certain properties of the objects and a behaviour of perceptual crossing becomes possible. That means in natural situation an individual learning of the association between the stimulus of a face and the behaviour of perceptual crossing. This novel individual capacity for recognizing the presence of another subject in a perceived face finds its origin and its intentional content in the social interaction that it makes possible.

For the **perception of the intentions**, it is widely supposed that internal structures such as the Mirror Neuron System (MNS) make it possible to understand a perceived movement as being equivalent to a movement that one could produce oneself. Now in the very simple experiment that we have proposed, it is the perceptual activities themselves that are dynamically linked. This opens a path for explaining the *origin* of such internal structures. The perceived gesture is associated to a gesture one has performed oneself because it very precisely perceived *by* being performed. The neuronal arrangements which control the accomplishment of a specific gesture are functionally the very same arrangements which are mobilized to perceive the performance of this gesture by another subject. To the extent that the interaction stabilizes a given gesture, we can understand how it is possible to construct structures which associate the concomitant multimodal sensations that are received, whether they be of exteroceptive origin (the gesture of another subject), or proprioceptive (one's own gesture); and this should remain true even when, with a parallelism at the level of the sensory input (a retina), the perceptual activity tends to become separated from the movements which are observed or performed tends to establish itself. We therefore have here a potential way of *explaining*, by the functional meaning of interactions, the *formation* of internal structures such as the MNS, which will subsequently make it possible to recognize the intention of an observed movement without now having to actually perform it oneself. This new capacity finds its origin and intentional content in the engagement that it allows in interactions with the observed person.

For the **imitation of facial expressions**, there again, the collective dynamics of the perceptual crossing brings about a situation of sensorimotor interactions that are sufficiently stable to serve as the basis for associative learning. We have seen that in the natural situation of proto-conversation, the perception of an "agreement" precedes an explicit awareness about what that

agreement is about (Reddy 2008). Mimicry spontaneously results from the mutual regulation of collective interaction dynamics, and it is this social interaction which provides the newborn with the motivation and means for linking her perception of the other with her proprioceptive sensations. It is only later that the child will discover that what she is doing is in fact an imitation. And from then onwards, on the basis of an agreement in the perceptual crossing, she may presume that her own facial expression, that she cannot see, actually resembles that of her partner that she does see.

What is particularly interesting here again, is that it is a question of an association between the face of the partner and the dynamics of interaction which is socially meaningful (the perceptual crossing). The classical logic of "imitation" is inverted. It is the *de facto* "imitation" resulting from the collective dynamics, which then provides the means for linking the perceived image to proprioceptive sensations. The existence of structures such as "mirror neurons" for facial expressions might be genuinely *explained* by such a social situation, which allows for an association between different synchronized fluxes of multimodal and proprioceptive sensory inputs, sensory data which comes both from the behaviour of the other subject and from the subject's own actions (De Jaegher et al. 2010, 7).

We may note that the modification of the bond between receptor field and body-object, are modifications of an embodiment of the action strategy (Maillet et al. 2008). Indeed, the distance between the receptor field and the body-object define the manner in which each subject intervenes in the dynamics of the interaction and the collective drift which follows if the distances are not matched. Following this explanatory scheme, a facial expression corresponds to a configuration of the relation between perceiving-body and body-object, configuration which can be associated with a given form of the face for each type of relational engagement. In the framework of a relational conception of emotions (Dumouchel 1995, Damiano et al. 2015) it is possible to conceive how the emotional meaning of expressions could be learned. The form of the face of the partner is associated in real time with a particular meaningful relational structure (for example a moment of joy and approaching, or a moment of disgust and retreat); there can thus be an association between this social structure and the corresponding facial expression.

6.2.4. Novel capacities for social cognition

In its generality, this kind of explanatory scheme does not decide in favour of either a hereditarian conception or an environmentalist conception of human social cognition. It does however militate strongly in favour of an interactionist approach, and thus a fully social approach to social cognition. The important point is that the dynamics of inter-individual interaction constitutes a situation which link on one hand a collective dynamics, and on the other hand a particular perceptual content. The association between this social signifying dynamics and a determinate property could equally well be the result of individual associative learning, or of the selection of hereditary characters which accomplish this association. The logical point which is crucial here is that the individual neuronal structures which participate in the association can be partly the *result* and not the primary cause of the dynamics of inter-individual interaction.

The perceptual learning that we envisage consists of profiting from stable configurations in the dynamics of interaction, in order to favour the formation of internal (neuronal) structures which associate (a) the fluxes of actions and sensations which result from this dynamics of inter-individual interaction and (b) the coupling with determinate elements of the situation (the body-object of the partner).

In coherence with the enactive approach adopted here, we do not require that these internal structures function as "stand-ins" or "representations" of the situations which served for their learning, as if they could substitute for the actual presence of the social interactions. These structures are to be understood rather

as the bases for strategies of action which stabilize the situations and which permit engagement in richer forms of social coupling. For example, the association between the determinate form of a face, and the dynamics of perceptual crossing, makes it possible in what follows for an individual to base herself on the sole perception of the face in order to engage in an interaction, supposing in advance the existence of a perceptual presence who will be able to respond. Similarly, counting in advance on an intentionality in an observed movement one can engage in other movements; or perceiving a facial expression one can respond by another expression.

At the same time, the link, between determinate perceived properties and the social meaning of the dynamics of interaction, makes it possible to understand that one can engage in a coupling with traces or signs, finding a social meaning in this coupling even in the absence of actual interaction with other subjects. This is a possible route for accounting in an enactive framework for capacities of imagining, reasoning or planning. It is sufficient to understand these activities, not as the manipulation of mental representations, but as the result of a game of coupling with traces of a social presence.

6.3. The distinction perceiving-body / body-object

Throughout these explanations it has been necessary to make a distinction between the body that perceives and the body that is perceived. This distinction first became obligatory at the level of technological mediation; in the Tactos system, for an inter-individual interaction to be possible, it was necessary to define for each individual on one hand her receptor fields (i.e. where the encounter with objects triggers a sensory stimulation for the subject), and on the other hand the body-object which can affect another subject. There must then be some relation between these two aspects of the body; this relation can be constant (as in ch. 2 and 3) or variable (ch. 3).

In a way, this distinction corresponds to the phenomenological distinction between one's own lived-body, and the body for others (Merleau-Ponty 1945); there can be no question of opposing them as in a dualism between body and mind. Here, in a pragmatic framework, it is simply a distinction between the body that makes it possible to perceive and the body that enters into social interactions, i.e. the body that affects others and can be perceived.

An individual does not perceive his own body-object as it is presented to others. This is what makes it possible to characterize a concrete difference between various situated points of view, distinct from one another. It is a constitutive feature of the social that we never perceive exactly the same things as others (otherwise we could not perceive each other mutually). In the case of the face, there is a distinction between the face as an organ of perception and the face as an organ of interaction. This is a distinction that functions without being directly accessible at the individual level. Its role is profoundly social.

The body-object does not participate in the initial individual perceptual activity, but it participates *indirectly* in social perception since it is necessary to the establishment of dynamics of interaction which allow each subject to give a social meaning to her activity. In fact, this distinction is functionally necessary to the formation of the social interactions that we have examined. In the various experiments, the perceptual crossing corresponds to a dynamics that escapes each participant because it depends on perceptual actions bearing on the object-bodies that the participants do not perceive themselves and which are nevertheless related to their perceptual activity. There is thus something radically indeterminable in the body-object of another subject. However, at the same time, we have seen that the individual appropriation of the organization of the dynamics of interaction passed by moments where each individual could sufficiently determine the properties of the body-object of her partner in order to subsequently link them to this organization. Thus the distinction between the perceiving-body and the body-object rebounds at the level of the body-object as a distinction between the body-object which serves to enter into a

dynamics of interaction (in which it cannot be precisely determined) and the body-object which bears determinable properties. This constant tension does indeed seem to be constitutive of the face of another: at the same time something which resists complete determination, and which nevertheless persists in being present and that one can partially determine.[4]

6.4. Enaction and technology

The collective, the dynamics of interaction which escapes from each individual, can in return confer on this individual new capacities for acting, interacting and hence capacities for sense-making which did not exist before this social engagement (Di Paolo and De Jaegher 2016). The social transforms the field of individual autonomy by giving it access to a novel domain of action and meaning. However, if we say that the dynamics of collective interactions fashions the individual structures of social cognition, does this not admit a social determinism which would put into question the autonomy of the individual? It is not the case if we interpret this feedback of the social on the individual as a mechanism of individual appropriation, which can of course be a source of alienation as well as empowerment.

In order to understand this constitutive feedback of the collective on the individual one can take the model of a tool. Made socially, a tool is given to an individual as a new power to perceive, to act and to interact. The social gives to each individual a technological and linguistic environment which is constitutive of individual activities. Now the tool which is received poses first of all the problem of its appropriation. It forces the learning of specific strategies, i.e. neuronal configurations allowing for mastery of its use.

For the mechanisms of social cognition that we have presented, the body-object plays the role of a tool. It is given by others (since it is not perceived directly by the individual concerned), and it serves to enter into the dynamics of social interactions. The body-object plays a constitutive role not directly (like the perceiving-body), but indirectly as a body constitutive of interactions which give their meaning to various forms of social cognition. The stages of appropriation that we have described correspond to the individual learning of how to use this primal "tool" of social interactions since it serves to recognize another subject, to perceive her intentions or to imitate her expressions.

In an enactive perspective, the body-object cannot directly be part of individual sense-making. It only has meaning by way of interactions. If we wish to understand social cognition it is thus necessary to admit a reconfiguration of the operational closure of individual autonomy by considering a form of sense-making which is accomplished in a coupling mediated by this body-object, a coupling with meaningful forms of the social and first of all with another subject, her intentions and emotions.

Hence, just like a tool that one keeps and can carry around with one, each individual keeps her body-object even in the absence of the social environment which created it. Like other traces of social presence the body-object, the prime basis for reflexivity, serves to repeat, even in solitude, the meaning of inter-individual interactions.

[4] It seems to us that there is here something which corresponds to the description of the face as proposed by Emmanuel Levinas in *Totality and the infinite (*Levinas 1979), the other as something that does not let itself appear as a phenomenon, yet exists precisely at the phenomenal level (Lenay & Sebbah 2016). We may note that this reading of Levinas is quite different from that proposed by Gallagher (2014) which aims rather at locating the transcendence of otherness in the interaction itself.

7. Conclusion

We have proposed three explanatory schemes, in order to provide an interaction-based account of three prime forms of social cognition: the recognition of another subject, the perception of intentions and the imitation of facial expressions. For this we have proposed a minimalist method which makes it possible to disentangle the various components of the dynamics of inter-individual interaction. We have thus shown that initial non-social capacities allow for the emergence of collective organizations which are socially significant; situations of interaction which provide the opportunity for the formation of individual structures associating determinate properties of object-bodies and these situations of interaction.

In the three cases *intercorporeity*, which can be understood as the factual dynamics of inter-individual bodily interactions, is the *explanans* and not the *explanandum* of specific neural structures. Rather than the neural mechanisms that make human capacities of social cognition possible, it is a matter of showing how the dynamics of interactions that makes sense in the human social world, make possible these neural structures. In the three cases, explanation of social activities is based on the meaning of these activities. It is not based on meta-cognitive internal representations, nor on infra-personal structures. It is itself social.

It is now an empirical question to verify whether such explanatory schemes are useful tools for accounting for phenomena in the more complex situations of real everyday social life.

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WHAT IS MISSING IN THE "BASIC EMOTION VS. CONSTRUCTIONIST" DEBATE?
PRAGMATIST INSIGHTS INTO THE RADICAL TRANSLATION FROM THE EMOTIONAL BRAIN

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ABSTRACT: The theoretical bases of affective neurosciences are going through a turbulent period. In answering the apparently naïve question "what is an emotion?" scholars supporting a basic emotion theory (BET) argue that emotions are discrete mental entities localized in the brain in the form of affect programs. Recently, psychological constructionists (PC) have attacked the stronghold of BET by defending an anti-essentialist position inspired by James's theory of emotion, arguing that emotions are cognitive-based and culturally constructed phenomena, and not natural kinds. Who is right? To answer this question, I will highlight some theoretical pitfalls related to the shared assumption that brain-imaging results are sufficient to delimit the boundaries of the playing field. In contrast, I will capitalize upon electrical stimulation studies, which demonstrate the existence of discrete emotions but, most importantly, emphasize the interpenetration of emotional experiences and expressions. The latter observation links emotions to action tendencies, in line with a longstanding tradition that goes back to the criticisms made by Dewey and Mead of James's theory of emotion, and survives today in contemporary embodied and enactive theories. This approach proves to be the best equipped to account for the fullness of available empirical data. Who is right, then? Neither of the two. The time has come for a theoretically sound, and empirically grounded, alternative to both BET and PC.

1. The deconstruction of emotions: from basic emotions to constructionism

Philosophy of science teaches that a successful strategy in the early stages of any biological research is to identify an ordinary phenomenon, and localize it in a unique mechanism (Bechtel 2008; Bechtel and Richardson 2010). In the field of neuroscience, direct localization has led to the view that language processing is encoded by a single brain area, Broca's area in the left inferior frontal gyrus, or that vision depends on a single neural mechanism located in the occipital lobe. Albeit direct localization rarely turns out to be correct – in the two cases mentioned, for example, it was not – this strategy has considerable heuristic value in opening up new lines of research. Notably, the naïve attempts mentioned above made it possible to discover to what extent language and vision depend on complex mosaics of structurally and functionally different mechanisms. In recent years, something similar is taking place in emotions research.

Direct localization came in affective neuroscience between the 30s and the 50s. In that period, scientists believed they had identified the seat of a unique neural mechanism underlying all emotions, the "limbic system." A paradigmatic example is the well-known Papez circuit, a cortico-subcortical circuit that – according to its creator – constituted the neural basis of our emotional life.[1] Starting from the 70s, however, the idea that a single mechanism could be responsible for all emotions was gradually replaced by the view that different emotions are supported by different mechanisms. Inspired by Charles Darwin's work on the expression of emotions, it was also suggested that such mechanisms are identifiable in a limited number of basic emotions,[2] typically denoted by terms borrowed from everyday language, and on which high-level emotions are built. This view has been referred to as basic emotion theory (BET). Following BET, basic emotions are universal, or substantially unchanged among different cultures, and triggered by corresponding affective programs, neural mechanisms regulating complex, coordinated and automatic responses (Griffiths 1997; Ekman 1999). Affect programs are complex, as they orchestrate multiple variables including facial expression, body posture, and autonomic and neuroendocrine responses. They are coordinated, as they organize specific activation sequences. Finally, they are automatic, as they trigger reflex-like responses.[3] The concept of affect program made it possible to tackle the issue of the basis of emotions at the computational and neural levels, and

[1] For an historical overview of these studies, see LeDoux (1999).
[2] It must be noted, however, that Darwin never spoke about "basic" emotions.
[3] In this sense, affect programs are similar to the modules described by Fodor (1983). It should be noted, however, that both Ekman and Griffiths consider emotional responses to be more complex than reflexes and homeostatic drives (Griffiths 2004).

numerous studies have been undertaken to identify the cortical or, more often, subcortical regions housing these programs.

At the end of the nineties, in a work that soon became a classic, Paul Griffiths (1997) went even further. Griffiths made a case for eliminating the concept of "emotion" from the psychological and neuroscientific vocabulary, claiming that this category does not denote a natural kind, as discoveries concerning specific emotions cannot be extended, by induction, to other emotions. Knowledge concerning the mechanisms of, say, fear is not helpful to understand the mechanisms underlying other emotions, such as happiness or surprise. In addition, what we know about the mechanisms of fear is not even transferable to all instances of "fear": think for example how different the fear is that is evoked by someone who suddenly jumps out of the dark, compared to fear of flying, or fear of a stock market crash. Thinking that these commonsense concepts are scientifically useful only because it is possible to provide a precise conceptual definition is an error comparable to that made by Aristotelian physicists, who mixed all objects above the orbit of the moon in a single category, that of superlunary objects. Although it is true that there are objects above the orbit of the moon, i.e. superlunary objects, nothing follows from the fact that an object is superlunary. In the same way, nothing follows from the fact that a psychological state is an emotion. Griffiths' conclusion is that, since there is not a unique psychological mechanism underlying different emotions, this concept should be eliminated from our scientific vocabulary and replaced by three different independent concepts: affect programs, high-level cognitive emotions, and socially constructed emotions.

As might be expected, therefore, concepts borrowed from ordinary language on emotions have gone through a gradual deconstruction. Over time, also, Griffiths and others have moved further away from the classical perspective, arguing that the concept of basic emotion can be saved only by sacrificing a number of assumptions. These assumptions include *essentialism* (if some properties are reliably and systematically grouped, then the objects exhibiting these properties constitute a natural kind; there is no need to postulate a common "essence"), and the view that emotional categories can be identified by concepts taken from our ordinary language (Scarantino and Griffiths 2011; see also Scarantino 2015)[4]. In this view, emotion concepts can still explain regularities in emotional behavior, without committing reference failure (they refer to something – in contrast to concepts like "phlogiston"), or projectability failure (it is possible to project information from some members to other members of the same category – in contrast to concepts like "superlunary object"). A key point of BET, however, survives: basic emotions are different from high-level emotions (say, shame) – either because complex emotions are constructed by assembling basic emotions or because, following Griffiths, complex emotions are completely different from basic ones.

The last brick in the deconstruction of emotions has been removed by psychological constructionists (PC). Disciplines such as quantum mechanics, relativity, plate tectonics or evolution by natural selection has taught us how the truths of science can go far beyond prescientific commonsense, the role of which ran out early on in research. According to PC, the view that there are regularities related to basic emotions would be one of the prescientific insights to be abandoned (Russell 2015). In this view, what is encoded by our putative emotional brain regions are not specific emotions but, in contrast, primitive psychological or physiological components that make them up: disgust, or fear, would be nothing but a particular combination of these primitive components, held together by binning processes influenced, inter alia,

[4] Further reflections have emphasized that the concept of "basicness" can be independently understood at the conceptual, psychological or biological levels (Ortony and Turner 1990; Griffiths and Scarantino 2009).

by language and culture. Most importantly, each of the primitive components that make up our emotions is not inherently emotional, as it also contributes to other, non-emotional, cognitive functions. Last but not least, the view that some emotions are more basic than others, and that high-level emotions are constructed by assembling basic emotions, loses all its meaning. According to Lisa Feldman Barrett, albeit it is an incontrovertible fact that we often (though not always) experience emotions as discrete and separate events, or that we categorize other expressions in terms of basic emotions, there is no scientific support for the hypothesis that these behaviors depend on anatomically and functionally distinct brain circuits. The various occurrences of, say, "fear" do not share any phenomenological, behavioral or neurophysiological substrate. Consequently, a theory of emotions should deal with the following facts: (a) there is no one-to-one correspondence between putative basic emotions and physiological, expressive, phenomenological, or behavioral traits; (b) variability and context-dependence are the norm, not the exception.

2. The "BET vs. PC" Debate

While supporters of both BET and PC now agree that emotions, as they appear in our ordinary language, do not mirror our brain ontology, these two parties disagree on whether emotions are "natural kinds" or not. To put it simply, the debate concerns the question of whether the concept of emotional "basicness" still has any scientific value or not (Griffiths 2004; Barrett 2006; Barrett et al. 2007; Izard 2007; Scarantino and Griffiths 2011). Endorsing one or the other positions has concrete consequences. As an example, if emotions are natural kinds, the same emotions could be more or less present in different cultures and, most importantly, in different animals. As a consequence, we should be allowed to study emotional circuits in animals using them as reliable models for testing psychiatrically effective drugs.

Constructionist claims are typically supported by functional magnetic resonance (fMRI) data. More specifically, many of these studies are based on meta-analyses (Kober et al. 2008; Lindquist et al. 2012b, 2016; Brooks et al. 2016), i.e. studies in which a large number of experimental data, collected from different published works, performed by different groups, is re-analyzed and pooled together. Meta-analyses well fit the aims of PC. By meta-analyses, in fact, it has been possible to demonstrate that studies originally interpreted as supporting a one-to-one mapping between basic emotions and brain areas are also in line with PC predictions. Pooling many studies together, indeed, it appears that, very often, the same areas contribute to different emotions, and individual emotions activate different areas. Accordingly, the discovery that brain regions typically associated with, say, disgust, are also activated by other emotions, say fear, could be employed to argue that such brain regions encode emotion-unspecific "core affects" (Lindquist et al., 2012; see below for a replication at this point). Some supporters of BET have countered by resorting to most sophisticated fMRI data analysis techniques, such as multivoxel pattern analysis (MVPA), showing that emotion-specific neural patterns are not distinguishable at the level of the individual brain area, but rather at the network level (Kragel and LaBar 2016; Saarimäki et al. 2016). Constructionist responses, however, were not long in coming, setting the stage for a potentially endless debate (Clark-Polner et al. 2016).

Here I question the shared, albeit tacit, assumption that we can entrust a big chunk of our understanding of emotions to correlation studies, such as fMRI studies, without consequences. These studies are of crucial importance, of course, but they also have a number of basic limitations that cannot be overlooked. I fear that the price to pay is potentially high. How can we evaluate the hypothesis that emotions are useful movements (Dewey 1894), actions (Döring 2014), action tendencies (Frijda 1987), predictions of action tendencies (Lowe and

Ziemke 2011), affiliative communicative displays (Proust 2016), action-oriented embodied representations (Hufendiek 2016), skillful engagements with the world (Griffiths and Scarantino 2009), affordances (Griffiths and Scarantino 2009; Hufendiek 2016), or activations of action systems (Panksepp 2005), if tests on emotions are entirely conducted isolating the subjects within fMRI scanners, where actual emotional circumstances cannot be realistically simulated, and where true emotional reactions cannot be instantiated? I will turn to this important point in the second part of the paper. Before focusing on this technical weakness of correlative data, I want to focus your attention on an epistemological one.

3. The radical translation from the brain

Functional MRI studies are *correlation* studies. Correlation studies investigate how a part of the brain reacts to stimuli presented by an experimenter. Notably, these studies constitute a greater part of contemporary cognitive neuroscience including – beside fMRI – EEG, MEG and single neuron recordings. Complemental to correlation studies are *interference* studies, i.e. studies in which the experimenter evaluates how interfering with the normal brain functions impacts on the overt behavior of a subject. Interference studies include electrical, chemical, and magnetic stimulations, as well as real and virtual brain lesions. As I will show hereafter, the interpretation of correlation studies, including fMRI studies, suffers from epistemological problems of the kind described by Quine (1960) in the famous experiment on the "radical translation." In contrast, these problems do not affect interference studies, to which I will turn my attention in the second part of the paper. Since Quine's line of thought is very well known, a very brief reminder should suffice.

Quine describes the case of a linguist having the task to translate the language of a tribe that has never had contact with English speakers. The linguist is assisted by a native, who allows him to observe his verbal reactions to different situations. Observing the scurrying of a rabbit, the native produces a statement, which the linguist transcribes as "gavagai." However, this hides a problem: the statement "gavagai" can be translated with "rabbit", but also with a number of alternative possibilities, such as "un-detached rabbit part", "rabbithood", and so on. All these alternatives are perfectly plausible. Which one, if any, is the *true* translation? Unfortunately, increasing the amount of empirical evidence cannot be of help in solving the ambiguity, all the hypotheses of translation being equally appropriate to explain further occurrences of "gavagai." Starting from these alternatives, manuals for translating one language into another can be set up in divergent ways, all compatible with the totality of speech dispositions, yet incompatible with one another (Quine 1960, 26). To put it simply, one can never be *truer* than the other. Strikingly, however, every translation affects in a very peculiar way our interpretation of the society and culture of the tribes. And so far this is what Quine says.

There are, I think, many similarities between the example described by Quine and the neuroscientific inquiry. The standard procedure in place during correlation studies, including fMRI studies on emotions, mirrors the case of a linguist presenting the native with rabbits, and recording his verbal responses. Similar to the case of the linguist, the neuroscientist involved in correlation studies tries to translate the native language by ostension, i.e. presenting external stimuli (e.g. emotional situations) to the native and recording his spontaneous responses: the brain's "responses." In this neuroscientific version of Quine's story, the neuroscientist plays the part of the linguist while the neuron is the native speaker.[5] The occasional sentence "gavagai" is expressed by a "significant increase in neural activity", and the stimulus meaning "rabbit" can be

[5] Actually, the spatial resolution of fMRI is not that good, so "voxel" would be more appropriate than "neuron." But let us postpone this issue for the moment.

replaced by any experimental stimulus. How can the neuroscientist be sure about what the neuron "perceives" during stimulus presentation, if not by making very strong (arbitrary) assumptions about what we might call the ontology of the neuron?[6] In accord with the original account, the reference is inscrutable.

Compared to the Quinean linguist, however, the neuroscientist faces an additional problem: while some normative principles are available to the linguist interpreting the native's sentence, the same is not true for the neuroscientist. For instance, the Principle of Charity constrains the interpreter to maximize the rationality of the subject: "[…] the more absurd or exotic the beliefs imputed to a people, the more suspicious we are entitled to be of the translations; the myth of the prelogical people marks only the extreme" (Quine 1960, 68). As has recently been noticed, the Principle of Charity depends heavily on empathy, an innate shared sense of similarity between speakers, which remains the guiding strategy of the linguist to interpret the native language (Baghramian 2016). This empathic step, which allows for learning by ostension, introduces, in contrast, a crucial problem for the neuroscientist.

Learning by ostension has two requirements: first, the native (or a teacher) and the linguist (or a child) should receive the same stimulation; second, the two subjects must categorize the perceived reality using similar conceptual frameworks. In other words, it requires a common ontology. During correlation studies on emotion, e.g. based on the presentation of emotional situations or faces depicting basic emotions, both the neuroscientist and his peculiar native – a nerve cell, or a brain area – receive the same stimulation, satisfying the first postulate. However, the implicit standard of similarity, which plays such a crucial role in the case of the linguist or a child, is clearly unavailable to the neuroscientist. Following Quine, "people have to be in substantial agreement, however unconscious, as to what counts as similar if they are to succeed in learning, one person from another, when next to assent to a given observation sentence. Here, then, is an irreducible kernel of relativism: all sensory evidence as reflected in observation sentences is relative to the neural organization that determines what different triggerings of nerve endings will favor the same response. Subjects radically at odds in this neural way could never learn observation sentences or anything else from one another. Our training even of a dog, horse, bear, seal, or elephant hinges on a conformity of his inarticulate similarity standards to our own" (Quine 1984, 293-294). In our case, however, the subject is not a person, or an animal, but a nerve cell. Too bad. In fact, if I am correct, this analysis leads to the following conclusion: in correlation studies, each assignment of meaning to neural activity is a kind of interpretation and, following Quine, faced with multiple interpretations, any interpretation is *truer* than the other. There are no deeper truths to look for.

A "proof of concept" could be of some help to convince the reader that this is a very concrete problem. Imagine a macaque presented with pictures of animals, depicted on a monitor screen. During the presentation of the stimuli, the electrical activity of a neuron is recorded, and aligned to the stimulus onset. During the presentation of a tiger, the neuron increases its firing rate, in line with the view that, the tiger being a predator, the macaque's visual system has been equipped with special tiger-detectors by evolution. The increase in firing rate acts as an affirmative statement uttered by our native, the nerve cell and, accordingly, the neuroscientist indicates the cell as a tiger-selective neuron (similarly, we can imagine Quine's linguist presenting the native with different animals and listening to the native saying "gavagai" only when a tiger is presented). Subsequently in our story, the neuroscientist adds some experimental controls, deconstructing the original image of the tiger into

[6] I always felt embarrassed talking about the ontology of the neuron, until I found out that Dennett spoke about the ontology of the elevator (Dennett 2013).

subcomponents and discovering that the same neuron is also active during the presentation of a black and white image of a tiger. In addition, the scientist presents a composition of white rectangles, replacing the tiger's orange stripes, and black rectangles, replacing the black ones. The neuron fires again. In contrast, we can imagine that the neuron stops firing when the entire picture is replaced by separate black or white rectangles. From a scientific point of view, this is a well-controlled experiment, demonstrating that the "ontology" of this specific neuron does not include "colored tigers' heads." I did not invent anything: this is indeed the result of a classic study by Tanaka (1993). However, what can we say about the "ontology" of this neuron? Similar to the case described by Quine, this neuroscientific result can be interpreted in very different ways: the constructionist will say that "the analysis of visual stimuli effected by inferotemporal neurons is not complex enough to specify a particular biological object on the basis of a single cell discharge" (Jacob and Jeannerod 2003, 59), while the evolutionist could still argue that the neuron is selective to tiger-like patterns, also including false positives (black-white rectangles superimpositions) for evolutionary reasons. Furthers studies will not be of any help in discriminating the two interpretations.

This, in my view, is what is happening in the debate between BET vs. PC: the "essentialist" BET neuroscientist will publish an article on the "cortical representation of rabbithood", while the constructionist will reply with a commentary on the "un-detached rabbit part."[7]

While correlation studies require the interpretation of the response of a nerve cell (or brain region), electrical stimulation (and other interference) studies are in a privileged position. Let us consider electrical stimulation: the delivery of small quantities of electricity in a specific part of the brain elicits specific movements or modification of the overt behavior in the experimental subject. The task of the experimenter is to interpret this behavior, a natural task that we perform all the time. In addition, when performed on humans, electrical stimulation allows the scientist to take advantage of the first-person experience provided by the experimental subject, who can verbally report on the sensations elicited by the stimulation – allowing for the Heterophenomenological approach described by Dennett (1991, 2003). Suddenly, the epistemological limitations mentioned above are somewhat defused, leading translation troubles back to a more common situation: undetermined but, nevertheless, assisted by some normative principles – as in the case of the Quinean linguist.

4. Beyond correlation:
what stimulation tell us about emotions

Stimulation studies have important advantages over correlation studies, including access to the behavioral responses elicited by the stimulation. The relationship between subjective experiences and actions is of particular interest when discussing emotions. How did a bear met in the woods differ from one watched in the zoo? Asking this question, Dewey (1894, 1895) noticed that the main difference between a bear met in the woods (i.e. something to be run from) and one watched in the zoo is that only the former is something to be avoided, and consequently explained "by reference to movements having some use." In contrast, the experience of the bear in the zoo involves no racing of the heart or increase in respiration, because the individual does not contemplate escape (see also Ward and Throop 1989; Backe 2001). However, whether actions are the stuff the emotions are made of, as Dewey and others suggest (Mead 1895; Frijda 1987; Panksepp 2005; Lowe and Ziemke 2011; Caruana and Gallese 2012; Döring 2014; Gallese and Caruana 2016;

[7] Notably, Dennett and Millikan consider the indeterminacy of radical translation really negligible in practice: in their view, it is extremely unlikely that there could be two different pathways that produce two interpretations of the same value, globally indeterminate and radically different (Dennett 2013, Ch.30). As should be clear, I disagree with them on this.

Hufendiek 2016), is something that fMRI studies would hardly be able to clarify. Beside the epistemological problems mentioned above, in fact, there are also very important technical limitations.

When we are locked in an fMRI scanner, we can talk about emotions, recognize them in other individuals, categorize them or, at most, remember our own past emotional states – but we can hardly have vivid emotions. Think of mirthful laughter. Correlative (fMRI, EEG, MEG or similar) studies cannot easily tackle two "hard problems" posed by this emotional expression: (1) "Laughter is a social behavior that virtually disappears in isolated people being scrutinized in a laboratory setting" (Provine 2000). (2) Laughter involves facial grimaces, vocalizations and postural movements, which render it impossible to study it within an fMRI scanner. Not surprisingly, the majority of correlative data on laughter are based on the visual or auditory perception of laughter produced by others. The same is true for many other emotions: whatever leads you to laugh out loud, or makes you scream with fear, or disgusts you until you vomit, will remain outside the laboratory. The number of imaging studies on emotion in which nobody feels any emotion is astonishing. Panksepp is probably right: "correlative approaches, such as brain imaging in humans or psychophysiology, are not strong enough to judge what is 'basic' in the basic emotions. […] We must be selective in choosing which techniques are appropriate for addressing affective questions. For instance, one should do their best to get people into strong affective states" (Panksepp 2007, 282-283).[8] Hereafter, I will review some examples.

4.1. Disgust: from facial grimaces to disgust-behavior

According to constructionists' meta-analyses, the insula is active during the experience of disgust, but also during other emotions – in particular, sadness and fear. Moreover, fMRI studies indicate that disgust processing also recruits a variety of other areas (Phan et al. 2002). According to PC, therefore, studies showing a correlation between insula activity and disgust processing cannot say the last word on whether disgust is a discrete emotion anchored to the insula's circuitry. After all, they continue, disgust may not be a discrete emotion, and discrete emotions may not exist at all. Stimulation data, however, tell a different story.

A few years ago we found that, in the primate, the electrical stimulation of a specific sector of the anterior insula evokes facial expressions that mimic the natural expression of disgust (Caruana et al. 2011; Jezzini et al. 2012). This motor response was accompanied by a decrease in heart rate – consistent with the view that disgust experience is linked to vagal activity and, consequently, to an increase in bradycardic tone. In addition, if the stimulation was delivered during spontaneous feeding behavior, the elicited response included – besides the production of disgusted facial expressions and heart rate modulation – complex disgust-behavior consisting in the refusal of food: throwing away food already on hand, or spitting out the food in the mouth. The stimulation of other regions of the insula, only a few millimeters away, evoked very different responses, suggesting that the insula is a mosaic of anatomo-functional fields orchestrating different behaviors (Jezzini et al. 2012).

[8] Not to mention the fact that, for some time now, this technique has been questioned because of its alarming propensity to false positives (Logothetis 2008; Bennett et al. 2009; Eklund et al. 2016). And to say nothing of the uncomfortable reality expressed by the following observation of Panksepp, who gives voice to a distrust shared by many physiologists: "With regard to modern brain imaging, simply consider the fact that the pseudocolor statistical maps of neural activity changes (rarely more than a few percentage points different than baseline levels) hide vast oceans of neurophysiological and neurochemical activities, with multiple functional systems interpenetrating [...] and with overlapping, interacting circuits generating affective mentality. Each imaged pseudocolor region of the human brain hides enormous complexities and individual variabilities that need to be considered. What we can surely say of the typical final products of most averaged results from human brain imaging studies, consisting of isolated islands of arousal, is that 'the brain does not work that way'" (Panksepp, 2007, 282).

These data, which show a systematic connection between the activation of a given brain structure and some instances of disgust, are in line with a lot of evidence from human interference studies: the stimulation of the insula in surgical patients evokes disgust and nausea, as also verbally reported by patients, and selectively alters the ability to recognize facial expressions of disgust (Krolak-Salmon et al. 2003; Isnard et al. 2004; Papagno et al. 2016). Moreover, it has been observed that, in temporal lobe epilepsy, vomiting and nausea only occur when the seizure invades the insular territories (Catenoix et al. 2008). Altogether, interference studies show systematic involvement of the anterior insula in a discrete emotion, disgust, in such a reliable way that disgust and nausea are commonly employed by neurologists and surgeons to identify this region. Most importantly, albeit it happens that the electrical stimulation of this region may not trigger any behavioral response or subjective experience, nevertheless disgust is the only emotion that could be directly elicited here.

There is evidence that, from the behavioral point of view, oral disgust is closely linked to moral disgust, suggesting that moral transgressions depend on an expansion of the role of disgust over evolutionary time (Chapman et al. 2009; Chapman and Anderson 2012). It would be crucial in the future to understand if, at least in principle, all the several instances of disgust could be modulated by targeting this insular region.

4.2. Laughter and smiling

The hypothesis of a direct link between a sense of merriment, typically associated with laughter, and the pregenual sector of the anterior cingulate cortex (pACC), has been suggested by some fMRI studies supporting some versions of BET, but subsequently questioned by constructionist meta-analyses. As discussed above, it is likely that these studies will not be able to overcome the limitations of the radical translation from the emotional brain, as I called it, leading to an endless controversy. We investigated the hypothesis of an involvement of the pACC in mirth and laughter production by resorting once again to electrical stimulation, in drug-resistant epileptic patients. In about ten patients, stimulation of the pACC evoked laughter and smiling. In half of these subjects, the stimulation also elicited a sense of merriment and mirth. The other half did not report any specific emotions associated with the expression evoked, although patients often reported interoceptive sensations involving the stomach or the whole body (Caruana et al. 2015). Curiously, new evidence showed that the same region is also selectively active during the observation of others' laughter, thus suggesting that this region could also play a key role in laughter contagion (Caruana et al. 2016a). As in the case of the insula, discussed before, it occurs that electrical stimulation of this region may not trigger any response or experience, but of great importance is the fact that, to date, stimulation of this region has not evoked any *other* emotional phenomenon but laughter. In this it is unlike the subgenual sector of the anterior cingulate (sACC), immediately ventral to it, which theories of basic emotions associate with sadness and which, accordingly, is now a target region for the treatment of depression by neurosurgeons (Mayberg et al. 2005). Curiously, laughter can also be evoked by stimulation of other cortical sites, including some frontal and temporal regions, and subcortical centers such as the hypothalamus (typically compromised in patients with gelastic seizures, i.e. epilepsies characterized by pathological laughter) and the nucleus accumbens (a nucleus whose stimulation evokes smiling and merriment in humans; Gibson et al., 2016) – these are centers whose stimulation evokes laughter also in rats! (Burgdorf et al. 2001; Panksepp and Burgdorf 2003; see Caruana et al., 2015, 2016b for an overview). Although the link between laughter and joy is incredibly complex and controversial – most of our daily laughter is not due to humor but to communicative reasons (Provine 2000) – the systematic link between specific anatomical structures and these expressions is a solid scientific result that cannot be overlooked.

4.3. Primate affiliative responses

In answering those who stressed the role of stimulation data in the basic emotion debate (Panksepp 2007; Caruana and Gallese 2012), supporters of PC object that stimulation of specific anatomical sites does not systematically evoke emotional responses: in some cases, for example, stimulation may be totally ineffective (Barrett et al. 2007; Lindquist et al. 2012a). This statement is partially true, but naïve. There are several reasons why this could happen – ranging from technical reasons involving the stimulation parameters to the state of wakefulness of the subject, and others. Most importantly, in line with the view that the context matters, in some cases stimulation may require some additional contextual factors. Let us consider the insula once again. The stimulation of a ventral region of the monkey insula, caudal to the region eliciting disgust, evokes lip-smacking, an affiliative social expression (Caruana et al. 2011). In our original study, this expression was evocable only if the stimulation was released while the subject was establishing eye contact with the experimenter, and was totally ineffective otherwise – thus suggesting that this region is involved in controlling affiliative behavior provided that specific social factors, modulated elsewhere, were present. Hence, the right way to interpret these results is that the production of affiliative expressions is anatomically *distributed*, but still anatomically *constrained*. One could argue, similarly, that many other triggering factors, yet to be discovered, are critical in generating certain responses to stimulation, in other areas.

4.4. Panksepp's basic emotional systems

All the studies mentioned above only represent a selection, based on my own personal experience, among the amount of data describing emotional responses elicited from specific brain regions. A number of evidences, derived from electrical or chemical stimulation studies in other animal models, should be added to the list, including different types of affective behaviors elicited in rodents by the stimulation of subcortical centers. Using this technique, Jaak Panksepp described seven basic emotional systems, remarkably similar in different species of mammals: SEARCH, FEAR, RAGE, SEXUAL DESIRE, CARE, SUFFERING and GAME. It is noteworthy that Panksepp identified basic emotional systems using capital letters, in order to avoid semantic misunderstandings, and that such affective systems are not identified by commonsense emotional concepts (as both BET and PC suggest). In Panksepp's hands, these systems embody primary processes, solutions common to different animal species – beyond cultural or species-specific modulations. According to Panksepp, in fact, our daily emotions result from mixing processes of primary (affective), secondary (learning and thinking) and tertiary (thoughts of thoughts) level (Panksepp 2007; Panksepp and Biven 2012), an account also compatible with many assumptions of PC.

4.5. Stimulation data and the BET vs. PC debate

Altogether, stimulation data raise three observations. First, full-fledged emotional experiences can be directly elicited by stimulating specific brain regions. Needless to say, this evidence is not sufficient to demonstrate the existence of a one-to-one correspondence between brain regions and emotions. After all, as I mentioned, laughter could be elicited by stimulating many different regions, albeit all of them are part of a single anatomical network. By the way, there is abundant evidence that a one-to-one correspondence between structure and function is empirically untenable. Today, this model is by and large replaced with that of "pluripotentiality" characterizing the relationship between structure and function, leading to the view that every brain region plays different functional roles in different functional networks and, accordingly, that its contribution to a given function depends on its anatomical constraints, as

well as on its interaction with other structures. This phenomenon has been referred to as neural exploitation, neural re-use, or neural recycling (Gallese and Lakoff 2005; Dehaene and Cohen 2007; Gallese 2008; Pessoa 2008; Anderson 2010; Scarantino 2012). At the same time, however, stimulation data demonstrate that "anatomy matters" – some responses, and subjective experiences, are constrained by anatomy – and that the link between structure and emotion is not an arbitrary one: some specific emotions have preferential response-initiating areas.

Second, and in agreement with the previous point, these studies highlight the role that the social and natural environment plays in modulating the evoked response. In the case of insula stimulation, social variables such as establishing eye contact with another individual, or the presence of food, are needed to drive and modulate the affiliative and disgust-related responses, respectively. Similar modulatory effects, such as the presence of offspring, or individuals occupying specific hierarchical positions, have been described in past stimulation experiments on rodents (see Frijda 1987, Ch. 7.2). Altogether, these data suggest that, during electrical stimulation, external cues act as environmental or social affordances, modulating the elicited response. Stimulation data do not say the last word on the existence of "basic" emotions, nor do they encourage this hypothesis. However, they support the view that there are "discrete" emotions, coherent patterns distinguishable on the basis of neural, physiological, behavioral and expressive features (Colombetti 2009, 2014). Most importantly, they also leave space for the high variability and context dependence of emotions.[9]

Finally, stimulation studies highlight the role of action in emotions, and the interpenetration between emotional experiences and overt emotional expressions, showing that (a) stimulation of putative sensory areas, such as the insula, triggers emotional expressions, i.e. action patterns including disgust grimaces, complex disgust behavior, heart rate modulations, or affiliative responses, and (b) stimulation of putative motor centers, such as the pACC, triggers, in addition to emotional action patterns, subjective emotional experiences as well. These data vindicate a longstanding theoretical hypothesis linking emotions to action tendencies, adding a new element in the debate between BET and PC, which deserves to be deepened.

5. Stimulation data, through the lens of John Dewey

We have come to electrical stimulation as a strategy to get around the problem of the radical translation from the brain, and discovered that – besides supporting some kinds of discrete emotion theory – stimulation studies also show that the link between the overt behavioral response and the subjective experience is closer than expected. While the existence of discrete emotions is potentially compatible with many key assumptions of constructionism, the interplay between expression (action patterns) and experience is arguably the foremost discontinuity with current constructionists' accounts. Notably, the relationship between emotions and action tendencies is one of the first things that thrill in the eye of those who study emotions using techniques that can highlight their expressive side. This point is nicely expressed by Jaak Panksepp: "Emotional feelings may largely reflect the brain activities that control spontaneous emotional action tendencies. Although the motor system has typically been conceptualized as an unconscious output system of the brain […] there is a great deal of data to suggest that those systems do have a raw-feeling

[9] Compared to the view that there are "discrete" emotions, BET implies stronger assumptions, such as the hypothesis that some emotions are more basic than others, and that complex emotions result from the integration of basic emotions. The latter view is very controversial (for overview see Colombetti 2009 and Hufendiek 2016, Ch.2.5.), and difficult defend with stimulation data.

aspect when they are aroused. […] This view […] places a motor-action homunculus at the center of emotional life rather than any sensory homunculus. This shift of emphasis […] helps solve a variety of troublesome philosophical problems" (Panksepp 2005, 65). In contrast, constructionists – studying people performing "cold" tasks while lying in an fMRI scanner – stress how language, culture and cognition assemble basic physiological processes: "emotions emerge when people make meaning out of sensory input from the body and from the world using knowledge of prior experiences" (Lindquist et al., 2012, 123). Even more explicit is Lisa Feldman Barrett: "discrete emotions emerge from a conceptual analysis of core affect. Specifically, the experience of feeling an emotion, or the experience of seeing emotion in another person, occurs when conceptual knowledge about emotion is brought to bear to categorize a momentary state of core affect. The conceptual knowledge that is called forth to categorize affect would to be tailored to the immediate situation, represented in sensorimotor cortex, acquired from prior experience and supported by language. Categorizing the ebb and flow of core affect into a discrete experience of emotion corresponds to the colloquial idea of 'having an emotion'" (Barrett 2006, 49). The motor side of emotions, their possible identification with action patters or action tendencies, has a very small place in this framework.

5.1. William James and PC

In different respects, PC shares several assumptions with the theory of emotion formulated by William James in 1884. These similarities have also been explicitly recognized by constructionists on several occasions (Barrett et al. 2009; Barrett and Russell 2015). Since James's theory of emotion was subsequently criticized for having discarded the role of action in emotion, i.e. the same criticism I am making of PC, it is worth looking into the similarities and the common limitations of the two theories.

The physiological concerns underlying James's theory of emotion are evident from the early lines of the 1884 essay "What is an emotion?." The paper opens by asking which of the two hypotheses about the brain basis of emotions are true: "either separate and special centres, affected to them alone, are their brain-seat, or else they correspond to processes occurring in the motor and sensory centres" (James 1884, 188). He continues: "If the latter be the case, we must ask whether the emotional «process» in the sensory or motor centre be an altogether peculiar one, or whether it resembles the ordinary perceptive processes of which those centres are already recognised to be the seat." The fact that part of the problem starts from a purely physiological consideration is also supported by the reference to the pioneering electrical stimulation work by David Ferrier, a leading neuroscientist of his time. Indeed, one purpose of James is to criticize the view that emotions constitute a physiological category of their own, and the fact that David Ferrier failed to found purely emotional brain centers plays in favor of this view. Even when, in the *Principles of Psychology*, he deals with the issue of laughter, his position seems to be mostly devoted to criticizing the quest for a sharp border between emotional essences and sensorimotor response: if you ask someone "to imagine away every feeling of laughter and of tendency to laugh from their consciousness of the ludicrousness of an object, and then to tell you what the feeling of its ludicrousness would be like, whether it be anything more than the perception that the object belongs to the class 'funny', they persist in replying that the thing proposed is a physical impossibility, and that they always must laugh if they see a funny object" (James 1890, 451-452). Hence, we can reasonably argue that William James and contemporary constructionist theories of emotion agree that emotion categories are merely descriptive rather than biological kinds (Barrett et al. 2009). In other words, James and the constructionists share an anti-essentialist attitude (contra BET). The similarities do not end there.

James and the constructionists seem to agree that psychology and neuroscience should avoid postulating the existence of discrete mental entities that, in the field of affective neuroscience, correspond to discrete affect programs. In the words of James, traditional psychology "talks like one who should say a river consists of nothing but pailsful, spoonsful, quartpotsful, barrelsful, and other moulded forms of water. Even were the pails and the pots all actually standing in the stream, still between them the free water would continue to flow" (James 1890, 255). In emotion research, in fact, basic emotions *à la* Ekman – strongly criticized by constructionists – are typically depicted as static and stereotyped expressions, generated by the reification of some fragments of our continuous and uninterrupted production of communicative facial expressions: pailsful, spoonsful, quartpotsful, and barrelsful. Variability and context dependence shape our emotions, which are not the stereotyped output of an affect program, as in contrast BET suggests.

A third contact point between James and contemporary constructionism – indeed, their weak point, as it should be clear at this point – is that both of them pay little attention to the enactive dimension of emotions.[10]

5.2. Dewey's and Mead's "enactive" theory of emotion

Historically, the lack of emphasis on the enactive dimension in James's theory of emotions, which relegates emotion to a passive dimension, was stressed by John Dewey and George Mead's theory of emotion. Dewey formulated his own theory to overcome the passiveness of emotions implied by James's theory, finally suggesting that expression, affect and cognition are phases of a single functional coordination, and that agency is a core feature of emotional experience (Dewey 1894, 1895). In other words, Dewey argues that emotional experience is a parallel aspect of the processes involved in goal-oriented acts, emerging from a dynamic interaction between the agent and the social and natural environment: "the expressions of emotion are to be accounted for not by reference to emotion, but by reference to movements having some use, either as direct survivals or as disturbances of teleological co-ordination." (Dewey 1895, 1). Dewey criticizes the view that emotional expressions are expressions of independent, pre-existing, internal states – an assumption that, he says, is induced by the fact that we rate certain movements as expressive when looking at them from the standpoint of the observer (Dewey 1894, 555. See also Backe 2001; Garrison 2003 for recent reconstructions). The focus on the enactive dimension of emotions was further clarified, and extended, one year later in his famous paper on the reflex arc concept in psychology, where he argued that sensory stimulus, the central connections and the motor responses shall be viewed "not as separate and complete entities in themselves, but as divisions of labor, function factors, within the single concrete whole" (Dewey 1896, 358).

But what kind of actions are emotions supposed to be? Typically, actions are classified as instrumental or communicative (Gergely and Jacob 2012). While some emotions could probably be identified as instrumental actions, such as those aimed at defending ourselves, the emotional expressions elicited by electrical stimulation in the studies mentioned above (smiling and laughter, affiliative displays, disgust) are often explained in terms of communicative gestures. This fact fits well with the interpretation of emotional gestures carried out by George Herbert Mead (1895; 1934; 2001) who, capitalizing upon Dewey's theory, considered affiliative

[10] It must be recognized that, at the beginning of his 1884 paper, James mentions the role of actions and motor centers in emotions. Similarly, in the previous quotation from the *Principles*, he includes the "tendency to laugh" as a driving element in the definition of what is "funny." Albeit James is recognized as the father of the "somatic theory", and the James-Lange theory emphasizes the role of the visceral *feed-back*, and not that of the output, one could argue that his position is a little more complex than the way it is commonly popularized.

emotional displays as prelinguistic forms of communication. In Mead's words, "such beginnings of acts, and organic preparations for action, which have been called expressions of emotion are just the cues which have been selected and preserved as the means of mediating social conduct. Before conscious communication by symbols arises in gestures, signs, and articulate sounds there exists in these earliest stages of acts and their physiological fringes, the means of co-ordinating social conduct, the means of unconscious communication […] They had been already naturally selected and preserved as signs in unreflective social conduct before they were specialized as symbols." (Mead 2001, 3).

5.3. Dewey's and Mead's legacy today

Today, enactivists stress the enactive and action-oriented nature of emotions in a very Deweyan fashion: "we should refuse to conceive of the felt quality of anger or fear as something over and above, and thus logically distinct from, organismic ways of responding […] the phenomenal character of an experience is not identified with, or determined by, extra ingredients over and above the dynamic responses of organisms. Instead they are identified with specific, concrete activities of sentient beings – extended ways of responding, reacting, acting and interacting" (Hutto 2012). Accordingly, an enactivist reply to the constructionist theory would mirror the original criticism moved by Dewey to James, in accord with the interplay between experience and expression highlighted by the stimulation data reviewed above.

Furthermore, contemporary echoes of Mead's considerations concerning the primary communicative role of emotional acts survive in some theoretical account of emotions. Following Paul Dumouchel (1999), emotions are mechanisms of social coordination among conspecifics, their primary role being to signal the probability an individual will act towards other agents in one way rather than another. For this reason, Dumouchel agrees in considering emotions as forms of actions. Hutto seems to support something not very different, criticizing the popular conjecture that the functions of emotional expressions to produce effects on other organisms are necessarily "secondary adaptations." In contrast, he suggests, emotional expressions could be something for which social animals have selectively been directly calibrated for. Indeed, there is no reason to deny that the function of at least some of our capacities for emotional response are primarily social, not the expression of some internal state (Hutto 2006; p.30). Before him, Frijda (1987) also recommended that the function of emotional expressions is not communicating our mental states, or promoting understanding. Rather, it is communicating requests and intentions, and influencing others' behavior. In a similar fashion, Joëlle Proust (2016) recently theorized that impulsive and habitual signals, including emotional expressions and affiliative displays, convey information to others about what a situation affords, and thereby motivate a response in the receiver. In this view, they are, first and foremost, expressive acts prompting a reactive action.

Thus, if I am correct, we can envision a direct connection between stimulation data and a pragmatist account of emotions, which originates in Dewey's and Mead's theory of emotion, which survive today in contemporary enactive theories, and prove to be the best equipped to account for the fullness of available empirical data – a theoretically sound, and empirically grounded, alternative to both BET and PC.

6. "*Im Anfang war die Tat*": the pragmatist legacy as an alternative account of emotions

Recapitulating, in the present paper I have discussed a pragmatist inspired, and scientifically informed, approach to the neural basis of emotions, as an alternative to BET and PC. From a scientific point of view,

I capitalized upon the heuristic value of electrical stimulation studies, for two reasons. First, these studies are less prone to the epistemological pitfalls of what I called the radical translation from the brain – a neuroscientific version of Quine's well-known thought experiment. The indeterminacy of the radical translation from the brain, I argued, underdetermines the results of correlative studies, including fMRI studies – on which the debate between BET vs. PC is based. Second, electrical stimulation can elicit strong emotional reactions, in contrast to standard correlative techniques, thus proving to be the most appropriate strategy for addressing affective questions.

The analysis of stimulation data leads to two important considerations: (a) these data demonstrate that discrete emotions can be elicited by stimulating specific brain regions, contrary to constructionists' predictions. They also account for the fact that discrete emotions are context-dependent, as the context modulates the elicited response; (b) stimulation data emphasize the interplay between emotional experiences and expressions. This last observation links emotions to action tendencies, in line with a longstanding tradition that goes back to Dewey's and Mead's corrections to James's theory of emotion. Notably, constructionists do not seem to consider the emotional expression as a constitutive aspect of emotion, sharing with James the limitations criticized by Dewey and Mead.

Thus, in the hands of James and his heirs emotional experience is *embodied*, but not *enacted*. Considering emotions as teleological habits aimed at facing environmental challenges and regulating communication, in contrast, sheds new lights on the close relationships between emotional expressions and subjective emotional experiences, described by stimulation studies. If, as I believe, such enactive view can hardly be forced within the BET-PC categories, this pragmatist alternative must be conceived as a third, independent, account of emotions. On one hand, this view redeems a theoretical tradition that associates emotions with useful movements (Dewey 1894), actions (Döring 2014), action tendencies (Frijda 1987), predictions of action tendencies (Lowe and Ziemke 2011), action-oriented embodied representations (Hufendiek 2016), affiliative communicative displays (Proust 2016), skillful engagements with the world (Griffiths and Scarantino 2009), affordances (Griffiths and Scarantino 2009; Hufendiek 2016), or activations of action systems (Panksepp 2005). On the other hand, it offers a useful framework to account for a huge bunch of contemporary stimulation studies that, albeit forgotten in the BET vs. PC debate, proved to be the most promising ones in the task of radically translating from the emotional brain. Which is what a theory is supposed to do.

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THE IMAGINATIVE REHEARSAL MODEL – DEWEY, EMBODIED SIMULATION, AND THE NARRATIVE HYPOTHESIS

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ABSTRACT: In this contribution I outline some ideas on what the pragmatist model of habit ontology could offer us as regards the appreciation of the constitutive role that imagery plays for social action and cognition. Accordingly, a Deweyan understanding of habit would allow for an understanding of imagery in terms of embodied cognition rather than in representational terms. I first underline the motor character of imagery, and the role its embodiment in habit plays for the anticipation of action. Secondly, I reconstruct Dewey's notion of imaginative rehearsal in light of contemporary, competing models of intersubjectivity such as embodied simulation theory and the narrative practice hypothesis, and argue that the Deweyan model offers us a more encompassing framework which can be useful for reconciling these approaches. In this text I am mainly concerned with sketching a broad picture of the lines along which such a project could be developed. For this reason not all questions are given equal attention, and I shall concentrate mainly on the basic ideas, without going directly into the details of many of them.

1. Habit and interaction

In the pragmatist model interaction is assumed to be constitutive of the mode of being of social phenomena (Dewey 1984, 240; 1981, 153). The primacy of the notion of 'action' leads here to a habit ontology insofar as the process where actions are cast into patterns is understood as a matter of habit formation, in which standing patterns of action are formed (see Testa 2017). Such a process is built into the organic nature of embodied living beings and is sensitive to the affordances of the natural and social environment (Dewey 1983, 38). Hence, habitual patterns are both embodied in individual organisms, and also embedded in the environment which such organisms interact with.

Habitual patterns of behaviour, understood as fundamental explanans and ontological constituents of social reality, are not understood by pragmatism as internal, individual, and representational units, but are rather conceived of in externalist terms (Steiner 2013). This does not exclude that internal mechanisms occur, but these are rather not to be modelled at their fundamental level on representational processes, and are to be conceived as ontologically derived from the sensorimotor character of embodied processes. This allows for an interactive and sensorimotor approach to cognition, based on the idea that "interaction" is the "basic category" and the "primary fact" (Dewey 1982, 129). Due to the "motor urgent force of habit" (Dewey 1983, 39), experience is for Dewey a vital, practical, and emotional matter of upward sensorimotor organization, and "cognition" has to be understood as a "derived phenomenon", secondary in its "origin".

At first sight it might appear strange that a model of social interaction based on a habit ontology may allow us to give a central role to imagery in the articulation of our experience. Still this is exactly the case if we consider that what connects habit with imagery is its "motor urgent force" (Dewey 1984, 39). Habits operate in fact as an anticipatory mechanism of possible action, insofar as they are based on past experiences of acting in certain circumstances which have given rise to patterns of actions of a certain form and structure (see Mättänen 2010). In this sense stabilized action patterns allow us to distance ourselves from what is immediately present and to see the actuality in light of possibilities of action (see Alexander 1993, 384; Dorstewitz 2008; 2016).

2. Imagery as Anticipation of Action

If we now consider the way habits operate as an anticipated future, we can begin to better appreciate first why habits can manifest a purposive structure, referred to action goals, even when they are not yet associated with intentional and conscious behaviour. Habitual patterns can implement what Dewey named 'ends-in-view', that is, ends through which a particular consequence is foreseen, already at a pre-linguistic and pre-reflective subpersonal level, that is, in the form of habitual mechanisms or automatisms. And this purposive structure is closely connected with the role of imagery.

Imagination has traditionally been understood as a reproduction in absentia, that is, as forming a representation of something that is not actually present. But if viewed through the lens of habit formation, imagery has a motor character rather than a representational nature, since it consists of a mechanism of the anticipation of action implemented by neural, functional and phenomenological structures controlling overt action[1]. Once we realize that habits are basically anticipatory mechanisms, we can begin to see that they are instances of consummation (Dewey 1989, chap. 3), that is, that they intrinsically involve a form of standing readjustment to experience, of more or less creative rearrangement of our action patterns. And in this sense the appreciation of the intrinsic role that imaginative reproduction plays within the pragmatist conception may contribute to the overcoming of the identification of habits with dead, fixed routines, which has been prevalent in the recent tradition of both philosophy and cognitive sciences (for a critical survey of this identification in different areas of philosophical thought and empirical research, see Camdic 1986; Kilpinen 2012; Seger and Spiering 2011; Barandian and Di Paolo 2014; Bernacer and Murillo 2014). The formation, the maintenance, and the transformation of habits, as well as the reconstruction of frustrated action patterns, all require that some degree of imaginative anticipation and rearrangement of experience be at play.

The motor character of imagery is also underlined by Dewey when he analyses the notion of 'imagination' in itself. For instance, in his 1896 essay on "Imagination and Expression", "motor imagery" is the crucial notion Dewey develops in order to understand what imagination is. In this sense he writes that "imagery of all kinds has a tendency to overflow in the motor channels", "a tendency to reproduce through action and experience" (Dewey 1972, 194). In this light Dewey, while for instance analysing the activity of drawing, sharply criticizes the representational model of imagery which opposes the representational content – the idea, the material to be conveyed – and the mode of expression – the mode of conveyance, the bodily format of the natural physical and psychical process of expression. The "motor expression" is assumed by Dewey to be not just a contextual or enabling condition, but rather a constitutive element of the representational content, of the idea to be expressed[2]. And it is in this context that Dewey writes that "thought is thought only in and through action" (Dewey 1972, 195). In this sense, Dewey locates his account of imagery within the context of the motor control of action rather than that of representational visual cognition, and it is in this sense that he anticipates contemporary embodied and enactive approaches to imagery, which understand imagery as a form of action rather than as a form of representational inscription (for the latter, see for instance Thomas 1999; 2014; Bartolomeo *et. al.* 2013).

One can easily see that the appreciation of the sensorimotor and expressive character of imagery does not reify it as a separate cognitive faculty – as if sensation, imagination and thought were self-standing cognitive processes – but rather understands it as a moment, a function which is more or less manifest in every instance of experience. Moreover, Dewey also underlines the role that habituation plays in the working of imagery when he writes that "the so-called mechanical phase is necessary to the integrity of the spiritual" (1972, 195). Even the imaginative function is a form of more or less plastic stability, a motor cognitive

[1] Counterfactual reasoning is in this sense not a matter of possible worlds, but rather a matter of imaginary variations of the conditions of experience controlled by abductive patterns and which plays a constitutive role for our everyday perception and thinking. Whereas the logical formula of induction for Peirce "expresses the physiological process of formation of habit" (Peirce 1931-58, 2. 643), the formula of abduction expresses the forward looking dimension of habit and its constitutive role for experience.

[2] See Dewey 1972, 195: "We cannot speak of an idea *and* its expression; the expression is more than a mode of conveying an already formed idea; it is part and parcel of its formation." See also ibid: "thought is thought only in and through action".

disposition, and the sort of habitual patterns we embody influences the grain of the sort of imagination we can develop. If we now remind ourselves of the interactive and embedded structure of habitual embodiment, we can realize that imagination in this general sense is not just a cephalocentric and internal representational activity but is itself fundamentally shaped and constrained by the bodily format and the externalist social structure of habit formation.

In the pragmatist, Deweyan model, experience as a whole can be understood (to different degrees) as a process of "embodied imaginative transition" (for this expression see Cuffari 2011, 539). If this holds, then I think that the tendency of some interpreters to think that Dewey "restricts imagination to conscious experience" (Fesmire 2003, 83), and accordingly to identify imagery with reflective imaginative rehearsal, should be criticized. When Dewey writes that "all *conscious* experience has of necessity some degree of imaginative quality" (Dewey 2008, 276), he is not at all excluding that some degree of imaginative quality can be proper to unconscious experience. On the contrary, the idea that habits act as an anticipation of the future means that they are imbued with imagery. And since in the pragmatist understanding of habits there is a continuous transition from subpersonal and personal, pre-reflective and reflective, unconscious and conscious activity, the same holds for the forms of imaginative reproduction they are infused with. Imaginative reproduction, then, should not be restricted to only conscious forms: the pragmatist model allows rather for the idea that imagery takes place already at the subpersonal and unconscious level[3]. Of course this does not mean that everything that happens at the subpersonal and unconscious level possesses an imaginative quality. But the motor character which characterizes both habit and imagery means that at least motor acts which are connected with reciprocal interaction cannot be understood without referring to the role that imagery plays within them.

The overall form of imagery as a quality of habitual experience is that of a mechanism of anticipation of action. In order to understand the interactive structure of imagery, it is important to note that imagery as anticipation of action has two main aspects. On the one hand imagination involves a form of i) sympathy or empathy, understood by Dewey in his *Ethics* as "entering by imagination into the situation of the other" (Dewey 1978, 150). Hence the anticipatory structure of habit is defined in its intersubjective form exactly by the role of imagery: habitual anticipatory imagery is the mechanism that sustains that capacity to put oneself in the place of the other that for both Dewey and Mead is constitutive of sociality (see Mead 1967, 325). Secondly, as we have seen, imagery as anticipation of action is ii) a mechanism of tapping a situation's possibilities (Fesmire 2003, 65). But it is important here to realize that this tapping for possibilities of action does not only occur when we reflectively consider alternative possibilities, as is the case for instance with moral deliberation. In fact some degree of imagery is always present in action, and even when we act out of automatism, we unconsciously imaginatively anticipate counterfactual possibilities of action.

[3] Some may hold, as a referee points out, that imagery or imagination is a process that by definition needs to be consciously realized. But even in the more commonsensical use, where imagination is understood as representation *in absentia*, I do not need to be aware of the fact that I have imagined something to be the case in order for me to have imagined that. I might discover it retrospectively, but this might never happen. If we now come to our more specific use of the notion of imagery as involved in the anticipation of action, one can see that this need not be a process I am aware of while it is happening, since the mechanism of anticipation is needed not only at the level of deliberative processes where I reflectively consider different courses of action, but also at the level of sensorimotor tasks connected with our pre-reflective perceptual engagement with the world. Moreover, the idea of unconscious imagery has an important tradition in philosophical thought also outside the pragmatist tradition. For instance, Kant's transcendental or productive imagination is understood as an activity which operates by definition at an unconscious level. Kendall Walton distinguishes between spontaneous and deliberative imagining, where the first occurs without the subject's conscious direction (1990).

3. Two forms of Imaginative Rehearsal

For the above mentioned reasons I think we can be more faithful to the pragmatist model if we say that this allows us to make an analytical distinction between a) imaginative anticipation as operative in overt action, and b) imaginative anticipation as operative in vicarious action. In a sense these are both manifestations of some sort of imaginative rehearsal, since they both involve some sort of capacity of entering into the situation of the other, and some sort of tapping for possibilities of action. The notion of dramatic rehearsal is here a good metaphor which captures the sensorimotor character of imagery in action, i.e. the fact that this process involves a form of enactment and embodiment of the motor possibilities which are anticipated through the vehicle of habits. The notion of dramatic rehearsal is also a good metaphor for expressing the interpersonal structure of imagery, the fact that anticipation of action always happens in a context where we are performing with others into whose situation we need to enter.

If we now consider the analytical distinction of the two forms of imagery I have introduced, one can see that only the second one, that is imaginative anticipation as operative in vicarious action, is what Dewey understood as the form of imaginative rehearsal that is proper to moral deliberation. I will label this as 'reflective imaginative rehearsal' in order to distinguish it from the other form we have analysed and to which the structure of dramatic imaginative rehearsal can also be attributed as happening at a pre-reflective level. Deliberation as reflective imaginative rehearsal is characterized by Dewey as a case where imaginative anticipation, instead of being operative in overt action, results rather in a form of a "vicarious" way of acting (Dewey 2008, 200), where overt, "direct action" is temporarily inhibited and delayed. Reflective imaginative rehearsal still has a motor character, only that here action is diverted, "activity is turned from execution into intra-organic channels" (Dewey 1983, 133). And it is important to remind ourselves that the blocking of overt action that occurs here is directly related to the process of habit formation, and namely, to a situation where prior habits enter into conflict with new impulses to action and are somehow impeded to manifest in direct action.

Reflection is thus understood as some sort of introverted, off-line, indirect activity. As Dewey writes "this very inhibition gives habit a chance at manifestation in thought", "projecting itself into the screen of imagination" (Dewey 1983, 133). Reflective deliberation is thus understood as a case where "habit traverses its imaginary path" (1983, 134), that is, manifests itself as reflected habit: as a habit that, while entering into conflict with other habits and being suspended in its urgent and automatic motor character, becomes conscious. And the choice which eventually concludes the deliberative process is thus understood as the moment where the impeded energy is released and some combination of habit "finds a way fully open" to overt, on-line, direct action.

4. Simulation Theory, Narrative Hypothesis, and the Imaginative Rehearsal Model

One could be tempted here to read Dewey's dramatic rehearsal as being close to some sort of simulation theory[4]. Imaginative rehearsal would then result in an *as if* experience, where alternative courses of conduct are internally simulated by being projected on the imaginative screen. Instead of being overtly performed, the inhibited action would be screened in a mental trial, which would consist of a vicarious, anticipatory way of acting, a sort of efference copy of the direct action (see for instance Grush 2004). But one has to note here that, even though Dewey sometimes uses some sort of internalist representational lexicon in order to

[4] For a contemporary interpretation of basic imagining on the basis of a simulation theory, see for instance Currie and Ravenscroft (2013), who interpret imaging as perceptual reenactment.

characterize dramatic rehearsal – as for instance when he speaks of the screen of imagination – on the other hand the very idea of dramatic rehearsal also underlines the deeply embodied and enactive aspect of imagery. Moreover, reflective imaginative rehearsal is an aspect of conscious deliberation and its structure should not be attributed to imagination as a whole. Reflective imaginative rehearsal is rather an exercise of imagery that we develop at a later stage in life and against the background of ongoing forms of pre-reflective imaginative anticipation. Deliberation as reflective imaginative rehearsal is then some sort of specialized occurrence of imagery that intervenes when habitual automatic patterns become frustrated and need to be reconstructed. For this reason, even if we were to think that deliberation involves some form of internal simulation, this would not mean that simulation should be understood as the general model for the operation of interactional imagery, but could rather be understood as a specialized embodied routine which intervenes in some specific cases where habitual patterns are disrupted and default embodied imagery in action is suspended.

When Dewey writes that deliberation is "dramatic and active rather than mathematic and impersonal" (1978, 293), he is clearly stating that, to his mind, the process by which in deliberation we reflectively consider various courses of action, should not be modelled as a case of rational calculation. While opposing this utilitarianist understanding of deliberation, Dewey also underlines the interpersonal structure of intrapersonal deliberation, that is the fact that individual agents that reflect on their conduct anticipate within themselves the point of view of other agents. Even when this takes the form of an intrapersonal monological activity, the latter is nevertheless shaped by and responsive to social external interpersonal constraints. Moreover, the qualification of imagery as dramatic rehearsal, with its concern with characters, plot and scenarios (Caspary 2000, 113-115) underlines also the story-structured and narrative form of imagination that we need in order to enter into the situation of others and to interpret their actions as motivated by reasons. It is not by chance that Dewey in his early essay "*Imagination and Expression*" sees what he'll later label as imaginative rehearsal as already present in the pretend play of the child ("he acts an idea *out* before he really takes it *in*", Dewey 1978, 197). Even according to Mead the genetic role that pretend play occupies as for the emergence of the capacity of role taking seems to involve a model which is coalescent with that of imaginative rehearsal (see *The Social Self*, Mead 1913, on the "dramatic" aspect of the self as a "character", and also on the dramatic character of reflective moral reflection).

Reflective imaginative rehearsal can thus be understood as an extension, and sometimes an introversion – but remember that deliberation is not intrinsically monological and can also be pursued as a conjoint interpersonal action – of the form of imaginative rehearsal which is already operative at a pre-reflective and pre-intentional level. Here the model of imaginative rehearsal can be seen as a pragmatist precursor of the narrative practice hypothesis. The latter has been proposed (Hutto and Gallagher 2008) as an alternative to theory-theory and simulation theory explanations of folk psychology. According to the narrative hypothesis, our capacity to understand others, and in particular to understand reasons for action would not require us to be endowed from scratch with an intentionalist theory of mind nor that we operate some simulative procedure. According to the narrative practice hypothesis, we normally achieve our folk-psychological understanding of others by engaging from childhood in story-telling practices.

It is important to note that narrative practice does not stand alone. On this account our capacity to understand others would consist in an extension of those mechanisms of protological perceptually based recreative imaging that already belonged to our hominid forerunners (Hutto 2008, 79), and of those early forms

embodied pretend play that require children to occupy characters and personas that are different to their own, and that are implemented by the exposure of the children to their parents' story-telling. As one can see, the narrative practice hypothesis, in order to be put in motion, presupposes a sort of imaginative activity to be already operative. And I think that here the notion of imaginative rehearsal offered by pragmatism – understood as traversing a continuum from prereflective and reflective imaginative rehearsal – can be read as some sort of more encompassing model, which somehow bridges the gap between embodied simulation theories (Gallese 2005; Gallese and Sinigaglia 2011) and the narrative hypothesis.

In embodied simulation theory mechanisms of embodied simulation are supposed to already be operative at a subpersonal, functional, and physiological level – whereas the notion of narrative practice is a personal level, phenomenological concept. Supporters of the narrative practice have argued (against embodied simulation) that the notion of simulation is itself a personal level concept (Gallagher 2007) and cannot be properly applied at the subpersonal level of the mirror system; whereas supporters of embodied simulation have argued that the narrative hypothesis confines action's understanding at the level of high level linguistic practice and does not account for lower levels of action's understanding and for their subpersonal, functional and neural underpinnings (Sinigaglia 2009). Here the pragmatist model is an interesting one, since imagery, when understood as a habitual, embodied process, is a notion that is likely to be applied both at the subpersonal and at the personal, at the implicit and at the explicit level – and hence is less exposed than the notion of simulation to the criticism of being applicable only at the personal level. Moreover, the notion of imagery is more encompassing than the high-ranging notion of narrative practice, since it encompasses not only high level, linguistic competences, but it also includes lower level, subpersonal mechanisms such as those involved in embodied simulation theory. Finally, the pragmatist notion of motor imagery offers an approach to basic imagining which can account in a non-representational way for the embodied intersubjective mechanism of the anticipation of action implemented by the mirror system, while being compatible with the enactivist approach to imagining supported by the narrative practice hypothesis[5]. Hence embodied imaginative rehearsal could be the basis for a unitary paradigm which accounts in a continuous way for our habit based ways of understanding others in action.

5. Imagery and Decision Making

Let me finally observe that the analytic distinction I have broached between pre-reflective imagery in action and reflective imagery as postponed action, can be seen as manifesting (under the aspect of the imaginative function) the dual character of interaction – as being both active and passive, spontaneous and receptive, unconscious and conscious. If we do not reify this dual phenomenon but understand it as a perspectival and relative manifestation of the continuum of action anticipation in experience, then we are in a position to see that the overcoming of the strong dualism between routine and intelligent action also involves a re-evaluation of the role that imagery plays at every stage of the decision making process. And this can be better appreciated if we realize that even recent literature is increasingly re-evaluating the role that habitual behaviour plays at different levels of decision making[6].

[5]As Hutto acknowledges (2015), cognitive activities such as imagination, where what is thought about is not present or non-existent, may pose a threat to the enactivist non-representational approach to cognition, at least if one assumes that thinking about what is absent is merely a contentful mental representation of that thing. What the pragmatist perspective offers here is, as I have argued, an account of this imaging in absence which is not modeled on representations, but rather on the motor character of basic imagery.

[6] See for instance Wagner & Northoff (2014), who in a recent article based on empirical research in psychology

But how does this impact on the role that imagery plays within such a process?

Let's take for instance Selten's criticism of game theory through his bounded rational decision making model (1978). Selten distinguishes three hierarchical levels of decision making, that is, routine, imagination, and reasoning. The three levels involve a stepwise increase in cognitive effort: individuals first use procedures that incur low cognitive cost, and move on to more costly procedures only if there is no simpler solution (Sarieh 2010). At the level of routine decisions, these are based on past experiences with similar situations and are made without any conscious effort. At the level of imagination, outcomes of new scenarios are imagined by using the routine knowledge to make guesses. At the level of reasoning the decision maker makes conscious use of present and past information and uses logical reasoning to draw a conclusion (and this is the only level of decision making admitted and permitted by standard game theory). According to Selten, for every given situation decision, there is a pre-decision, where the decision maker first uses a routine level decision process in order to choose which level of decision making to employ, and a final decision, that is a metadecision – itself made on the routine level – where the suggested choices are selected. The distinction between pre-decision and final decision accounts here for the fact that people can always reach a routine decision, but not always follow the solution offered by the higher rational level even if they know it to be the best one. Hence, contrary to the rational agent theory, in bounded rationality the agent does not always choose to perform the action with the optimal expected outcome.

One can see that on the one hand the hierarchical structure of such a model presupposes a dualism between habit understood as routine (lower level), and goal oriented rational action (upper level), which are put on the two extremes of the scale. And routine is here understood to be a lower level than imagination on the assumption that it would not allow the person to put themself in the other person's shoes. On the other hand, the fact that pre-decisions and final decisions are taken at the routine level – which involves no conscious deliberation – somehow gives an encompassing role to habitual processes. But in Selten the fact that pre-decision is set at the level of routine is a sort of *ad hoc* assumption and there is no theoretical justification for this, if not for the fact that in this way Selten's model avoids the risk, faced by many rational choice models, of introducing too high a degree of complexity and cognitive costs.

As we have seen, in Selten's model imagination is put in the middle as a third term between routine and rationality. Now, Selten's model lets us appreciate that habits are involved in decision making. One could say that, from a pragmatist perspective, it is exactly this habit based character of decision making which constitutes the bounded character of rationality. On the other hand, it seems that in order to give a comprehensive account of this fact, one needs to rethink even the higher degrees of decision making – imagination and rationality – as themselves being habit based. Here pragmatist habit ontology could offer us a model that overcomes the dualism between habitual and intelligent action. Moreover, Dewey's take on imagination as motor imagery understands imagery not as a separate cognitive faculty, but rather as a function and a qualitative aspect which permeates both routine and reflective reasoning understood as manifestations of different degrees of habitual mindedness. If motor imagery is in this aspect a mechanism of anticipation of possibilities of action, then the two forms of imaginative rehearsal I have analytically distinguished, that is imagery in action and imagery as vicarious action, are both to be considered as involved in and constitutive of

and the neurosciences, conclude that the role of habits cuts cross the decision making process, since "habits can be considered to reflect not only a balance between internally and externally guided decision-making, but also a balance between diachronic and synchronic timescales that are involved in the relevant decision-making processes".

the whole process of decision making and not just of its intermediate level. And decision making, being intertwined at all its levels with habitual patterns and bounded by them, will then be a process that happens at both unconscious and conscious, pre-reflective and reflective levels.

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SOME PRAGMATIST INSIGHTS

IN ACCOUNTS OF COLLECTIVE ACTIONS

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ABSTRACT: Developmental psychology studies offered by M. Tomasello and his colleagues concerning early abilities of children for joint action and shared intentionality are considered in relation with philosophical accounts of collective intentionality. It is argued that (i) empirical data show that young children display joint intentional actions before having a theory of mind, (ii) that most of the main conceptions of philosophical joint intentionality cannot account for these facts, and (iii) that a pragmatist view of mind and action offers crucial insights for an alternative picture of collective agency and intentionality. The most important implication for philosophy of collective agency and intentionality is to recognize that the causal theory of action and the mentalist conception of intentionality do not constitute an accurate background; classical pragmatism tradition meets recent critics of the main proponents in the field of collective intentionality, offering a practice-oriented account of human agency including early intentional interactions.

For the past few decades there is a growing interest in philosophy of action and in philosophy of mind for phenomena of collective intentionality i.e. capacities of individual agents to share some intentional attitudes. One of the reasons for this is to account for joint intentional actions. Indeed, when we act *together*, cooperatively or not, we have to coordinate our actions. Many philosophers[1] think that we cannot understand such joint actions merely in terms of individual intentions but that we have to recognize joint or shared intentions. While there are several positions in the field, from individualist and reductive accounts (like that of Bratman) to rather holist conceptions (as those of Gilbert or Searle), one can think yet that they globally rest on individualist assumptions and especially that individual actions are still conceived as simpler and more fundamental than collective ones. Therefore, if one can praise this growing interest for collective intentionality as a way to produce theories of action that become more social, one can though regret the persistence of " anti-social bias" of thought (Stoutland 1997, 45). In fact, from the point of view of these accounts, one of the main problems consists in articulating the collective dimension of joint intentions (in their content or in their subject) with the principle of the individuality of the intentional attitude bearer – what one calls the "individual ownership thesis" (Schmid and Schweikard 2013). In order to act jointly, every agent has to understand that the other(s) intend(s) the same joint action. Thus shared, or collective, intentionality's theorists provide different and sophisticated accounts of the way this intentional coordination could be performed.

These works meet research in cognitive sciences regarding "social cognition" i.e. cognitive abilities such as joint attention, social referencing, perception of intention and so on. One of the main issues regarding the interpretation of such abilities is whether social cognition necessitates or not the capacity to view other persons as mental beings, having complex psychological and internal life, and especially having beliefs that can be wrong; this is roughly what one calls "theory of mind".

We can say that most accounts of collective intention require from the agents the possession of a theory of mind[2]. Yet recent studies in developmental psychology tend to show that infants and children of young age are able to act jointly very soon, before having developed a genuine theory of mind (not until four years of age). Thus these data seem to support the claim that social cognition does not necessitate the possession of this cognitive ability for meta-representation. It is as if human children apprehend other human beings firstly as partners for (intentional) interaction before seeing them as psychologically complex.

Although this idea might seem very common for a layperson, it leads to think that we need an alternative philosophical conception of collective intentionality that

[1] The most influential are Gilbert (1989, 1996, 2014), Searle (1990, 1995), Bratman (1992, 1993, 1999), Tuomela (1993, 1995), Tuomela and Miller (1988)

[2] Searle was an exception until his book published in 2010. See Searle (2010, 49).

could account for early abilities of infants and children for joint actions. My hypothesis here is that classical pragmatist philosophers (especially Dewey and Mead) provide crucial elements for such an alternative conception[3] through two main ideas: first, in conceiving intentionality from the practical perspective of goal-directed behavior, rather than from the property of aboutness of internal states of mind. Second, in conceiving that the first person perspective derives from social interactions rather than making them possible.

I want to argue for the need of an alternative conception of collective intentionality from the study of works in developmental and comparative psychology lead by Michael Tomasello and his colleagues (especially (Tomasello et al. 2005). In section 1, I present this work and its results as providing precious empirical and experimental data regarding the idea that collective action is fundamental for human agency and cognition. In section 2, I present some objections to this work, which concern the model of collective intentionality that it uses, namely Bratman's conception. More precisely, I will defend that the main problem concerns here the cognitive sophistication such a model requires for agents. In section 3, I present four main elements for an alternative conception of collective intentionality, coming from both internal critics toward prominent accounts of shared or collective intentions and pragmatist conception of mind and action.

1. Early abilities for understanding and sharing intentions: Tomasello et al. (2005)

1.1. Data for a conception of human cognition as intrinsically linked to collective agency

Several specialists of classical pragmatism[4] have noticed that research led by Tomasello and his colleagues can be understood as broadly in line with Mead's conception of the essentiality of social interaction for human cognition. Indeed, their whole research in developmental and comparative psychology tends to show that the specificity of human cognition rests on cognitive abilities and specific motivation for joint action and shared experience; there is a specifically human disposition to see others as partners, to identify with others, to cooperate and to share some psychological states, what they call "shared intentionality" or sometime "collective intentionality". Thus both action and sociality are recognized as essential for human cognition, features generally associated with the pragmatist tradition.

Indeed, Tomasello's 2005 paper, entitled "Understanding and sharing intentions: The origins of cultural cognition" identifies the co-emergence in ontogeny of the ability to progressively understand the structure of intentional action of an actor observed and of the capacity to participate in increasingly complex joint activities.

In the first months of life, infants begin to differentiate animate self-produced action and inanimate caused motion and look in the same direction as others do. Tomasello and his colleagues consider that infants can see human action as "object directed", without seeing it as goal directed at this level (678). At the same age, infants perform "dyadic engagement" (681-2) in their face-to-face interactions with adults. They show a mutual responsiveness at the behavioral

[3] Far from being a specialist of classical pragmatist thought, I do not pretend to give here a serious analysis of sense and scope of this convergence. I am just struck by the convergence of several internal critics of collective intentionality and Dewey's conception of mind, along with Mead's account of social interactions.

[4] See for instance Nungesser (2016, 254): "Tomasello's studies, I claim, can contribute to an empirically saturated and refined account of both the evolutionary and ontogenetic logic of cognitive development described by Mead." For more critical perspectives see Booth (2016) and McVeigh (2016)

level, and furthermore, they engage in "proto-conversations" with mutual gazing, in which adult and infant touch, look, smile and vocalize toward each other in turn. Such interactions reveal shared behavior and emotions between infant and adult.

A few months later, 9-month-old infants begin to understand goal-directed action and can recognize successful action from failure or accident; they also understand that the actor perceives his environment and perceptually monitors the result of his movements. Simultaneously, at around 9 to 12 months of age, they engage in several triadic interactions that involve a partner and a third entity, such as taking and giving objects, building a block tower together, pointing and naming games or pretend games, such as pretending to drink tea together. They coordinate their looking with that of the other person toward the relevant objects, what the authors call "joint perception". Some empirical works (Ross and Lollis, 1987; Ratner and Bruner, 1978) can be construed as showing that 9 month-old infants attempt to reengage a recalcitrant partner, by gesturing to him or handing him an object, suggesting the existence of a shared goal of the joint activity understood as such by infants. Thus according to Tomasello, these kinds of triadic engagement reveal the infants' capacity for sharing goals and perception.

The third step of this ontogenetic pathway for joint action and intentionality consists in understanding genuine intentional action i.e. action structured both by an aimed goal and an action plan chosen by the actor in order to achieve his or her end. This happens between 12 and 18 months of life; the main study showing this understanding is Gergely et al., 2002. It consisted in showing to 14-month-old children an adult touching his head to the top of a box to turn on a light. Children were divided in two groups; for the first one, the adult's hands were occupied (holding a blanket around his shoulders) whereas they were free for the demonstration to the second group. When it was their turn to act, children of the second group, who saw the adult using his head to turn on the light while his hands were free, touched the box with their head more often than children of the first group. This seems to mean that children understood that if the adult's hands were free and he still chose to use his head, then there must be some reason to do so. Thus 14-month-old children seem to be able to understand that the actor does things for a reason and chooses specific ways of acting that they can rationally imitate. Furthermore at the same age, children begin to understand that people attend to specific features of their environment, and see attention as an intentional perception. In parallel, children engage in collaborative interactions, which involve, according to the authors, joint intentions and attention. They consist mainly of triadic engagement where the child is increasingly active, especially by helping her partner if he failed to play his part. This implies role-reversal understanding and imitation. All these developments appear at the same time as language, which authors qualify with Clark (1996) as an inherently collaborative activity; conversation is seen as an essentially joint activity implying at least two partners in order to be performed. The crucial idea is to consider of language as a form of joint activity that *derives* from the ability for shared intentionality rather than *producing* it.

Tomasello and his colleagues understand these capacities of human infants and children for understanding and sharing intentional activities as preconditions for their ability to engage in "cultural learning[5]", i.e., the specifically human way of learning and teaching that convey conventional ways of doing things in a specific culture, implying an essential normative dimension.

[5] cf. Tomasello et al. 1993; 2016.

1.2. Models of intentional action and of shared intentionality

There is a specific philosophical interest of this 2005 paper because it makes explicit models of individual and shared intentional actions used in the interpretation of the previous data. Firstly, it offers a conception of individual intentional action as bodily movements of an actor caused by an internal mental state that consists in the representation of the goal aimed at and of the action plan chosen in order to fulfill it (676-677). Thus this model of intentional action conceives the relation between intention and action as a causal link. In other words, it is a causal, internal and mentalist conception of individual intentional action. Then, this model is adjusted to joint intentional action; joint intentions have to trigger bodily movements in the same way that individual intention does, that is as an internal and mental representation, embodied in each individual. Thus one can understand the choice of Bratman's model of shared cooperative intention since he explicitly aims at offering an individualistic and reductive account of such intentions (Bratman 1992, 341). If Tomasello refers to other accounts of shared intentions (especially Gilbert 1989, Searle 1990 and Tuomela 1995), it seems that Bratman's model is more likely to provide a model that appears as an extension of the causal and internal model offered for individual intentional action. Indeed, joint intention is conceived as an internal mental state embodied in each partner and its main features are conceived from the analysis offered by Bratman, 1992. This is the way Tomasello et al. resume this account:

> According to Bratman (1992), joint cooperative activities, as he calls them, have three essential characteristics that distinguish them from social interaction in general (here modified slightly): (1) the interactants are mutually responsive to one another, (2) there is a shared goal in the sense that each participant has the goal that we (in *mutual knowledge*[6]) do X together, and (3) the participants coordinate their plans of action and intentions some way down the hierarchy – which requires that both participants understand both roles of the interaction (*role reversal*) and so can at least help the other with his role if needed. (680)

These features are picked up in order to figure the content of each participant's representation of the joint intention. It includes the representation of the goal as a shared one i.e. that is aimed by both of them, and the representation of its own intention linked to the other's intention. These two points conform to clause (2) and (3), while mutual responsiveness (1) is provided by joint attention toward each other, and toward the same features in their perceptual field. The specific mental representations sustaining joint intentions are called "dialogic cognitive representation" (684) and are characterized by the fact that they include a representation of the whole situation and of both self and other. Thus this model of shared cooperative activities requires the capacity for the agents to represent the other's intention as an internal representation. Then, joint intention must trigger and constrain bodily coordinated movements in order to fulfill the shared goal aimed at by both participants.

Obviously, this kind of model requires a great cognitive sophistication from agents and by the way Bratman explicitly focuses on adult interactions (Bratman 1992, 327). Tomasello and al. do not address this particular fact in their paper. The idea seems to be that this account provides a general model of joint cooperative activities performed by mature human beings; infants and children are supposed to begin by interacting with others and then gradually internalize these interactions in a Vygotskian fashion (684 and 689).

Actually, it is rather convincing that we can only possess dialogic cognitive representations once we conceive of the other as someone who has (internal) representations of reality and of his or her goals. It is not problematic to consider that Bratman's model of joint cooperative action fits well for some specific interactions, namely planned and adult cooperation, but could it serve as an overall conception? The principal

[6] My emphasis, cf. supra

issue seems to be whether we can agree both with the presentation of this account as a *general* model for joint actions on the one hand and, on the other hand, with the idea that early interactions performed by infants and pre-school children *are* genuine intentional actions: if full-blooded joint actions presuppose sophisticated representations as their mental causes, do we have to say that early interactions are *not* genuinely intentional since this complex intentional structure is not yet internalized by young children? In fact, researchers interested in the study of some specific triadic engagement, namely games of pretend, raise this issue.

2. Critical points regarding main conceptions of joint intentions and shared or collective intentionality

Firstly, it is rather puzzling that Tomasello et al. refer to Bratman's model of joint intentionality, since their empirical researches are often claimed as objections against his individualistic and intellectualistic account (see for instance Risjord, 2014, 298). Admittedly, Bratman does not claim to offer a general account of necessary conditions for joint actions, but only a set of sufficient conditions. But the fact that infants and young children actually perform joint activities without fulfilling these conditions suggests that Bratman does not accurately represent the kind of cooperation fundamental to human joint actions. I think that one of the main reasons Tomasello and his colleagues have to choose Bratman's account lies in the fact that it fits well with the general model of (individual) intentional action they give which, let us recall, conceives of intentions as internal states that cause the bodily movements which produce effects in the world. Hence, if this is relevant, then critics of Bratman's account of joint actions and intentions can provide solid grounds against the whole conception of intentional action, arguing that this view has to be modified in order to avoid the aforementioned problems (section 3).

2.1. The requisite of the theory of mind

As we said, some important criticisms of the bratmanian conception of shared (or joint) intentionality are made in the context of the study of games of pretense. At first, we can broadly define these games as interactions where children act (with other children but first and foremost with adults) *as if* something (e.g. this piece of wood) was another thing (e.g. a cup of tea), or *as if* some proposition (e.g. "you are a horse") was true while it is not (e.g. I am not a horse). Although there are debates concerning the interpretation one must give of empirical data, it can be said that pretend play means acting intentionally, knowingly and non-seriously (Rakoczy 2006, 114). According to Rakoczy's view[7], games of pretense are genuine joint intentional actions performed by children from 12 months of age. Yet these features of intentionality and jointness are not understandable as such, as long as one conceives joint intentional actions as Bratman does.

In connection with these critics, Tollefsen (2005) notes two main problems in Bratman's account of joint intentional action when it is applied to intentional games of pretense performed by young children. She calls the first one the "mutual responsiveness problem" (Tollefsen 2005, 81) It corresponds to the condition (1) in regard with the characterization Tomasello et al. give of Bratman's account. This clause consists in the fact that each participant must be aware of the other's intentions and be responsive to his or her intentions. According to Tollefsen, this condition requires that participants have a "robust theory of mind" (*ibid*.) She defines it as including the following features: (i) an understanding of other persons in terms of their thoughts, intentions and beliefs; (ii) an understanding that other persons' thoughts, intentions and beliefs may differ from one's own; (iii) an understanding that others have thoughts

[7] This view is in fact Rakoczy and Tomasello's one, that they call Cultural Learning Approach (Rakoczy 2006, 116, 119; Rakoczy, Tomasello & Striano, 2004; Tomasello & Rakoczy, 2003)

and beliefs that may not match with the current state of affairs (false beliefs). Yet, there is a general consensus according to which children do not possess a theory of mind until four years of age. Therefore, one cannot understand how 18 month-old children could jointly and intentionally perform pretend games.

The second problem follows the same pattern, i.e., the cognitive sophistication required by Bratman's account. Moreover, it raises a deeper difficulty since it concerns a feature that most of philosophical accounts of collective or joint intentionality share, which is the clause of *common knowledge*. Indeed, in the quotation we made from Tomasello et al., this notion does not appear; authors mention "*mutual knowledge*" (I emphasized it in the quotation). According to them, the fact that each partner aims at the shared goal ("that we do X together") is in mutual knowledge. I do not know if this modification has been intentionally made but one can think that it could *prima facie* make the requisite less demanding than if it was genuine common knowledge. Actually, mutual knowledge requires only that each partner knows that the goal is one's own and the other one's too. It is less stringent that common knowledge that requires not only knowledge of the other's knowledge but also knowledge of the inferential capacities of others. Despite the several important debates concerning the notion of common knowledge (CK), one can say with Tollefsen that Schiffer (1972) offers a relevant definition: *p* is CK among X and Y iff X knows that *p*; Y knows that *p.* X knows that Y knows that *p.* Y knows that X knows that *p*. X knows that Y knows that X knows that *p.* Y knows that X knows that Y knows that *p*… and so on (Tollefsen 2005, 82). If this structure does not have to be actually and consciously present to the agents, it must be something that each of them could infer from his beliefs. Thus, Tollefsen argues that this clause of CK requires a robust theory of mind that children do not have yet. Could we say, then, that the less demanding mutual knowledge is enough in order to account for a joint goal? Unfortunately it is not, at least according to Bratman's view: if I want us to open this box together and I know that you want it too, but I do not know if you know that this is what I want, we do not actually have any shared goal. It is crucial in Bratman's account that the fact that the goal is shared is CK among partners in order to provide a joint intention to act according to it. This is also true to some degree for Gilbert's account (1989; 2014) and for Tuomela's one (1995).

Thus, since models of collective or joint intentionality require CK, they cannot account for pre-school children abilities to act jointly and intentionally. Rakoczy states in this way the logical problem space one is confronted by concerning this issue (Rakoczy 2006, 123). There are three mutually incompatible propositions:

i) Competence C requires psychological background ability P;
ii) young children seem not have ability P; yet
iii) it seems justified on pre-theoretical grounds to ascribe competence C to young children.

When C is the ability to engage in cooperative activities, including cooperative pretense, the problem arises with P as the possession of a genuine theory of mind i.e. the ability for mind reading. Rakoczy argues that most of the major accounts of cooperative joint activities available in the field of philosophical debates concerning collective intentionality lead to the same problem. Rakoczy examines Tuomela and Miller's (Tuomela & Miller 1988) and Bratman's accounts (Bratman 1992), but it concerns also Gilbert's view (1989; 2006; 2014).

Then, two first possibilities are available, which are rejecting either proposition (ii) and recognizing that pre-school children actually *have* a theory of mind[8], or proposition (iii) and denying that children are able to engage in cooperative pretense as an intentional joint activity[9]. However, Rakoczy offers relevant empirical

[8] Rakoczy mentions Fodor (1992); Leslie (2000); Sperber & Wilson (2002) as embracing this solution.
[9] This is the position adopted by the "behaving-as-if

arguments opposed to these options. Rather, he suggests revising proposition (i) in order to provide simpler psychological background ability needed for cooperative activity. He refers to Searle's conception (1990; 1995) according to which collective intentionality is a biologically primitive and pre-intentional capacity, possessed by all social animals. Yet, despite the attractiveness of this view, Rakoczy offers two main objections against it. First, the primitiveness makes collective intentionality inexplicable and rather mysterious; second Searle's conception does not permit distinguishing specific human forms of cooperation from those of animals. If Bratman's account is too demanding concerning cognitive abilities needed for cooperative joint activities, Searle's account is too liberal. Yet research made by Tomasello and his team, including Rakoczy, offers relevant data concerning the difference between non-human coordinated activities and human cooperative ones[10].

Therefore, Rakoczy asks for "more fine-grained conceptual distinctions and taxonomies" (Rakoczy 2006, 124) regarding in philosophical accounts concerning cooperative activities and psychological abilities required (it is worth noting here that conceptual analyses and empirical research have to work together). According to this line, Rakoczy refers positively to Tollefsen's modification of Bratman's account of shared cooperative activity (Tollefsen 2005). The point of Tollefsen's contribution is to resort to Peacocke's work concerning joint attention (Peacocke 2002) in order to substitute joint attention for the condition of common knowledge. Thus children have to perceive that the others perceive, and what they perceive and attend to, in order to be able to cooperate together. They do not have to know others' mental states or to be able to draw inferences about those states (Tollefsen 2005, 92). The main idea is to consider that children can recognize that someone is doing something rather than having something done to them, without having to understand that people have internal states of mind. In this way, one can say that children can *perceive* others' intentional actions as such, since they do not infer their intentions from the sensation of a set of mere sense data. Rather, they see somehow directly what the actor aims at and is doing, from the context and the situation in which the action occurs. Thus, the others' intentions would not be inferred but perceived. Now what is at stake is the way one conceives these intentions.

2.2. The causal conception of intention

Tollefsen uses the searlian notion of *intention-in-action* deployed in his analysis of intention action (Searle 1983, 83-98) as distinguished of the notion of *prior intention*, saying that children in pretense games can actually perceive the others' intentions-in-action. According to Searle, a prior intention is an intention that concerns an intended action in the future, whereas intention-in-action is the intention deployed in a non-premeditated or deliberated action, which is still intentional. All intentional action involves intention-in-action but not all intentional action involves prior intentions, because all our intentional actions are not premeditated. Thus one can say that intentions-in-action are primary regarding prior intentions.

But it is worth noting that Searle has a strongly causal conception of intention. According to him, an action has two components, a mental one that is intention, and a bodily movement. The intention has to represent its conditions of satisfaction (or to "present" them, in the case of intention-in-action) in a manner that is self-referential to the intention itself: this is because of this very intention that the action has to be made, otherwise one cannot distinguish between a genuine intention and a mere desire or wish. In other words, if I intend to write this article, my intention would not be satisfied if this article was written but not by me, or not

theory" of pretense developped by Lillard (1993; 1998); Nichols & Stich (2000). Rakoczy discusses this theory in his paper and argues quite convincingly against it.

[10] I do not treat here this central concern of Tomasello's works, not because of a lack of interest but rather of lack of space.

because of this intention; therefore, my action to write it has to be causally engendered by my intention in a manner that refers to this intention itself: this is because I intend to do it that I do it intentionally. According to Searle, this is a crucial feature of both intentions-in-action and prior intentions.

I do not have space here to develop the specific issues linked to this causal conception of intention[11] but I want to emphasize that these deep problems are even more obvious as soon as one thinks collective intentions as needing to be mental causes of action. Yet this is what Searle should do, given his whole conception of the relation between intention and action. Indeed, he claims that the difference between a mere aggregate of individual actions and a genuine collective action is the presence in the latter case of a "we-intention" in the heads of each participant, that causes these movements as a collective action (cf. the case of people running for shelter compared to the case of people performing a dance together, each group displaying exactly the same behavior in Searle 1990, 402-403). But doing so, this collective intention should cause these movements just like an individual intention is supposed to do, saying being self-referential. Yet, how to understand this self-referentiality when the intention is of the sort "we intend to do X"? Either it concerns only the movements of each individual, but then one fails to account for the collective character of the action, or it regards the whole of the group's movements but one has to recognize something as a super-brain, which is obviously strange.

Actually, Searle drops out the condition of self-referentiality in case of collective intentions and proposes a pattern according to which the individual intentions of each partner are the means in order to achieve the collective intention that is the end. However, in doing so, his account becomes very similar to Bratman's, where each individual has an intention of the form" I intend that we do X". But here again there is a problem: as some critics[12] have noticed, there is a conceptual issue with intentions of this form, mainly that one cannot intend something that is not up to her or him: "that we J" does not depend on the action, deliberation or discretion of the individual, but refers to the collective action of the "we" at stake. Now, Tollefsen broadly agrees with this last objection and even remarks "more interesting would be the possibility that [children] have something like the capacity Searle identifies and all of their early intentions are of the form "We intend to J" (Tollefsen 2005, 19, n. 24). But if Searle fails to analyze this proper "we-intention" as fitting with his causal conception of intention, then we have to think that what Tollefsen calls intention-in-action must not be conceived as a mental *cause* of the action.

Therefore, Tollefsen's attempt to modify Bratman's account of shared cooperative intentions in order to understand early games of pretense performed by young children leads to deep issues concerning the main conception of intentional action as such i.e. the causal theory of action. Saying that children can actually *perceive* intentions-in-action in order to form we-intention with their partners is consistent only if one conceives both intentions-in-action and collective intentions as being *not* internal states of mind in the heads of the actors causally linked to their bodily movements. I think that the reference she made to Searle's account can only be superficial, because if she had to endorse this whole conception, the solution offered would not be conclusive[13].

[11] These issues have been first raised by the proponents of a wittgensteinian conception of intentional action, especially by Anscombe (1976), Von Wright (1971), Melden (1961), Stoutland (1980), among others. It is worth noting that the term "cause" in these debates does not have the broad sense according to which it is just a synonym for "because". It is a narrower sense in which it presupposes law-like relations and rest on empirical generalizations, when antecedents necessitate the effects.

[12] Especially Baier (1997, 25-27), Velleman (1997, 34-35), Stoutland (1997, 56-58)

[13] In fact Tollefsen dos not endorse the causal theory of action in her latest works. In her book devoted to group agency she offers a denettian interpretationnist account of both individual and collective intentional actions. (Tollefsen 2015)

So, if we follow Tollefsen and Rakoczy when they affirm that children can display intentional collective activities by perceiving the others' actions as intentional, then we have to admit that we need a general conception of collective intentionality that deeply differs from main accounts available in the field. In particular, I think that we must agree with the claim made by Stoutland, who thinks that the main drawback encountered by the accounts of collective agency is the causal theory of action (Stoutland 1997, 59). More precisely, what is at issue is the conception of intentions as internal causes of action, understood as mental states that confer to bodily movements their intentional character. Although one can defend a causal theory of action without endorsing an internal conception of intention (see for instance Velleman 1992; 1997, 37), I deem here that one of the main distinctive features of causal theory of action consists in seeing causes of action as mental and neural events that occur inside the agents and trigger his or her bodily movements (Gnassounou & Kirstler 2007, 780). Because this view encounters deep difficulties especially when it is applied to collective actions, we better have to drop it out, in order to understand these actions as fundamental and intelligible.

Now, how shall we conceive intentionality and collective agency in order to avoid the previous difficulties? I think that we can find some crucially relevant insights in classical pragmatic philosophy.

3. Pragmatist insights for an alternative conception of collective intentional actions

Without claiming to offer here a genuine commentary of Dewey or Mead's texts, I will rather notice the congruence between some critics of mainstream trends in collective intentionality's studies and some of the well-known thesis of these authors. In this way, I hope to bring some important conceptual issues concerning collective actions to pragmatism specialists' attention. In the following part, four main features will be addressed: the perception of intentions, the "adverbial" conception of the mind, the priority of interaction upon individual action, and the derivative nature of the self.

3.1. The perception of intentions

We can say with Stoutland (1997) that main accounts of collective intentionality admit more or less explicitly the causal theory of action; hence these authors seem to be committed to a broadly mentalist conception of intentional action. This view is characterized by the idea that the difference between a mere behavior and a genuine action rests on the presence of a mental and internal state of mind (of brain for the most "naturalist" accounts such as Searle's) that causes bodily movements; this is supposed to be an intention[14]. Stoutland argues that mentalists agree with tight behaviorism that they elsewhere criticize in conceiving that "all observational terms are physical, so that observations of behavior must be expressed in physical terms." (Stoutland 1988, 42) Mentalists conceive the intentional terms excluded from descriptions of behaviors as *inner* and *individual* states that are not themselves observable *prima facie*. Therefore they still agree with the idea that bodily movements are by themselves accurately describable in purely physical terms. Against this idea, Stoutland defends another position that he calls "intentionalism[15]" according to which "we *observe* directly not only physical motions and events but behavior as intentional. We observe that persons are greeting each other, taking notes, trying to open windows, not merely that their body are moving" (Stoutland 1988, 44).

To consider that we can actually *observe* intentional actions as such is a way to reject the mentalist conception of action. Indeed, some important trends in cognitive sciences assert that intentions are actually *perceived* as such, especially in the study of social

[14] Tomasello et al. share this conception in the paper we discussed (Tomasello et al. 2005, 677)
[15] Thus Stoutland refers to Von Wright's distinction in analytic philosophy of action that oppose intentionalism to causalism (Von Wright 1971, chap. 1).

cognition. More precisely, the notion of social perception, developed by Jacob and Jeannerod (2003) or the idea of interpersonal affordances (Richardson, Marsh & Baron 2007) are instances of a broadly non-intellectualistic and mainly perceptual conception of the basic ability to understand others' intentions[16]. In this line of thought, some authors defend what they call the "hypothesis of direct perception", which proposes that perceptual experience primarily is a process of directly revealing the meaning of the perceived (Froese and Leavens 2014, 3). This meaning includes others' intentions since these people are perceived as agents with mental lives like oneself[17]. I think that this can be read as views in line with some aspects of intentionalism as Stoutland defines it.

The point is that one can admit that behaviors are not accurately described only in purely physical terms without having to endorse a mysterious and dualistic ontology, which could be thought as opposed to the general picture of reality given by modern natural sciences. Rather, one can admit that living beings biologically structure their environment according to what they have to *do* in it. A living environment is never purely "physical" since some aspects are valued whereas others are pointless according to the issues met by living beings; this is *a fortiori* true of human beings. In this latter case, we have to admit that meanings instituted by the *culture* are pervasive. It does not mean that these features do not have any physical description – every thing may have a physical description – but, rather, that this physical description does not grasp the relevant characteristic of these things. In saying that, we meet Dewey's conception of human environment:

> The environment in which human beings live, act and inquire, is not simply physical. It is cultural as well. Problems which induce inquiry grow out of the relations of fellow beings to one another, and the organs for dealing with these relations are not only the eye and ear, but the meanings which have developed in the course of living, together with the ways of forming and transmitting culture with all its constituents of tools, arts, institutions, traditions and customary beliefs. (Dewey 1938 / 1960, 42)

Dewey enables us to account for the intrinsically cultural dimension of human environment inside a naturalistic picture of the reality. Thus, one can recognize that naturalism is not necessarily committed to physicalism specifically understood as an *ontological* thesis according to which the sole things that *really* exist are the entities described by physics[18]. This pragmatist conception of naturalism is a relevant general background for what we have called with Stoutland "intentionalism". From this point of view, we can assert that intentions can be perceived by beings that live in a world where there *are* some behaviors accurately described and understood as intentional.

Furthermore, Dewey's conception of experience provides an insightful way to understand what perception of intention means. He rejects the idea that perception is a passive reception of sense data thought as the material for knowledge and conceptualization, which does not itself have a content informed by practical needs or concepts. On the contrary, what we experience is shaped by our vital interactions and our habits of expectation. Thus, sensations are not some idle and isolated pieces of information without any conceptual content or practical meaning. However, Dewey denies that experience is essentially cognitive, a view that he calls "intellectualism", "the theory that all experiencing is a mode of knowing" (Dewey 1925/1981, 28) and that both rationalism and classical empiricism share. Rather, experience is basically practical and pre-cognitive, "an affair primarily of doing" (Dewey 1920/1982, 129). A sensation is first and foremost

[16] cf. Dokic 2012.

[17] This view has important consequences for the issue of imitation and human ability to mimic the precise way an action is performed rather than just reproduce the action regarding the goal it aims at (what one calls "emulation"). See Froese and Leavens (2014).

[18] What is the starting point of Searle's account of social reality (1995)

"an invitation and inducement to act in a needed way. It is a clue in behavior, a directive factor in adaptation of life in its surroundings. It is urgent not cognitive in quality" (*ibid.*) This is when this kind of immediate experience encounters some issues in the adjustment to the situation that a cognitive, mediate and inferential relation to the objects of perception emerges. So Dewey shows how experience can be immediate and non cognitive while including in its content some meaningful features. I think this is a penetrant manner to see how other agents' intentions can be perceived. From the very beginning, children live with people and learn to perceive them as intentional agents. This learning is not theoretical but firstly vital and practical. They perceive their gestures and behaviors as goal-oriented and teleological since these movements have a practical meaning in the situation in which they are embedded together. In this line of thought, one can say that intentions are objects of perception because they are experienced as meaningful. Thus, I think that Dewey's conception of experience provides grounds for intentionalism.

But in order to avoid some ambiguity, one has to recognize that "intentionalism" refers to a specific sense of "intentionality". Here, it must be the *practical* meaning of the term that refers to goal-directedness of behavior and which aims at an end, whether consciously represented or not. This meaning differs from the mentalist property of mental states' *aboutness*, conceived as internal representations concerning something in the world[19]. Therefore, a crucial point in the discussion of collective intentionality with mentalism concerns the meaning we have to recognize for the word "intentionality". Since pragmatism develops a conception of the mind focused on "conduct", one can recognize in this tradition a way to defend the primacy of practical intentionality. This is the second relevant feature of pragmatism for our purposes here.

[19] Concerning the relevance of such a distinction for the social cognition's studies, see for instance Kaufmann & Clement, 2003, 20.

3.2. An adverbial conception of the mind and a practical conception of intentionality

Debates between intentionalism and mentalism rest on different conceptions of what the mind is, and how one must conceive the relations between mind and body concerning actions. Intentionalism denies that action is an *effect* of a mental cause and argues that action *expresses* the mental. Several commentators of classical pragmatism show that this view is already yield by Peirce, Dewey and Mead. For instance, Cometti writes that for pragmatism "intention is the action[20]" and refers to Anscombe (1953) for further developments of this very idea. Without doing justice to the complexity of Anscombe's conception of intentional action, let me present her view by this well-known quotation of *Intention*: "Roughly speaking, a man intends to do what he does"[21] (Anscombe 1953, 45). This position is mainly opposed to a conception of intention as a mental state of mind, conceptually distinct from the action itself. Rather, the intention conceived as the mental feature of the behavior *is* the action itself, described in its teleological structure. In this line of thought, intention and action are not even ontologically separable. Thus, if an intention is what confers to a behavior its mental character, then an action is an intrinsically mental behavior. In this regard, one can link intentionalism with the pragmatist conception of action. According to the latter, one can say that the mindedness is a quality expressed in the conduct of a being, in its relation with its environment. It even claims that the most basic sense

[20] Cometti (2010, 319) « *l'intention c'est l'acte* ».

[21] The whole passage is: "And against the background of the qualifications we have introduced, we can epitomize the point by saying 'Roughly speaking, a man intends to do what he does' But of course that is *very* roughly speaking. It is right to formulate it, however, as an antidote against the absurd thesis which is sometimes maintained: that a man's intended action is only described by describing his *objective*." The main idea I retain here is that the intentional character of an action lies in the whole structure of the behavior, the way it is performed and not only in the goal it aims at. Nonetheless, the crucial point of Anscombe's analysis, namely that an action is intentional only *under a description,* is left aside here.

of the word "mind" refers to ways of qualifying certain activities much more than denoting some specific entity. Dewey clearly defines the mind by referring to qualities of conduct:

> Mind is primarily a verb. It denotes all the ways in which we deal consciously and expressly with the situations in which we find ourselves. Unfortunately, an influential manner of thinking has changed modes of action into an underlying substance that performs the activities in question. It has treated mind as an independent entity *which* attends, purposes, cares, notices, and remembers. This change of ways of responding to the environment into en entity from which actions proceed is unfortunate, because it removes mind from necessary connection with the objects and events, past, present and future, of the environment with which responsive activities are inherently connected. (Dewey 1934/1980, 268)

Underlining the verbal use of "mind", Dewey defines the thought as an activity in itself. He denounces the view that reifies the mind as an entity distinguishable of the conduct, which becomes the substrate to which one attributes the activities that are indeed performed by the agent himself. This dualistic conception of the relation between mind and body in the action leads to misconceive the way an agent acts, because it disconnects the action and the whole context in which the former has a meaning. Furthermore, one can say that this prevents to think accurately how one actually understands the others' intentional actions. In fact, their meanings are inherently linked with the environment in which these actions occur; someone who observes someone else acting has to understand this activity as intrinsically linked with its context. From this third-person perspective, the intention of someone's gesture *is* his or her action itself.

More precisely, according to Dewey, the mind is not a specific activity (a verb) but denotes rather some specific manners of performing activities that can also be accomplished in a non-mental way. Thus, Dewey's conception of the mental is better qualified as an *adverbial* view, mind qualifying the ways activity are accomplished[22]. "Thought, reason, intelligence, whatever word we choose to use, is existentially an adjective (or better an adverb), not a noun. It is a disposition of activity, a quality of that conduct which foresees consequences of existing events, and which uses what is foreseen as a plan and method of administering affairs." Dewey (1925, 126). If the most sophisticated features of the mind are concerned with forecasting and planning, the fact remains that more basic conducts can still express mindedness. From this point of view, cognitive abilities are fundamentally linked to the *ways* we act, rather than to the *aboutness* of our mental states. Then, if we maintain that intentionality is the specific feature of mental, according to a common conception in contemporary philosophy of mind, we must clarify here that we refer to a *practical conception of intentionality* that Dewey allows to think. According to this view, one has to understand mental phenomena as primarily some qualities of conduct, some ways of acting and dealing with problematic situations.

In this perspective, I think we can find in pragmatism some relevant insights leading to consider that intentionalism thus conceived is an accurate way to answer to issues raised by early intentional activities of children. Indeed, it seems to support the claim that intentions have to be understood from the basic case of intentional action rather than intending to act in the future. Such a view corresponds to Anscombe's (1953), who asserts that the process of actualizing of an intention has to be understood before the intention to do something later. She postpones the analysis of the former until the last pages of her book (1953, 90-94). Yet this is explicitly what Bratman refuses, saying that "to understand what intentions are we should begin by concentrating on the future-directed case. This is the *methodological priority of future-directed intention*" (Bratman 1982, 379). But this priority is not just a mere

[22] This is the reason of the enlightening comparison made by certain specialists of early pragmatism (see for instance Steiner (2008) and Garreta (2012)) between Dewey's view and Ryle's adverbial conception of mental terms (Ryle 1949 /1955).

methodological point because it leads to view intentional actions as particular cases of prior intentions to act in a certain manner, where intentions are formed consciously throughout the action[23]. But this is not the way we usually act and in most cases; and this is not anymore how children learn to act and to understand how people act.

As a matter of fact, in order to account for children's abilities to perceive others' intentional actions as such, we would better have to focus on pervasive adult practices whereby adults teach, explicitly or not, what a given action *is*, that is *why* it is performed in *this way*. To answer the question "why" is not fundamentally to mention the end the actor consciously aims at, but rather to state an internal structure of the conduct itself. I think that an adverbial conception of the mind which makes intentionality a basically practical concept permits to conceive that one of the main features of cognitive education humans provide to their young consists in teaching how to perceive a structured action. In this perspective, studying the several cultural patterns of early relationships between infants and caregivers could provide insightful data concerning human cognition specificity[24]. These social practices consisting in settled ways of acting are doubtless crucially important for the later developments of the ability to understand intentional actions. Furthermore, this leads to the third point I want to make here concerning relevance of pragmatism for issues regarding collective intentionality and action, that is a social conception of the mind.

3.3. The importance of reasoning on essentially collective actions

Among classical pragmatists, Mead is the one who most emphasized the intrinsically social nature of the mind. Furthermore, one can understand his work as defending the idea of an intrinsic sociality of action. Thus, Nungesser argues that Meads claims that "human agency is in itself an intersubjective process, which must be explained on the basis of the individual's embeddedness in human sociality" and that this is "a systematic claim about human agency and action" (Nungesser 2016, 252). One of the most important Meadian concepts concerning issues of collective agency and intentionality is "the social act", that is an action that can only be performed by several agents doing their own parts. There is not only a differentiation between complementary roles, but also a form of interdependence in the *performance* of the action. This is what happens in the paradigmatic case of conversation of gestures developed by Mead in *Mind, Self and Society*. The later development of conversation of significant gestures involving language follows broadly the same pattern.

Without going into the details of the relations between these two kinds of communication, I would rather focus on the simple fact that, according to Mead, it is obviously necessary to study collective and cooperative activities from the perspective of intrinsically collective actions that are actions that can not be performed alone. Indeed, conversation and communication are logically and ontogenetically made with a partner. The possibility to internalize the presence of the interlocutor and to be able to have an internal conversation, that is a private thought, develops later. Firstly, it is an intrinsically *social* act. This point is important regarding the way Bratman, by contrast, conceives the analysis of cooperative or even joint activities. According to him, in order to avoid problems of circularity in the analysis, we have to study some specific actions, i.e. actions that do not already bring in the very idea of cooperation, otherwise we do not show

[23] Although Tomasello has argued that his research supports the view that young children have an understanding of prior intentions, data support a less controversial claim, that young children perhaps even infants can perceive intentions-in-action, yet conceived in a non-searlian way.

[24] Therefore the comparative study of social learning on the one hand, and cultural learning on the other hand, led by Tomasello and his colleagues, is of outstanding importance: Tomasello et al. (1993; 2016.)

how the goal to perform something *together cooperatively* can be engendered from mere individual intentions. Thus he recommends to reason from actions whose joint performance may be cooperative, but need not be. This is how he draws a distinction between "cooperatively loaded joint-act-types", e.g. solving a problem together, and "cooperatively neutral joint-act-types", e.g. going to New York together or painting the house together (Bratman 1982, 330). In the latter case, there is a clear sense in which two persons can go to New York together without their activity being cooperative. This is the reason why he writes, "our analysis of shared cooperative activities should appeal to intentions in favor of joint activities *characterized in cooperatively neutral ways*" (*ibid.*).

Yet, it seems that other accounts of collective intentionality approve more or less implicitly this priority of actions that could be performed alone or together but being not intrinsically cooperative. Gilbert's main example is two people going for a walk together and Searle's is two people making a hollandaise sauce, both examples are actions that could be performed alone or even together but not cooperatively. The choice of such actions is therefore all but insignificant and I agree with Baier who asserts: "I find an individualist bias to be discernible in all these accounts […] But why should we take the first person singular to be more self-explanatory than the first person plural?" (Baier 1997, 17-18) Baier accurately notes that accounts of collective intentionality and actions begin with analysis of individual intentions and actions and subsequently look at shared or collective intentions. Yet, and in line with Mead's view, we can rather think that interactions have to be considered first in order to understand individual actions thereafter.

Baier notes:

> Some features that [Bratman] has to take pain to specify, in order to make the activity "cooperative", depend upon the fact that this activity of house painting is only accidentally shared. […] Now if what we were doing was essentially a two-persons activity, such as singing a particular already composed duet […], then a certain degree of meshing will be built in […] The nature of the activity, not just the limits of human power, rule out doing this sort of thing on one's own. (Baier 1997, 22)

Thus Baier thinks that collective and cooperative activities have to be studied from cases of cooperatively loaded activity. It is worth noting that when Rakoczy examines the social background necessitated by cooperative early games of pretense in the paper stated above, he supports the view that these activities have to be understood as originally cooperatively loaded:

> One interesting possibility, inspired by the Vygotskian tradition and its notion of internalization and by Mead (1934), is that for a given act type it does not remain constant over developmental time whether it counts as cooperatively neutral or cooperatively loaded; specifically, that it is primarily cooperatively loaded, i.e. essentially tied to joint execution, and only in a derived way becomes cooperatively neutral. […] [I]nitially pretense is cooperatively loaded for young children, is essentially pretending together, and only later – through internalization – becomes possible as a solitary and cooperatively neutral act type. (Rakoczy 2006, 121-122)

Therefore, we would better have to study early intentional interactions between young children and caregivers and adults as essentially collective actions, whose complex intentional structure does not have to be built only from the cognitive resources of interactants but first and foremost from the action's structure itself. The intentional structure of the action does not have to be mentally scaffolded before being displayed. In this perspective, it will be crucial to study how adults teach children the way to do such things with particular attention to the cases of failed attempts i.e. when young children stop the interaction and adults reengage them, e.g. "this is not the way we build something together" or "please, help me to dress you by giving me your hand". This is how we can take seriously the fact that interaction between young children and adults is ontogenetically fundamental, considering that partners do not have the same cognitive abilities, nor the same

perspective at first. Doing so, we could understand how the child can progressively internalize more and more complex patterns of intentional actions from an initial and also progressive sharing of essentially cooperative actions. Thus, I think that Mead's conception of human agency as essentially social provides relevant insights against the implicit priority of individual agency prevailing in the main philosophical accounts of collective agency and intentionality. Furthermore, his conception of the emergence of the self from social interactions gives crucial elements concerning the problems raised by the theory of mind; this is the last point.

3.4. Sense of the self derives from sense of the others as selves

Mead is well known to have given an account of the social nature of selves, asserting that self is a product of our interactions and does not preexist to them. In a paper where he compares the different theories of mind[25] with Mead's conception of the self, McVeigh notes that since Mead conceives the selves as socially constituted, his view is "fundamentally at odds with both theories of mind" (McVeigh 2016, 221). According to Mead, there is no such thing as a "problem of others" that is the issue concerning how an individual can be ensured that other people with mental life exist as he himself does. In fact, this cartesian question only makes sense if one conceives that what is fundamentally given is a certain sense of "me" as a self, having an internal mental life immediately perceived as such. But Mead argues on the contrary that the self is not a precondition for our interactions with others, but rather a product of them, since an individual begins to conceive him or her as a self after he or she has managed to internalize the others as selves:

> For he enters his own experience as a self or individual, not directly or immediately, not by becoming a subject to himself, but only in so far as he first becomes an object to himself just as other individuals are objects to him or in his experience; and he becomes an object to himself only by taking the attitudes of other individuals toward himself within a social environment or context of experience and behavior in which both he and they are involved. (Mead 1967,138)

Here, again this conception leads the inquiry toward the actual and concrete interactions humans[26] perform in order to understand how the self emerges. As McVeigh notes, quoting Mead: "In that sense, the appropriate question to ask is not how we are logically sure others exist but how we personally come to exist as a self amongst others: "what is there in human social conduct that gives rise to a 'me,' a self which is an object?" (Mead 1925, 405) This inverts the problem of other minds and rightly focuses on the developmental issues faced by an individual self." (McVeigh 2016, 222).

This perspective leads to deny that children have to experiment their own mental states and abilities for intentional behavior before being able to recognize that others have their own and act similarly. This is Tomasello's general view, asserted in the paper we discussed above and elsewhere: "our general view is that infants begin to understand particular kinds of intentional and mental states in others only after they

[25] This concerns the debate about how the theory of mind is actually realized. Two main models are confronted: theory-theory and simulation theory. The former maintains that our understanding of others as psychological agents stems from an implicit knowledge of psychological laws and theories (several versions of this conception are developed and refined). In contrast, the simulation-theory explains our understanding of others from the ability to take their own perspective and imagine the situation from their point of view. One simulates the way someone else perceives, thinks and acts, from a first-person point of view, as putting herself in the other's shoes. For a clear presentation of theses debates and their relation with Mead's position, see McVeigh (2016, 215-221).

[26] Again, by focusing here on main accounts of collective intentionality I did not say anything about the question concerning the comparison between human and other animal species, which is yet a central concern (*per se* and in Tomasello's works). Let me just say that this idea of seriously considering actual interactions applies also to comparative studies between animal species; the importance of observation in the wild, added to experiment in laboratory, has to be noted both for human and non-human species.

have experienced them first in their own activity and then used their own experience to simulate that of others" (Tomasello et al. 2005, 688). On the contrary, for Mead, this is social process and interactions that make progressively arise the self and self-consciousness when an individual adopt the perspectives of pre-existing others toward him or her. "Since I seem to be like *them*, any new understanding of *their* functioning leads immediately to a new understanding of *my own*. I subsequently simulate other people's psychological functioning to constitute my own" (McVeigh 2016, 224). Then, what is internalized is the psychological functioning of others understood on the basis of fundamental interactions with them.

It is worth emphasizing the convergence between this Meadian line of thought and some critics already mentioned concerning main accounts of collective agency and intentionality such as Baier's. According to her, there is something like a "Cartesian brainwash" that leads us to think that we cannot conceive of not taking the first person singular to be the place to start (Baier 1997, 18). Yet we could as well

> see solo action as in a way the least simple, having to be construed as managing without our usual helpers. (We routinely do construe a child's first attempt to walk alone, dress herself, or manage her bike alone in this way)[…]. We make unnecessary philosophical problems for ourselves if in our philosophy we forget that individual action was something we all have to learn and that we learned it as a departure from common action" (Baier 1997, 22- 29).

Far from being obviously simpler, individual action can also be seen as a complication of collective actions. This is true from an ontogenetically perspective, essential for our topic here, but it may be argued that this is also true from a logical point of view, many of our individual actions necessitating the presence and participation of others. Against the apparent patency of the primacy of individual actions, Baier brings to the fore some facts linked to our mammalian nature:

> If our physical separatedness is what supports our biases in favor of methodological individualism, they could perhaps be countered by reminding ourselves of our origins, of the time when basic involuntary bodily activities such as nourishment and growth and removal of bodily waste were necessarily common, where one pair of kidneys functioned for two persons, where the two grew in size together. It is our separatedness, not our togetherness, that originally needed initiative and assistance form others. The question "how is individuality and individual action possible?" is just as good a question as the more usual one, "How is collective action possible?" (Baier 1997, 43)

I see a deep continuity between these recent lines of critics toward main accounts of collective actions and intentions as being too individualistic, and the classical pragmatist approach. Generally, it seems that we can find decisive arguments in early pragmatism leading to consider first that, intentionality is fundamentally a practical notion rather than a representative conception of the property of 'aboutness' of internal mental states. Second, that the mind or the thought is expressed by ways of acting rather than the cause of the actions, and consequently that intentional actions have to be studied from the fundamental case of non pre-planned actions. Third, that collective actions are best understood from cases of essentially collective actions rather than from cooperatively (or collectively) neutral act types. And fourth, that one can argued that there is something like an ontogenetic primacy of the sense of "we" upon the sense of "I". Last but not least, I think that one can find in pragmatism (classical and later "analytical") some strong arguments concerning the logical primacy of multi-persons actions upon individual ones, and this concerns both cooperative and non-cooperative actions, such as conflicts and hostile activities. Here are some main features of an alternative conception of collective agency and intentionality, which has to be built.

Conclusion

We wondered here how to account for Tomasello and his colleagues' empirical researches concerning early abilities of children for collective intentional actions, exposed in Tomasello et al. 2005. The point was that their data were hardly understandable from the philosophical background they have chosen as a model of collective or shared intentionality, namely Bratman's account of shared cooperative activities (Bratman 1982). The main issue concerns the cognitive sophistication required by this account, i.e. the ability of participants to have high order intentions, that is intentions concerning others 'intentions. In other words, Bratman requires that the agents have a robust theory of mind expressed in the ability for mind reading. However, there is strong evidence according to which children begin to possess these abilities around four years of age, long after they display collective intentional interactions. Furthermore, this requisite is more or less present in most of the available philosophical accounts of collective agency and intentionality.

Studies focused on a specific kind of early cooperative interactions, games of pretense, offer some elements of modification of these accounts, in particular a perceptive requisite of joint attention instead of the cognitive criteria of common knowledge. Yet I argued that this modification is coherent only if one considers intentions perceived, and collective intentions thus formed, as being not some mental and internal causes of movements. Therefore, it is the whole picture of the intentional action depicted by the causal theory of intention that has to be modified. In order to provide insights for such a modification, I brought recent criticisms of collective intentionality's debates together with a classical pragmatist conception of mind, action and sociality. Thus, I defended a practical intentionalism, according to which agency is not only fundamental for the development of human cognitive abilities, but also that collective agency is itself originally fundamental. Hence, I can now defend a terminological choice to avoid an ambiguity present in the whole paper: we should better speak of "collective intentionality" rather than of "shared intentionality", since the latter seems to refer to something that is first possessed by one and only after separated between several persons. On the contrary, we can assert that there is a sense according to which we collectively do things with others, before doing things alone and being able to share.

To conclude, I will refer to a commentary of Tomasello's book, *Origins of Human Communication* (2008) offered by H.B. Schmid. The author reveals a tension in Tomasello' conception of collective intentionality between "a mentalist or intentionalistic[27] account" and "a practice account". According to the former "whether a complex of behavior instantiates joint actions, or whether it is simply an aggregate of individual actions depends on whether it is intended *collectively*, or individually. From an empirical point of view […] since the difference is in the mental infrastructure, there is ultimately no way to decide the question on the base of the observable behavior" (Schmid 2011, 8) This is exactly how we defined mentalism. Schmid continues: "The opposing view [the practice account] holds that the relation between practice and intention runs the other way around: it is the *practice* that determines what the intentional attitude of the participants is (ibid.)". I agree with the observation of an ambivalence of Tomasello's conception between these two accounts but against Schmid, I think that the practice account – which we called practical intentionalism - is the better way to understand at least early abilities displayed by young children for collective actions. This view is supported by a broadly pragmatist conception of what intentional actions are. This is not to say that mentalist accounts such as Bratman's do not have any relevance. They fit well with certain specific kind of joint actions, which require a great cognitive sophistication in order to plan

[27] Here is the ambiguity of the term « intentionalism » that I tried to avoid in 3.1 and 3.2, a noun used by very different philosophical perspectives, namely mentalism and anti-causalism.

and share each partner's participation. Neither does it say that we expect from empirical researchers such as Tomasello to arbitrate between philosophical views. Yet, it seems that empirical data they provide are better understood from the practice-oriented account, rather than from the mentalist one. In general, this defense of a practical conception of collective intentionality leads to view these kinds of practices in which it is expressed as fundamental in regard with the understanding we shall have of human life as a whole. This is consistent with an idea developed by a colleague of Tomasello according to whom collective intentionality has to be thought of as a feature of "the human form of life" rather than of "individual" (Kern & Moll 2017, 3), being pervasive in the whole of our existence. If the authors refer this "transformative conception of collective intentionality" to the Aristotelician-Wittgensteinian tradition, I hope having shown here that this can be bound with classical pragmatism as well.

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A Pragmatist Perspective on Self-state Knowledge in the Therapy Context

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Abstract: Knowledge of our self-states seems to be characterized by two features: first-person authority – first-person statements about internal experience by someone can be used as grounds for making third-person claims about his/her self-state – and non-inferentiality – we are not supposed to give reasons for justifying how we know that we are feeling e.g. sad, angry, happy. These features have been often accounted for by hypotesizing the existence of a faculty called introspection. In this paper we aim to develop an alternative approach that overcomes introspectionism and at the same time accounts for the two features of self-state knowledge outlined above. After a critical discussion of the introspectionist standpoint, we discuss the anti-introspectionist approaches of Peirce and Mead. In the attempt to corroborate Peirce's and Mead's views with empirical observations, we examine self-state knowledge in the specific setting of psychoterapy. We will propose that - in the context of psychotherapy - a third feature of self-knowledge should be considered, which we wish to term incompleteness. Incompleteness entails that the expression of self-states calls into question the active contribution of the interlocutor, who in turn helps the subject making meaning of the client's internal state. In the conclusion, we will discuss how the nature of first person authority and non-inferentiality should be reassessed when we consider the feature of incompleteness.

When we think about how we come to know our present, 'internal' self-states – our moment to moment emerging needs, intentions, emotions, and so on – we may realize that this knowledge differs markedly from our knowledge of the external world. Knowledge of our self-states is characterized by two apparently special features. First, it demonstrates what philosophers often call "first-person authority". Although the idea of first-person authority can be understood in several ways (according to Rowlands, 2003, for instance, it can at be alternately interpreted as infallibility, incorrigibility, or self-intimacy), it generally means that first-person statements about internal experience can be used as grounds for making third-person claims about someone else. In other words, it is commonly believed that - unless one thinks that I am lying or severely deluded - my claim that I am e.g., in pain must be accepted as a reason to believe that I am (Wright 2000). Secondly, our claims about our own self-states are typically *non-inferential*. The demand that we produce reasons for saying that we are e.g., feeling angry or lonely ("how can you tell that you are feeling angry/lonely?") generally reveals a deep misunderstanding of fundamental socio-linguistic and interpersonal norms.

Philosophers have attempted to solve the so-called self-knowledge problem – that is, how can self-knowledge be at the same time authoritative and non-inferential (see Gertler 2015 for a review). This is no minor task. In fact, in most domains in which we regard a statement as epistemically authoritative, it is because we believe that the utterer has sufficient grounds to state it. To explain first-person authority and non-inferentiality in the context of self-knowledge, many philosophical theories have then hypothesized a faculty – i.e. *introspection* - that would give subjects privileged and non-inferential access to their self-states. Theories endorsing some version of introspectionism have occupied a central position in both modern and contemporary philosophy – from Descartes, to Locke, up until Russell. Even today, the introspectionist view remains essential to most paradigms of research in cognitive, clinical, and developmental psychology.

In accordance with pragmatist thinkers such as C.S. Peirce and G.H. Mead, we regard introspectionism as highly problematic. In this paper we attempt to make a case for alternative approaches that overcome introspectionism and at the same time account for the two features of self-state knowledge outlined above. After having illustrated a simplified version of the introspectionist standpoint and of the main objections against it, we discuss the anti-introspectionist approaches of Peirce and Mead. Next, in the attempt to corroborate Peirce's and Mead's views with empirical observations, we examine a context in which self-knowledge is routinely produced, discussed, and elaborated upon: the office of the psychotherapist.

We will then propose that - in the context of psychotherapy - a third feature of self-knowledge should be considered, which we wish to term *incompleteness.* When we observe how therapists and clients discuss the client's self-states, we realize that the expression of self-states by the client almost necessarily elicits an attuned response from the therapist. In response to the clients' disclosures, the therapist offers recast, redefinition, and elaboration. In other words, the expression of self-states calls into question the active contribution of the interlocutor, who in turn helps the subject making meaning of the client's internal state. Without such therapist contribution, the client's disclosures are truncated and fail to achieve their full communicative function. In the conclusion, we will discuss how first person authority and non-inferentiality can be seen in a different light when we add to them the feature of incompleteness.

Our hypotheses in this paper do not address self-knowledge in general, but a specific subdomain of self-knowledge that we term "self-state knowledge." Thus, before we proceed further, some distinctions are in order. To begin with, we must observe that first person authority and non-inferentiality are only features of the type of self-knowledge that Crispin Wright has called "phenomenal self-knowledge" (e.g., *I have a headache*, *I feel irritated*, *my vision is blurred*), and not of self-knowledge overall. In fact, the term self-knowledge is also used to describe knowledge about one's beliefs, attitudes, and character traits, which are at least in part known through a process of self-interpretation (Wright 2000). In addition, in this paper we want to focus on phenomenal *self-state* knowledge (or, more simply, self-state knowledge), because it is self-states what therapists and clients focus upon in psychotherapy. Self-state knowledge refers to claims made about the self as a whole, and it can be considered as a subdomain of phenomenal knowledge. As we will attempt to show, the reciprocal meaning-making process that highlights in our view the incompleteness of self-states is quite peculiar to this type of self-knowledge, while it is much less evident in the communication of e.g., sensations. Given that phenomenal knowledge and self-state knowledge are seldom distinguished - if at all – in the philosophical literature about self-knowledge, in the following we will use the term "self-state knowledge" in an effort to maximize clarity and streamline our presentation.

1. A common sense account of self-knowledge and its conceptual problems: the Introspectionist Theory of Self-state knowledge

Perhaps the most well-known theory that attempts to explain why self-state knowledge is at the same time authoritative and non-inferential is a theory that we will call in the remainder of this paper 'Introspectionist Theory of Self-state knowledge'. This theory is attractive and almost commonsensical. The general attitude that this theory articulates towards understanding others and ourselves seems so evident that most of us take it for granted by the time we are seven or eight years old (Botterill and Carruthers 1999). The idea behind the theory is that we - as humans - possess a faculty called introspection, which almost always help us arrive at a correct and direct 'perception' of what we are 'feeling inside'.

Different versions of the Introspectionist Theory of Self-state knowledge (from now on: ITSK) have been independently advanced by philosophers as different as Descartes (1641/1984), Locke (1689/1975), and Russell (1917). On this view, thanks to the faculty of introspection, we have an immediate and privileged access to the contents of our own minds. At the same time, according to this same view, it is impossible to know directly the thoughts and feelings of anyone other than ourselves. Minds are isolated. We are, as it turns out, imprisoned within the sphere of our own subjectivity (Colapietro 1989, 100-1)[1].

[1] In his seminal work *Peirce's Approach to the Self (1989)* Colapietro labels this standpoint as "subjectivism". His definition of subjectivism is fully consistent with the here proposed definition of introspectivism.

The ITSK is a natural and appealing view, and it may appear to many as obviously correct. Yet, when examined, it runs into serious objections. Namely, as James (1884) maintained, self-knowledge requires more than just an individual "looking" at her own self-state; one has to properly conceptualize and label the self-state that she is experiencing. The most difficult hurdle for the ITSK is to explain how this conceptualization occurs. In particular, the difficulty is to explain how awareness of a self-state can be direct and immediate, and at the same time solid from an epistemic point of view. We are left with the issue of determining how introspection ensures that the representation of the self-state matches the self-state itself.

Further, the ITSK can hardly be transformed into a parsimonious scientific theory. In order the explain authority and groundlessness, this theory hypothesizes an invisible and indeed difficult to pin down faculty that warrants direct access to subjective intentional and emotional self-states; it also hypothesizes that such capacity to access intentional and emotional self-states develops equally in all humans, regardless of any difference that occurs during development (Shoemaker 1994).

It is therefore somewhat surprising that we find the ITSK at the roots of most current psychological theories of subjectivity. This is especially the case of theories that study the emergence of self-experiences in the context of early social development (a field of study commonly referred to as "infant research", Beebe and Lachmann 1998). Based on the micro-analytic observation of early mother-infant interaction, a striking majority of the authors in this field rightly emphasize intersubjectivity as primary in development (Beebe and Lachmann 2002). In order to explain the emergence of intersubjectivity, most infant researchers also assume that infants are provided with an originary drive to share their internal states with other human beings, chiefly with their caregivers (*primary intersubjectivity,* Akhtar and Tomasello 1998). Finally – and this is the crucial point - these authors agree that primary intersubjectivity must be based on an innate capacity to attribute mental states to oneself (see e.g., Trevarthen and Aitken 2001).

For instance, Meltzoff and his colleagues (Meltzoff & Gopnik 1993; Meltzoff & Moore 1977; Meltzoff & Moore 1998) propose a specific innate mechanism that underlies intersubjective attributions of intentional and feeling states during early imitative interaction. In their "active intermodal mapping model", the affective intentional behavioral acts of the other are mapped onto a supramodal body scheme, that allows the infant to recognize the other person as "just like me". Similarly, Stern (1985) claims that mental states are accessible to introspection basically from the start, and that self-knowledge arises independently from interaction with others. As a last example, Tronick, & Gianino (1987) maintain that, from the beginning, there must be a set of differentiated mental states that are immediately known by the infant and can therefore be expressed by the infant and regulated by the caregiver.

Even some of the fiercest critics of the primary intersubjectivity hypothesis, such as for example Peter Fonagy, Gyorgy Gergely, and Philippe Rochat, tend to endorse the view that an infant has an immediate knowledge of their own self-state, however implicit and embryonal. For example, Fonagy and Gergely disagree that "from the beginning of life the infant is aware of a relatively rich set of differentiated mental states of the self" (Fonagy, Gergely, Target 2007, 292). Yet these authors assume that, during parent-infant regulatory interactions, the infant is exposed to an explicit, analyzable form of what the infant feels 'privately' at an implicit level (Rochat, 1995, 2009). Thus, these authors theoretical position does not entail the thesis according to which the child initially lacks any awareness of her internal states. Rather, the infant may lack the capacity to label the self-states, not to be aware of them altogether. According to these authors, infants may have a certain awareness of the stimuli belonging to "the groups of internal state cues that are indicative of categorical emotions" (Gergely 2007, 111), even if only as a part of a Jamesian "blooming, buzzing confusion" of internal states (James 1890, 442**)**

As discussed above, claiming a central role for introspection in self-state knowledge seems to bring up thorny philosophical issues. These issues are not less pressing for psychology and other social sciences than they are for philosophy of mind. However, dismissing the introspective dimension altogether may incur in the danger of accounting for our subjective life only very incompletely. In the remainder of this paper, we will discuss how two classical pragmatist authors such as Charles Sanders Peirce and George Herbert Mead – by means of a certain kind of externalism - provide a viable way out from this dilemma.

2a. Charles Sanders Peirce on self-state knowledge

Peirce's rejection of introspectionism is central in the continuing development of his philosophy. Beginning with his early anti-Cartesian essays of the 1868-1869, Peirce always rejected the idea that individuals possess a special faculty through which they arrive at a privileged knowledge of their internal experience. Instead, Peirce proposes that we come to know our internal experience by means of a semiotic and social process. Like any other kind of thinking, self-knowledge is made up of signs. The ubiquity of signs entails that our knowledge of internal states is achieved through a semiotic process, whose outcomes are in principle fallible.

In *Questions Concerning Certain Faculties Claimed for Man* (1868), Peirce distinguishes two ways in which we can arrive at a privileged knowledge of our self-states. In Peirce's view, we could hypothesize that we obtain privileged knowledge of our self-states by acquiring "inferential knowledge of the internal world not derived from external observation" (CP 5.244). Alternately, we may obtain privileged knowledge about our self-states by means of a form of non-inferential knowledge, or 'intuitive self-consciousness'[2]. Peirce believes that both options lead to conceptual problems.

Peirce denies that there may be non-inferential knowledge of any sort that is based on 'internal' facts. This knowledge is what Peirce views as proper 'introspection': "by introspection, I mean a direct perception of the internal world, but not necessarily a perception of it *as* internal" (CP 5.244). Peirce offers the example of emotions. Emotions arise apparently as something that 'refers' to the mind, and they seem to offer a comprehensive knowledge of mental processes that do not require any reference to the external world. One could think that, if an individual 'looks through' his or her anger, he or she must inquiry into a mental property, without any interest in what is going on in the external world and in the minds of the others.

However, such purely internal self-reference is only apparent. Any emotion relies on a predicate about an external object. When we are angry, for instance, we make (at least implicitly) a claim that the external world is not meeting our needs. Anger, or any other emotion, would not be possible without reference to external objects. Peirce writes: "any emotion is a predication concerning some object, and the chief difference between this and an objective intellectual judgment is that while the latter is relative to human nature or to mind in general, the former is relative to the particular circumstances and disposition of a particular man at a particular time" (CP 5.247).

Peirce also considers whether there may exist a faculty that is responsible for self-knowledge and is conceived as an 'intuitive consciousness of oneself.' Peirce defines intuition as "a cognition not determined by a previous cognition of the same object, and therefore so determined by something out of the consciousness", which is something analogous to a "premise not itself a conclusion" (CP 5.213). Intuitive immediate knowledge is then understood as the opposite of inferential and "discursive cognition", as already pointed out by the medieval philosopher Scotus, and in accordance with Kant's definition of the term. Knowing by intuition requires an immediate and direct relation between the subject and her object of

[2] In order to make our exposition as clear as possible, we reverse here the order in which Peirce discusses these two forms of self-state knowledge.

knowledge, without the mediation of previous cognitions and signs. Intuitive self-consciousness is thus an immediate and non-discursive knowledge of our personal selves.

The conceptual possibility of intuitive self-consciousness is first challenged by Peirce by referring to the observation of children. According to Peirce, "there is no known self-consciousness to be accounted for in extremely young children" (CP 5.227).[3] Consequently, self-consciousness must be the outcome of a developmental process. According to Peirce, a crucial role in this process is played by the "testimony" of the others. As soon as the child begins to produce vocal sounds, he or she starts learning how important are the opinions and the responses of the others (CP 5.233).

Later in his paper, Peirce advances an indirect, but possibly stronger, criticism against the possibility of intuitive self-consciousness. If we focus on external facts, Peirce argues, we notice that "the only cases of thought which we can find are thought in signs" (CP 5.251). In theory, things may be different as far as 'internal' facts are concerned; however, as we discussed above, in Peirce's view any knowledge of the internal world is mediated by knowledge of external facts. There is no thought and no knowledge without signs, and thus there can be no intuitive self-consciousness.

> From the proposition that every thought is a sign, it follows that every thought must address itself to some other, must determine some other, since that is the essence of a sign. This, after all, is but another form of the familiar axiom, that in intuition, i.e., in the immediate present, there is no thought, or, that all which is reflected upon has past. *Hinc loquor inde est.* That, since any thought, there must have been a thought, has its analogue in the fact that, since any past time, there must have been an infinite series of times. To say, therefore, that thought cannot happen in an instant, but requires a time, is but another way of saying that every thought must be interpreted in another, or that all thought is in signs. (CP 5.253)

In his later works, Peirce strongly refuses again to view any sort of introspection or intuitive self-consciousness as a special type of knowledge. Since knowledge is always expressed in signs, self-state knowledge must be mediated at a social level. Nothing akin to pure interiority can exist - an individual cannot 'direct its gaze towards her internal states'. Interiority is always made up of signs, communication, and sociality. Communication is the process through which the allegedly private self-states become the object of common attention and consideration. According to Peirce, the self is not a thing, or a property of an individual entity. Rather, the self is a sign, constantly reshaped by ongoing semiotic processes (Colapietro1989, 104). To "share our internal feelings" is thus not simply a metaphor. When one shares his disappointment with a sympathetic friend, the allegedly pure and isolated individualities merge together into a common field:

> But are we shut up in a box of flesh and blood? When I communicate my thought and my sentiments to a friend with whom I am in full sympathy, so that my feelings pass into him and I am conscious of what he feels, do not I live in his brain as well as in my own – most literally? True, my animal life is not there; but my soul, my feeling, thought, attention are. If this be not so, a man is not a word, it is true, but is something much poorer. There is a miserable material(istic) and barbarian notion according to which a man cannot be in two places at once; as though he were a *thing!* (CP 7.591).

It is important to highlight that such emphasis on the social dimensions of self-states does not lead Peirce to downplay the significance of internal experience altogether, or to endorse a sort of behaviorism *ante litteram*. Despite what Peirce's writings may sometimes seem to convey[4], some of the most prominent scholars

[3] Peirce does not ground this statements on actual empirical data, unavailable at his time. He briefly refers to Kant's remark about the late use of the word "I" by children as something suggesting the existence of "an imperfect self-consciousness in them" (CP 5.227).

[4] See for example when Peirce writes: "I have long ago come to be guided by this maxim: that as long as it is practically certain that we cannot directly, nor with

of Peirce's anti-psychologism (Calcaterra 2006, Colapietro 2003) have shown that Peirce never dismisses internal experience as an epiphenomenon of external processes. Rather, he acknowledges that the inner aspect of sensations and emotions refers to the "constitution of the mind" (CP 5.291). At the same time, every time that I say: "I am sad", or "I am angry", the expressions of my self-states become "interconnected with the social cognitive and value-related criteria shaping the "external" frame of individual life" (Calcaterra 2006, 38).

Every thought is a sign, and nothing can be known by means of intuition. We should not view our 'cognitive' relation to ourselves as immediate or transparent. Our self-knowledge is always mediated by signs, and thus inherently subject to error and ignorance. Self-knowledge is no exception to Peirce's fallibilism. It is only because we incur in countless misunderstandings in our daily interaction with others and with the external world that we come to single out self-consciousness. The experience of error pushes us to infer the existence of the self as the subject of such error and ignorance.

2b. Mead and self-state knowledge

George Herbert Mead's approach to self-knowledge is fully consistent with Peirce's rejection of introspectionism. Like Peirce, Mead refuses to admit introspective knowledge as a privileged method to attain self-of knowledge. Rather, he maintains that self-knowledge is achieved through a social and communicative process. Self-states are expressed and acknowledged through an inner conversation, grounded on the internalization of the communicative interactions with the others.

Mead's theory of self-state knowledge must be understood into the general framework of his methodological externalism. Mead turns introspectionism upside-down. The object of study of psychology is not subjective experience in its alleged immediacy. Rather, Mead proposes to inquire into the social conditions that make the existence of subjective experience possible:

> The point of approach which I wish to suggest is that of dealing with experience from the standpoint of society, at least from the standpoint of communication as essential to the social order. Social psychology, on this view, presupposes an approach to experience from the standpoint of the individual, but undertakes to determine in particular that which belongs to this experience because the individual himself belongs to a social structure, a social order (Mead 1934, 1)

According to Mead, the focus of psychology is conduct, rather than introspection. Apparently, such premises seem to lead Mead to endorse a behaviorist standpoint, according to which there exists nothing but external behavior, and there are no *strictu sensu* subjective experiences. However, such view of Mead's approach to psychology as akin to behaviorism has been strongly criticized during the last decades, chiefly by Hans Joas in his fundamental 1985 monography. Despite Mead himself sometimes employs the phrasing label " behaviorism" when referring to his own theory, the differences between his approach and Watson's behaviorism are tremendous.[5] These differences do not lean only on the "social" character of Mead's alleged behaviorism. Rather, they are grounded on Mead's staunch refusal of eliminativism. Mead does not deny that talking about subjective experience is meaningful. He does believe, however, that subjective experience is a

much accuracy even indirectly, observe what passes in the consciousness of any other person, while it is far from certain that we can do so (and accurately record what [we] can even links at best but very glibberly) even in the case of what should through our own mind, it is much safer to define all mental characters as far as possible in terms of their outward manifestations" (EP2, 465). Some further quotes, collected by de Waal (2013), seem to support an eliminativist interpretation of Peirce's approach to the self. However, equally convincing arguments and evidences whixh point to the opposite direction can be found in Colapietro (1989).

[5] On Mead's behaviorism, see Joas (1985), Cook (1993), Baldwin (1981).

phase of a wider process. He thinks that there is a subjective side of experience that is provided with his specific qualities, one of which is accessibility:

> There are certain very genuine experiences which belong to physical objects and yet which are accessible only to the individual himself, notably, a toothache. There is an aching tooth, no question about it; and yet, thought others can see the tooth and the dentist can tap it, it aches only in whose head it is located, and much as he would like to he cannot transfer that ache to somebody else. (Mead 1936, 399).

Subjective experiences involve a sort of privileged access of the individual to her subjective experiences. Such a privilege does not entail neither a flawless epistemological relation between the subject and her experiences, nor an ontological distinction between world and consciousness. My experience of pain is the subjective side of an experience which is involving something which exists in a public way – e.g. my tooth. For instance, "feeling home" involves the subjective feeling of living in a material house made up of bricks. A landscape involves some sensations, to which I may have a sort of privileged access. But these feelings can be shared, as long as my communicative skills allow for such expression. To sum up, Mead believes that the subjective side of experience is a phase of a broader social act, involving a concrete relation with ourselves, with the world, and with the external environment. Rather than refusing to warrant epistemological legitimacy to subjective experience, Mead's pragmatic intersubjectivity (Joas 1985) focuses on the social and communicative conditions of the emergence of such an experience.

While Mead conceives subjective experience as the subjective side of a wider social act, he does not believe that such experiences represent a sufficient condition for the development of the self - Mead believes that subjective experiences should not be seen as identical to self-states.[6] In *Mind, Self, and Society* (1934) he articulates this point by distinguishing between subjective experiences and reflexive experiences. Subjective experiences such as bodily feelings are the object of privileged access by the individual, which so to speak delimits the field of subjective experience. Subjective experiences do not coincide, however, with reflexive experiences:

> Our bodies are parts of our environment; and it is possible for the individual to experience and be conscious of his body, and of bodily sensations, without being conscious or aware of himself— without, in other words, taking the attitude of the other toward himself. (...) Until the rise of his self-consciousness in the process of social experience, the individual experiences his body—its feelings and sensations—merely as an immediate part of his environment, not as his own, not in terms of self-consciousness. The self and self-consciousness have first to arise, and then these experiences can be identified peculiarly with the self, or appropriated by the self; to enter, so to speak, into this heritage of experience, the self has first to develop within the *social process in which this heritage is involved.*(Mead 1934, 171)

The perception of subjective experiences as self-experiences is not automatic. Self-experiences presuppose the capacity of the self of perceiving itself as an object, and therefore of engaging a reflective relationship with itself: "Neither a colic nor a stubbed toe can give birth to reflection, nor do pleasures or pains, emotions or moods, constitute inner psychical contents, inevitably referred to a self, thus forming an inner world within which autochthonous thought can spring up" (Mead 1934, 357). Subjective experience becomes reflexive only if there is a self. But what condition should we presuppose in order to account for the existence of the self?

According to Mead, the condition of existence of subjective self-conscious experiences must be traced back to a specific trait of human conduct. Humans are able to prompt in themselves the same response that they prompt in other individuals. By means of this process, which Mead calls "taking the attitude of the other", individuals anticipate in their own experience the possible responses of the other. Taking the attitude of

[6] For a detailed discussion of this distinction see Baggio (2015).

the other means internalizing the responses of the others to own our gesture. Thanks to this internalization, the individual can talk to herself in the same way as she talks to the other. Such an internal conversation constitutes what Mead calls the self, that is, self-consciousness. I am a self, as long as I can reflect upon myself through an inner conversation. Such an inner conversation is neither an innate pre-wired capacity, nor a transparent intuition of myself. Rather, it is the outcome of the active internalization of the conversations of gestures that I had with the others. Differently from other kinds of subjective experiences, self-conscious subjective experiences presuppose the existence of a very specific kind of social process:

> the existence of private or "subjective" contents of experience does not alter the fact that self-consciousness involves the individual's becoming an object to himself by taking the attitudes of other individuals toward himself within an organized setting of social relationships, and that unless the individual had thus become an object to himself he would not be self-conscious or have a self at all. Apart from his social interactions with other individuals, he would not relate the private or "subjective" contents of his experience to himself, and he could not become aware of himself as such, that is, as an individual, a person, merely by means or in terms of these contents of his experience; for in order to become aware of himself as such he must, to repeat, become an object to himself, or enter his own experience as an object, and only by social means—only by taking the attitudes of others toward himself—is he able to become an object to himself. (Mead 1934, 226)[7]

The social condition of the development of the kind of specific self-experiences should then be identified with social communication. Our specific and peculiar experience of ourselves is continuously shaped by our communicative intersubjective interactions with others. Therefore, the natural social conditions should not be understood in a static way. Mead does not see the self as the warehouse of past internalized communicative interactions. He rather believes that, to a certain extent, such transformative process is ongoing and never complete once and for all: "The important character of social organization of conduct or behavior through instincts is not that one form in a social group does what others do, but that the conduct of one form is a stimulus to another to a certain act, and that this act again becomes a stimulus at first to a certain reaction, and so on in ceaseless interaction" (Mead 1909, 101).

Mead clearly acknowledges both the communicative conditions and the communicative nature of subjective experience. It is not just that social communication allows for the emergence of the peculiar subjective experiences that take place within the self. Rather, internal reflexive experiences are inherently communicative as they are "made of" inner speech. Reflexive experiences are thus social experiences, and yet they may become "at any moment personal" (Mead 1913, 146).

To sum up, Peirce's and Mead's criticism of introspectionism is grounded on the key role of communication. By postulating the primacy of communicative and semiotic processes, they both overcome the paradoxes involved in an approach to self-knowledge based on introspection as a special faculty. The legitimacy and peculiarity of subjective experience does not entail a solipsistic closure of the individual. The capacity of sharing self-states is fully accountable, as long as communicative processes are conceived as permeating our relation with ourselves.

[7] According to Madzia (2015) Mead's argument presupposes the existence of an originary form of self-awareness. This criticism is consistently based on the ambiguity of Mead's concept of "self-stimulation". The discussion of this important interpretative issue falls beyond the scope of this paper. For a wider criticism of the semiotic approaches to the self, see also Madzia (2015a).

3. Peirce's and Mead's anti-introspectionism at the test of observation: the case of self-state communication in psychotherapy

Many philosophical analyses of self-state knowledge, from Descartes to Searle (1983) have been intensively focused on the analysis of single utterances and how they enable self-expression. In the following paragraphs, we will attempt to gain a different vantage point by reinstating the expression of self-states in their natural context: the dialogue. In particular, we propose to analyze self-expression in the context of psychotherapy, a revealing communicative context in relation to our object of study. Self-states are expressed and attuned to in many everyday situations; yet in psychotherapy, regardless of the therapeutic modality, clients and therapists focus upon them more intensely and deliberately. We thus believe that a close examination of conversation in psychotherapy can illuminate aspects of ordinary language that may otherwise rest hidden or only incompletely understood. As we hope to convince the reader, our analysis of self-state communication in the context of psychotherapy will show that the ITSK is to be regarded as unsatisfactory, and that we should endorse the pragmatist views that self-knowledge is to be understood in the communicative and pragmatic dimension of interaction.

The following excerpt is taken from a session with a client named Laura, 28 years old, in treatment for longstanding anxiety and to address ongoing relational problems. The excerpt comes from the beginning of the eight session of treatment, and it starts in a fairly typical way:

(1) **Therapist**: Hello. How are you doing today?
(2) **Laura**: I'm…I don't know whether to laugh or cry. I'm…I had a crazy fight with my brother yesterday. *I'm actually quite upset*.

The ITSK seems to account fairly well for the previous excerpt. Laura is asked about her present self-state ("how are you today?"); she is the 'subject of the experience', and therefore she is the 'most informed person to ask'. In keeping with the ITSK, Laura provides with her statement an *authoritative* and *non-inferential* account of her present self-state. In fact, consider the following utterances as possible replies to Laura's self-state expression:

(a) It's not true that you are upset.
(b) How can you tell that you are upset?

These sentences would constitute severe violations of conversational expectations. By saying (a), the therapist violates the assumption of authority, while by saying (b) the therapist violates the assumption of non-inferentiality.

Well and good. There are, however, other statements that in this context would violate fundamental linguistic expectations without violating the assumptions of authority and non-inferentiality. Consider if, for example, the therapist offered one of the following utterances in response to Laura saying "I'm quite upset":

(c) OK, but I don't care.
(d) Yes you are upset.
(e) Oh dear, what happened?
(f) I can hear it from the sound of your voice. Perhaps you are frustrated too?

The reader will easily admit, it seems to us, that (c) and (d) constitute violations of some fundamental conversational rule, while we will regard (e) and (f) as both correct. Why? Neither (c) nor (d) challenges the truth of the client's claim, nor the grounds on which the client's discloses that she feels upset. Something else is missing. It seems to us that, contrarily from (e) and (f), (c) and (d) do not make any attempt to advance the process by which the client's self-state is known. The statement (c) betrays a disinterest in the meaning-making process; the statement (d) simply fails to add any content to the client's self-expression.

We are thus encouraged to postulate a third characteristic of self-state knowledge, in addition to authority and non-inferentiality: *incompleteness*. As in the example above, the expression of self-states calls for the

active contribution of the other speaker. Self-state expression should thus be regarded, in and of itself, as inevitably partial. From the analysis of psychotherapy transcripts (Talia, Miller-Bottome, & Daniel 2015) it appears that there are two ways in which an interlocutor can add content to the expressions of a subject's self-state. First, an interlocutor can make a guess about the client's present self-state, either in the form of a conjecture, or in the form of a closed question. For example – as in (f) - the therapist hypothesizes Laura's self-state (i.e. frustration) *before* she even does so. Alternately, the therapist may empathically validate the expression of the client's self-state. Empathic validation consists in the expression of agreement with the subject's definition of her present self-state by validating the reasons why such self-state is experienced at this time. For example, the therapist may affirm the client's emotional reaction by agreeing on the client's assessment of the situation that caused it; or the therapist may support the client's agency by saying that having to take another course of action 'would not be fair'.

In this sense, the contribution of the other is not merely a contingent response that occurs after the expression of self-states. It is, in psychotherapy, the necessary condition for the communication of self-states to be meaningful in first place. The client and the therapist contribute to determining the client's present self-states, until some kind of reciprocal agreement is achieved, at least temporarily. Completeness is always relative to a given communication process involving some speakers in relation to a specific object – i.e. the self-states of one of them. This contingently completed process is a potential source of new semiotic outcomes within a wider and, as Peirce claims, infinite semiosis.[8]

[8] For an original Peircean understanding of the distinction between complete and incomplete, see Maddalena (2015). Following Maddalena's definition of complete and incomplete gestures, one could say that the constitutive incompleteness of the individual expression of self-states opens the path to a "complete" cooperative sharing of our self-states with the others. This only apparently paradoxical point has been fully developed in Santarelli (2017).

Conclusion

The working hypothesis sketched here agrees with the pragmatist twofold stance about self-state knowledge: asserting the primacy of communicative social processes, while conceiving self-states as more than just epiphenomena. We tried to develop such stance by focusing on the actual communication of self-states, and we outlined three characters of such communication: authority, non-inferentiality, and incompleteness. The subtle dialectic between the legitimacy of subjective reflexive experience and the crucial role played by social communication is a fruitful heritage of pragmatist thought, and especially of Peirce's and Mead's theories. As both Peirce and Mead foresaw, social communicative processes are not simply external conditions of self-reflexive experience. Rather, they play a constitutive role in shaping the content and the nature of self-states in themselves.

This dialectic is at work in the three features of self-state communication that we have presented in this paper. Authority and non-inferentiality rest on the privileged epistemological relation of individuals with their internal world. Such epistemological privilege, however, should not be read within an introspectionist framework. In fact, authority and non-inferentiality coexist in our view with a third character, which we proposed to term "incompleteness". Incompleteness refers to the observation that the client and the therapist are both actively cooperating in a communicative process which aims to specify and determine the nature of the client's self-states. This process is reciprocal: on one side the client expresses her self-states without the need for grounding them on justification; on the other side the therapist contributes to making meaning of the client's self-state by agreeing, proposing additional or even alternative perspectives ("Are you sad? You actually look nervous...", etc.). The therapist does not merely recognize, imitate, and mirror the self-expressions of the client. Both client and therapist actively cooperate in determining the content of the client's self-states.

It is interesting to notice that, as we realize that self-state expression is inherently incomplete, we are increasingly led to interrogate the degree in which self-state expression can be authoritative or 'groundless' in first place. If self-state expression has always to be completed by a listener, at least in the context of psychotherapy, it is easy to see that we should rethink the concept of first-person authority in a more fallibilist direction. There is a sense in which only a subject of an experience may have the "first" and the "last" word on his experience. Yet, the capacity of the subject to speak about his experience in first place is enabled by a collaborative and interested interlocutor.

At present, it is not clear whether our considerations on self-state communication can be generalized outside psychotherapy. We routinely express our self-states with our significant others; and we attune to their self-states too. Yet, it may be that the character of incompleteness that we have pointed out in self-state communication is specific to psychotherapy. Psychotherapy creates a very special relationship between patient and therapist, one in which many conversational norms are temporarily suspended or subverted. It could also be argued that clients go to therapy precisely because they have trouble in expressing and symbolizing their internal states, and thus their avowals and expressions are "more" incomplete.

A viable reply to this criticism is based on an observation that will be familiar to most clinicians. The patient's openness towards the therapist's attunement that typifies self-state communication in therapy is more evident in well-functioning patients than in the more impaired ones. It is the patient with a higher level of functioning the one who invites feedback, or who expresses her experience in a way that feedback and mirroring are possible in first place. Such character of incompleteness is, on the contrary, virtually absent in the communication of patients with severe personality disorders or psychosis. These patients are often impermeable to the attempts of the clinician to redefine their experience, and they stick to rigid and almost petrified views of who they are (see e.g., Fonagy, Gergely, Jurist, Target, 2002). These considerations seem to suggest that incompleteness is a feature of functional rather than dysfunctional communication; or at least, if incompleteness turned out to be a special feature of self-state communication in therapy, that would not likely be a consequence of the level of patient's impairment. Further work is needed to ground our observations into a broader context and to establish how general or logically primitive incompleteness is in self-state communication.[9]

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[9] The paper is the outcome of a cooperative work between the two authors. Section I and III could be more strictly attributed to AT; part II to MS.

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Enacting the Moral Self – Combining Enactivist Cognitive Science with Mead's Pragmatism

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Abstract: This paper suggests teaming up enactivist cognitive science with George Herbert Mead's pragmatist conception of social self-constitution, in order to develop a new account of moral agency. Such a new account is necessary because our everyday conception of being autonomous individuals, or moral selves, is seriously challenged by a wealth of empirical findings from the cognitive and social sciences. But while those findings challenge the idea that there is a real, pre-social autonomous self who is the subject of human actions, the findings leave conceptual space for a Meadian social enactivist account of the self as an object, that is, as an objectified self-*conception*, developed by human animals in the course of embodied social interactions. This objectified self-conception can then, it is argued, feed back into our embodied social interactions, so that we humans actually play our selves – play our roles as pre-social autonomous individuals.

1. Introduction

I am an autonomous individual: I can think for myself, can see that some of the social norms we currently have are morally wrong, can make free and independent decisions which authentically reflect my true inner values, and am responsible for the actions of my earlier and future selves. Many people, philosophers or otherwise, would assuredly claim that the same statement holds true of them as well. Some might even regard the statement as a simple truism. However, this apparent truism seems to fly in the face of many views in recent cognitive and social sciences – and in particular, it seems to fly in the face of George Herbert Mead's pragmatist account of the social constitution of the self, and it seems to fly in the face of the recently very popular enactivist cognitive science. For, the apparent truism presupposes that we humans are autonomous moral agents who can criticize the social order from outside, in virtue of detached moral reasoning. However, according to Mead, we humans only become persons with selves by being constantly interwoven into social interactions – then, humans are not external judges of social norms, but rather products of the social order. In Mead's words, we should "assume a social process or social order as the logical and biological precondition of the appearance of the selves of the individual organisms involved in that process or belonging to that order" (Mead 1934, 222). Enactivism suggests that at least "the vast sea of what humans do and experience is best understood by appealing to dynamically unfolding, situated embodied interactions and engagements with worldly offerings" (Hutto & Myin 2013, ix) – thereby, it seems, denying the existence of disembodied autonomous agents who act in virtue of considering thoughts with moral content. Thus, at least at first glance it seems that a simple truism about moral selfhood gives rise to a complicated problem for Meadian pragmatism and enactivist cognitive science.

In this paper, however, I will argue that it is actually the other way around: The apparent truism that we human beings are pre-social autonomous individuals, or moral selves, is actually brought into severe danger by a wealth of recent empirical findings from both the cognitive and the social sciences. But if the idea that we are autonomous individuals were just an illusion, the consequences would be disastrous: For what would happen to the criticism of social norms, authentic actions, rights and duties, and responsibility for past and future actions? I will suggest that there is a way to avoid this disastrous situation: enactivist cognitive science and Mead's pragmatist account of social self-constitution can be teamed up in order to construe a new account of moral selfhood.

According to this suggestion, human agency, as a biological and psychological phenomenon, really consists in "dynamically unfolding, situated embodied interactions and engagements with worldly offerings" (Hutto & Myin 2013, ix), without there being an autonomous self who is the subject of the action. But in virtue of being constantly engaged in social interactions, human animals develop a self-*conception*, a conception of their selves as objects – as things which can weight and measured, looked at and thought about. And part of

this objectified self-conception is that humans are autonomous individuals. This detached self-conception then – it is suggested – feeds back into our embodied social interactions with others. And in such a way, we humans can, so to speak, play the role of an autonomous individual, even if we are not autonomous individuals in reality. If this proposal is on the right track, it would not only show that the idea that we are autonomous individuals is not in conflict with enactivism and Mead's pragmatism – enactivism and Mead would show how moral selfhood becomes possible in the first place.

By making this proposal, I am of course also making a suggestion for how "4e cognitive science" and classical pragmatism might be fruitfully combined. Combining enactivist cognitive science and Mead's pragmatist account of social self-constitution is particularly fruitful, I suggest, not only because enactivism and Mead share so much, but also because it promises to show how the reach of enactivism can be extended to the social domain, and this in a novel way (different, for instance, from the so-called participatory sense-making approach, see e.g. de Jaegher & di Paolo 2007). Indeed, it would be appropriate to call Mead a "social enactivist". Yet the philosophical depth, innovativeness, and plausibility of enactivism and Mead's pragmatism can be seen best once their accounts are brought into conversation with mainstream views – and this is why is paper aims to set up a trialogue between enactivism, Mead, and classical moral philosophy.

The paper unfolds as follows. In the next section (section 2), I will explain the central problem in more detail, contrasting our everyday self-conception as autonomous individuals with recent findings from the cognitive and social sciences. Having set up the central problem, section 3 departs from the main line of argumentation for a moment in order to refute a view I call "harmonism" – that is, the idea that there actually is no tension in our human self-understanding, because things like autonomy and free will can be unproblematically conceived of as part of the natural world. It is worth showing the implausibility of harmonism since it can be arrived at through a misunderstanding of anti-dualism, which is very prominent amongst pragmatist thinkers. Section 4 returns to the main line of argumentation and introduces enactivism as one crucial element for a new explanation for the emergence of moral selfhood. But since enactivism cannot explain moral selfhood on its own, section 5 introduces Mead's account of social self-constitution as a further building block for approaching moral selfhood in a new way. Even though this can already explain a great deal, the enactivist, constructivist, constitutionist spirit of both enactivism and Mead's account of selfhood is in tension with the realism about autonomous individuals which is part of our everyday moral practices. This is why section 6 introduces a further and final building block, combining enactivism and Mead in a more sophisticated way. Finally, section 7 shows how this new account of moral selfhood allows us to conceive of human nature as unitary, but also to appreciate the tensions and disharmonies between our biological nature and our social self-conceptions – disharmonies which make us the beings we are.

2. Human Nature in Inner Conflict

There are many ways of thinking of human nature, ranging from the conceptions of world religions to the very diverse views in antiquity, enlightenment, and evolutionary theory. But I want to suggest that today two views of ourselves are of particular importance to us, views which are both indispensible, but which are in conflict with each other. One view is the conception of ourselves as moral agents, a conception which we presuppose in our everyday moral practices. The other view is the idea that we human beings are essentially animals, habitually interacting with our material and social environments in a bodily way, not too dissimilar to the way other animals behave – a conception suggested both by recent cognitive and social science. – Let me first spell out our everyday self-understanding in more detail,

and then show how it can be seen as challenged by recent empirical findings. These expositions will be more abstract and general, but they are necessary for setting the stage for the new combination of enactivist cognitive science and Mead's pragmatism which is to follow.

As I have already alluded to in the beginning of the paper, in our everyday moral practices we think of ourselves as active beings who can freely act in the light of reasons, can criticize social norms, and are responsible for their deeds. Of course, this is often a rather unarticulated and implicit conception, but it clearly guides our everyday behavior, and so it is worth highlighting some aspects of it.

One aspect of our everyday self-conception is that we think that we are agents, that we can do things such as buying biscuits or blaming others. In our everyday practice, we clearly ascribe some events to ourselves as their authors, saying "that was me", or "it was not me". This conception is of high practical importance because it allows us to take responsibility for certain events. In philosophy, this conception is represented in many action theories (e.g. Anscombe 1963, Davidson 1963).

Another related set of features of our everyday self-conception is that we have full control over our behavior, and act with free will and autonomy. Cleary we say things such as "Sorry, but I couldn't control myself", or "He is not a very autonomous and independent person but just does what his parents expect him to do". This conception is of practical importance for taking responsibility and for excluding someone from responsibility. In philosophy, it can be found, amongst other places, in discussions about free will (e.g. Kane 2007, Fischer & Ravizza 1998).

We also think that we are able to see reasons and act on them, in particular moral reasons. For instance, we say things such as "What were your reasons?", or "It was not rational, I just reacted emotionally". This idea is practically important because it allows us to judge actions, and to sometimes guide our behavior. This part of our self-conception is represented in philosophical accounts of rationality and reasons (e.g. Parfit 2011, Korsgaard 2009).

Finally, another important set of ideas entailed in our everyday self-conception is that we are particular persons with a distinctive personality, identity, character, and true self. For example, we say things like "She is not the same person anymore", "he has a good character", or "I was not really myself". This set of ideas is of high practical importance because it shapes how we act in the present, opens up the possibility to relate to our past and future selves, and influences how we make sense of others and interact with them. In philosophy, these ideas are represented in conceptions of the self (e.g. Gallagher 2011), in ancient and modern conceptions of character (e.g. Aristotle, NE), and in discussion about personal identity (e.g. Parfit 1984).

Much more can be said about the particular aspects of our everyday self-conception – but for the moment, it is sufficient to notice how rich and multi-facetted our everyday self-conception is, and how important it is for our everyday practices. Here is the reason why it is crucial to be aware of the multifaceted nature and the practical importance of our self-conception: Some philosophers assume that all there is to empirical challenges of our everyday self-understanding are neuroscientifically informed arguments against incompatibilist theories of free will. But this would be wrong in at least three ways: First, it is not only abstract theories, but our very practical everyday self-conception which is in danger. Second, the idea that we have free will is only one of many different aspects of our everyday self-conception. And third, as it will be made clear shortly, it is not only neuroscience which challenges our everyday self-conception, but also findings from other cognitive sciences such as cognitive psychology and social psychology, findings from the social sciences, and even careful philosophical descriptions of phenomena of life.

Indeed, it should not be too surprising if our everyday self-conception would be refuted by cognitive and social science. After all, the core of our everyday

view can already be found in early antiquity, e.g. in the works of Plato and Aristotle. And many other aspects have been developed through Christianity. Yet most of the views dating form that time, on physics or biology for instance, have been replaced today. So one might wish to take serious the possibility that our ancient-old self-conception has to be reconsidered in light of what has been found in controlled, rigorous scientific experiments (cf. Doris 2002).[1]

And there is indeed a wealth of empirical findings which have been used for challenging different aspects of our everyday self-understanding. Given that there are so many different sets of findings from the cognitive and social sciences, I will mainly focus on selected sets of findings from the cognitive sciences during the next paragraphs. The most prominent set of findings is the influence of unconscious factors on human behavior. Human behavior has been found to be often effectuated by factors humans are not aware of, but which can be successfully used for predicting the behavior (Wegner 2002).[2] Moreover, it has been found that human behavior often proceeds "automatically" and habitually, without being guided by conscious intentions (Bargh & Chartland 1999). If one is honest to oneself, I submit, one might also see the influence of those unconscious factors in one's own life, or in the behavior of one's friends. However, those findings have been used as material for arguments to the effect that we do not have the free will, or the control over our actions, which we take ourselves to possess (Wegner 2002). And similarly, it can be argued that we are not the rational creatures we think we are, insofar as we often do not act in the light of reasons (Sie & Wouters 2010). Moreover, the findings can be utilized for arguing that we are not the self-transparent, self-conscious selves, or agents, which we take ourselves to be (Wilson 2004, Doris 2015).

In our everyday moral practices we think that action is a matter of our conscious control, of our intentions.[3] However, there are many empirical findings suggesting that other factors might have an even more profound effect on the course of human behavior. For instance, it has been found that how well humans can control themselves and withstand temptations is depended upon their current energy – that is, on their glucose level in their blood (Baumeister et al. 1998). And it has been

[1] Of course, this does not mean that, say, Aristotle's philosophy is as outdated as his physics. Quite to the contrary, Aristotle might have had an outstanding sense for analyzing important phenomena of human life, a sense which many thinkers today are lacking. And it is of course also true that we today might fail to see important phenomena clearly, just because we are viewing them through the dyed lens of modern conceptual frameworks which have become invisible to us, but which shape our outlook on the world in one-sided ways – materialistic, individualistic, or capitalistic ways of thinking might be examples. In these senses, I agree that it can be helpful to return to philosophical views dating back to the time of Plato and Aristotle.
Yet I insist that those views have to be checked against findings from recent cognitive and social science. In reluctance to this view, one might argue that so far nothing has really made us change our classical self-conception. So, did the ancient Greeks get it right about human agency after all? But it does not seem very likely that societies which even got the simpler things like biology wrong should be exactly right about the more complicated matters such as cognition in action, which is the topic of sophisticated research e.g. in cognitive psychology and cognitive neuroscience. Rather, I contend, we should distinguish between truth and success conditions. A self-conception can be very successful even if it is wrong. For example, if I believe that I am God's Chosen One, this might uplift my view on life and make me bear misfortunes more easily – still, this practically successful self-conception would be superstitious. Or, to have a slightly different example: a society which systematically punishes those who deviate from its social norms might be more stable and successful – whether or not things like ultimate desert, true responsibility, or libertarian free will really exist.

[2] Obviously, the unconscious has already been famously discussed by Freud. However, his theory has been regarded as problematic from a psychological point of view, because it postulates Homunculi (the id, the ego, and the superego), allows for no concrete predications of behavior, and appears to be unfalsifiable (cf. Uleman 2007, 4f.). However, the situation has dramatically changed during the last decades, and now there is a wealth of non-Freudian empirical studies of the unconscious which do meet scientific standards. Expressing this trend, the title of a recent anthology on the topic is "The New Unconscious" (Hassin et al. 2007).

[3] Of course, philosophers in the traditions of Hume and Davidson would emphasize that we have no direct control over our desires, in the service of which we allegedly get to action.

found that human behavior is strongly shaped by moods, habits, and the body (e.g. Gallagher 2005, Pacherie 2011). And I again, I submit, everyone who has more or less carefully observed her own past behavior or the behavior of her friends can know these things from her own experience. However, these findings can be utilized for arguing that our behavior is not controlled by ourselves in the way we think it is.

According to our everyday self-conception, it is primarily "inner" factors which shape our actions, be it our character traits, conscious control, deliberate intentions, or reflective decisions. However, there is a large class of findings, stemming primarily from situationist social psychology, according to which human behavior is essentially shaped by "outer" factors of a given situation (keeping in mind that the dichotomy between "inner" and "outer" is something pragmatists and enactivists might reject). It has been found that situational factors such as finding a dime (Isen & Levin 1972), being in a hurry (Darley & Batson 1973), and playing roles (Zimbardo et al. 1973) tremendously influence behavior, e.g. whether people help others. Famously, Stanley Milgram even found that the situational factor of being in the presence of an authority figure tremendously influences whether normal people are ready to torture an innocent person (Milgram 1974): In what was presented as an experiment on the effect of punishment on learning, normal people gave electric shocks up to 450 Volts to their vehemently protesting fellows, if an authoritative scientist insisted that this has to be done. Admittedly, the amount of influence situational factors have on human behavior by far exceeds what is intuitive – for instance, laymen and professional psychiatrists predicted that between 0.125% and 2% of the persons in the Milgram experiment would give 450 volt electric shocks to a protesting victim, whereas in fact 65% of the persons (in one version) did so. These findings have been used to argue that we humans do not possess classically conceived character traits, since it might, for example, depend more on the situation, and our mood and stress level whether or not we help another person, rather than on our benevolence or good intentions (Harman 1999, Doris 2002).

Another set of findings concerns the idea that we are creatures who normally act in the light of reasons. It has been found that most of the good reasons we mention in favor of our actions are not statements of our initial motivations, but are rather post-hoc rationalizations uttered for the purpose of justifying ourselves (Nisbett & Wilson 1977, Haidt 2001). Again, any attentive and honest person might be able to detect at least some of those rationalizations in her own behavior and in the behavior of her friends. However, these findings call into doubt our self-conception as agents who normally act in the light of reasons (Sie & Wouters 2010).

A last and heterogeneous set of thoughts calls into question the idea that we are autonomous persons with a unified personality. To begin with, the idea that humans have consistent personality traits has been questioned by findings which suggest that personality traits are at best situation sensitive – the person who is honest with her parents might be dishonest with her friends (Mischel 1968). Moreover, inspired by different findings from social science, many social theories have given up the idea that humans are autonomous selves, focusing instead on the social power mechanisms which shape our constructions of our identities. And even in the recent interdisciplinary debate about the nature of the self, basically no one defends the idea that humans are just by nature persons with agential powers: either the existence of the self is denied (Metzinger 2003, Albahari 2006), or understood as a bodily phenomenon (Zahavi 2005), or as a narrative construction (Dennett 1992, Schechtman 1996, 2014). Those findings and ideas can be used to shed doubt on our everyday self-conceptions as particular persons with distinct personalities and true inner selves.

We must, then, come to the following conclusion: There is an important new problem concerning human nature. Our human self-understanding is terribly conflicted. On the one hand, we conceptualize ourselves

as autonomous individuals. And this conception seems to be the condition of the possibility of the moral practices which enable us to live the lives we live. However, there is an abundance of findings from the cognitive and social sciences which suggest that we are at best human animals with fragmented minds and no inner selves, constantly interacting with a material and social environment against the background of factors such as moods, bodies, habits, energy, and stress-levels. And attentive persons can verify this by observing their own existence. So it seems that we humans are both: autonomous agents and automatic animals. And yet, the conceptions seem to be mutually exclusive. So, what are we?[4]

I would insist that the problem just described is new. However, at first glance one might have a different impression. One might think that the conflict described is actually nothing but a particular version of what Wilfried Sellars (1963) has called the clash between the manifest image of men in the world – our everyday self-understanding –, and the scientific image. According to Sellars, our everyday view on the world might clash with science's view on the world. However, the problem I described is different from the problem described by Sellars. For, the view in favor of which I argued is opposed to our everyday self-conception is not exactly a scientific image. Indeed, the view that we humans are human animals which habitually interact with their material and social environments is very well supported by recent findings in the cognitive and social sciences. But it is not exactly a scientific view: rather, it is a view which is described on personal (and not subpersonal neuronal) terms, which is related to and mirrored in our everyday existential experience, and which has also been described by philosophers and poets.

But one might think that the problem I have described is not new because it only reflects old dualistic conceptions of human nature. According to the views of Plato and Aristotle, for instance, we humans have different, higher and lower parts of the soul.[5] According to Kant (1787), we are beings which live both in the phenomenal and in the noumenal realm. It is thus tempting to assume that the idea that we are autonomous selves with reason and free will is somehow to be identified with the higher part of the soul, or our existence in the noumenal realm, while our habitual animality is to be identified with a lower part of the soul, or our existence in the phenomenal realm. However, even though dual-process models in psychology might be seen as a modern version of the ancient old parts-of-the-soul doctrine (cf. Haidt 2006), it seems to fair to say that the parts-of-the-soul theory does not find much supporters anymore today, both because of philosophical arguments against such dualisms (e.g. Heidegger 1927), and because of scientific findings. For example, the influence of unconscious processes, moods, emotions, habits, and energy clearly does not stop half-way, but is rather pervasive in all our thinking and acting. Moreover, if there were such things as autonomous souls, they should manifest themselves at least in the morally crucial situations of Milgram's obedience experiment and Zimbardo's Stanford prison

[4] Obviously, the existence of this problem relies on the credibility of the experiments alluded to, and the plausibility of the arguments based on the findings. But it has become popular amongst some philosophers to "refute" scientific findings and their interpretations, targeting in particular neuroscientifically based arguments against free will (cf. e.g. Mele 2009). However, is has to be pointed to the fact that the mentioned findings stem from a large variety of research programs, and that there are hundreds of studies backing up one result (cf. Doris 2002). Moreover, the results mentioned also resonates with careful observations of existential phenomena, and also with philosophical descriptions of them to be found, e.g., in the works of Dewey (1925), Heidegger (1927), Merleau-Ponty (1942), and Sartre (1943). Consequently, the strategy of "refuting" single findings by re-interpreting single experiments does not seem very promising. But I agree that it would be important to have a closer look at how the mentioned findings conflict with our everyday self-conception.

[5] Of course, Aristotle is a weak naturalist according to some interpretations. But this is not important for the point I want to make: My point is that human nature has often been conceived of in a dualistic way in the history of philosophy, and Aristotle is one proponent of such a dualistic conception.

experiment – but apparently, the behavior of at least most of the participants is guided by situational factors.

So I insist that the problem I described in really new. Or, more precisely, the problem is as old as our self-conception as responsible autonomous individuals, but it has become visible only recently. I suspect that there are at least two reasons why the problem has only recently become manifest: One reason is that the tension has been hidden behind the dualism of soul/mind vs. body, so that all phenomena were just interpreted as falling either in the category of soul/mind or body. However, nowadays such dualisms are widely rejected, and so it becomes a problem that we continue to conceive of ourselves as autonomous moral agents. And another reason why the problem has only become visible recently is the more or less recent emergence of controlled experiments and of statistics in the cognitive and social sciences, supporting the view that we are habitual animals influenced by unconscious and environmental factors. For, clearly, the crucial influence of unconscious factors could not have been seen by a self-conscious reflection or a reconstruction of one's intuitions.[6]

Now once it is acknowledged that there is an important problem, the next question is how to solve it. There are several options (cf. Alfano 2013). The first option would be to embrace what might be called "dogmatism", that is, the view that our classical self-conception needs to be defended by all means (cf. Mele 2009). But this would not be a promising way to go, I contend, because it neglects a whole dimension of human existence and would refuse to make the progress scientific results allow us to make. The second option would be a view which might be called "scientific skepticism", that is, the view that our classical self-conception has to be completely replaced by scientifically informed account (cf. Churchland & Churchland 1999). However, this option is not promising either, I contend, because our classical self-conception seems to be indispensible for living the lives we live. Consequently, I propose taking a third path: Using the scientific results in order to question what it means to be an autonomous moral individual in the first place, and asking how autonomous selfhood is constituted. As I will suggest, enactivism and Mead's pragmatism provide exactly the right resources for this developing a fruitful answer to this question.

But before turning to this important task, it will be helpful to quickly discuss and refute a view I suggest calling "harmonism" – a view which denies the existence of the problem I just discussed …

3. Against Harmonism

There is no one who calls herself a "harmonist", but I contend that this is an apt name for a view which some philosophers adopt implicitly. Harmonism would be the view that we human beings are just natural parts of a non-dualistic natural world, and that autonomy, free will, reason, agency, and selfhood can unproblematically be conceived of as parts of this natural world. According to this view, humans naturally have eyes and can use them for seeing, and have lungs and can use them for breathing; and in the same way, harmonism assumes, humans have brains and can use them for moral reflection, and have free will and can use it for making moral decisions. Consequently, the problem I described would not really exist.[7]

[6] Obviously, the respective dualism of soul/mind vs. body is already crumbling for over a century (one might think of Nietzsche's criticism), and controlled psychological experiments also already exist since some time – so it might be not surprising that versions of the new problem already showed up during the 20th century, for instance in Freud's and Lacan's works.

[7] Of course, it is logically possible to subsume a lot of very different philosophical positions under the concept of harmonism. So, one might find the concept unhelpful for categorizing philosophical views. But I do not claim that my distinction between harmonism and disharmonism is the exclusive, one and for all times best way for making such categorizations. Still, the concept of harmonism can be very helpful for making explicit a widespread, momentous, and non-trivial way of thinking which is often implicit and which is sometimes even

Indeed, harmonism can be arrived at by a misunderstanding of anti-dualism, so that even some pragmatists might get misled into harmonism. I agree with most pragmatists, phenomenologists, scientists, and others that dualism, and in particular the soul/mind vs. body dualism, or mind vs. matter dualism, is deeply problematic. But still, I submit, it is a matter of fact that we conceptualize ourselves as autonomous individuals, and that this self-conception is in conflict with our biological and social nature as it is described by the cognitive and social sciences. But this does not presuppose any problematic metaphysical dualism: we can just accept that any plausible theory of human nature has to conceive of human nature as non-dualistic, while we must also acknowledge the hard fact that our self-conception is in tension with a more empirically informed conception of human nature. Long ago we have construed a conception of a flat earth in the center of the universe, and now we know that this was wrong, and we have given up that conception. But long ago we have developed the conception of ourselves as responsible moral selves, and now this conception runs up against scientific findings. Yet we have not given up that self-conception, and so crucial conflicts arise. Thus, I contend, anti-dualism is right, but still there are important disharmonies within our self-conceptions, so that harmonism is wrong.

Let me briefly explain in a bit more detail why harmonism is so mistaken. One version of harmonism has just recently (even though implicitly) been embraced by a thinker with great merits in pragmatism and in the philosophy of cognitive science, namely by Mark Johnson. In his book *Morality for Humans* (Johnson 2014), he uses findings from the cognitive sciences to argue against a Christian understanding of morality. Using Dewey's famous metaphor, Johnson insists that we humans are no "little gods" who would have epistemic access to absolute, transcendental values. Johnson insists on, and provides empirical evidence for statements such as "There is no such thing as a faculty of pure practical reason" (Johnson 2014, 24), "Faculty psychology is outdated and misleading", (Johnson 2014, 24), and "Moral absolutism is profoundly mistaken" (Johnson 2014, 26). Caricaturing Johnson's position a bit, he thinks that such problematic ideas can just be cut out of our moral self-understanding like a tumor, leaving back a healthy patient. Once we get rid of the belief in transcendental values and similar things, we can realize how our moral values actually emerge from our very mundane bodily interactions, how moral reflection is just a version of everyday imaginative problem-solving, and so on. So our self-understanding as moral agents would (once it is cleansed of Christianity) be in a perfect natural harmony with our nature as bodily beings.

Even though I strongly agree with Johnson's project of approaching morality from the point of view of cognitive science, and even though I agree with his rejection of faculty psychology and transcendental values, I am deeply skeptical about the harmonist picture Johnson draws. First of all, harmonism naïvely take it for granted that humans can be agents, or persons, or selves, with the ability to think. Harmonism just takes for granted that humans are autonomous individuals, assuming that morality is just some later addition. In this way harmonism places itself, of course, in the early modern tradition and follows the lead of Thomas Hobbes (1651), for instance. But given the problematic nature of our status as autonomous individuals described earlier, one cannot just assume the existence of autonomous individuals which is called into question elsewhere: consequently, it has to be explained how human animals can be autonomous individuals. This first problem leads to a second problem, namely that harmonism seems to be historically naïve. Friedrich Nietzsche (1886), for instance, has provided an account of what one today would call "social mind-shaping", an account of how social, and in particular religious practices have shaped and transformed our human abilities, maybe creating even new capacities such as conscience. Then, the harmonist's idea that Christianity

invisible to those who hold on to it.

can be just cut out from our moral practices would be naïve – it would have been the historic condition of the possibility of some of our moral capacities, and it would still be prevalent in our embodied habits for engaging in moral practices. Thirdly, harmonism is metaphysically naïve: clearly, a Cartesian metaphysical dualism of a *res cogitians* and a *res extensa* is metaphysically dubious. But a Platonistic conception, according to which the whole world is in natural harmony and is perfectly ordered, is metaphysically even more dubious. It must be acknowledged that our self-conceptions and our biological nature can easily be in conflict. And fourthly, harmonism is politically naïve. As Nietzsche and Foucault have pointed to, for instance, there are many dark sides to human nature, with social power relations suppressing many human beings. It might of course be right that Nietzsche and Foucault overplay these points. But likewise, it seems, harmonism underestimates them, painting an all rosy picture of humans as natural-born autonomous individuals, in harmony with themselves and with their natural place in a logically well-ordered world.

Consequently, one should give up harmonism. Anti-dualism is right: there is no mystical dualism in human nature. But likewise, harmonism is wrong: There is no mystical perfect natural harmony in human nature.

So we are back to where we were at the end of the last section: We find ourselves faced with a conflict between two important views of human nature, and we need a new account of moral selfhood to solve that conflict. In the next section, I will introduce enactivism as the first building block for a new understanding of moral selfhood.

4. Enactivist Cognitive Science

This section introduces enactivist cognitive science as a first building block for construing a new account of moral selfhood, an account which is compatible with the findings from the cognitive and social sciences, but which avoids the naïve harmonist's assumption that humans are just autonomous agents. Enactive cognitive science is part of "4e cognitive science", which suggests viewing cognition as embodied, embedded, enactive, and extended. Enactivism is influenced by work in radical constructivism, hermeneutics, phenomenology, Buddhism, and neurobiology, and has been introduced by Francisco Varela in his book *The Embodied Mind*, co-authored with Evan Thompson and Eleanor Rosch (Varela, Thompson & Rosch 1991). Enactivism shares pragmatism's rejections of dualism, of representationalism, and of cognitivism. It also opposes the idea that human behavior is essentially guided by a brain which computes contentful representations; rather, the idea is that there are no contentful states in the brain, and that the brain is not the organ for thinking, just as the heart is not the organ for emotions (of course, there are no emotions without the heart and no thoughts without the brain). In a positive vein, there are at least two constructive ideas which are crucial for enactivism. One idea is that action is essential. But here, "action" is not to be understood as morally autonomous piece of behavior, carried out by a self-conscious human person with deliberate intentions and in the light of moral reasons. Rather, "action" here refers to bodily interactions with one's environment, interactions even simple animals such as bacteria are capable of. For instance, is has been suggested that at least most human behavior consists in such more or less simple bodily interactions (Hutto & Myin 2013). It has been suggested that action and perception shape each other, for instance that we perceive our environments in terms of action possibilities (Gibson 1979, Noë 2004, 2012). And it has been suggested that being in interaction with one's environment actually gives rise to the conscious experience we have (O'Regan & Noë 2001, O'Regan 2011). Today there are many different versions of enactivism, but this first idea is widely shared. By contrast, the second idea is less widely accepted, even though it is the idea which gave enactivism its name, and which is a key idea in Varela's original work: This is the idea that experience is always enacted, that is, made, or

brought about (Varela 1988, Varela et al. 1991). The idea is that it is wrong to suppose that we can truly or falsely represent within our minds a mind-independent, objective reality, which would continue to exist in the same way if the experiencing subjects were removed (so that Cartesian skepticism becomes a possibility). Rather, we only have the experiences we have because we are actively engaging our (mind-independent) environments against the background of subjective background conditions, and thus bring the (mind-shaped) experience of reality about. For instance, when perceiving a purple flower, we might naively think that the purplesness is just there in the outer world, and that we might represent it truly or falsely in our inner world. But enactivism would emphasize that the color experience is actually something we make, for instance because we have human eyes, have the color concepts of our culture, and are able to move around (Varela et al. 1991). By contrast, a person from another culture, or an animal from another species, might experience light of the same wave length as a different color. According to this second idea of enactivism, "making" experience, or making sense, is something which occurs all the time in any living being's life (cf. Thompson 2007, 2014).

In the following paragraphs, I will present what one might call "an enactivist account of basic agency". I will concentrate on basic animal action and a conception of an "enacting animal self" because this is what is most helpful for developing a new account of moral selfhood which is in line with cognitive and social science. I will combine enactivism with some ideas from ecological psychology and from the so-called sensorimotor theory of consciousness, and I will take the liberty to add a few new ideas.

A helpful start for developing an enactivist account of basic agency is to be found in Hutto and Myin's enactivist manifesto, where they write, as already quoted above: "the vast sea of what humans do and experience is best understood by appealing to dynamically unfolding, situated embodied interactions and engagements with worldly offerings" (Hutto & Myin 2013: ix). But whereas Hutto and Myin proceed by arguing against traditional theories, my focus here is more constructive. If one wants to develop a more elaborate enactivist account of embodied agency, one has to ask what "worldly offerings" are, how the dynamic "interactions" with them are to be understood, and how the embodied human agents are to be conceived of, if they are not Cartesian cognizers.

Drawing on work from ecological psychology (Gibson 1979), which is in turn influenced by Gestalt psychology and phenomenology (Merleau-Ponty 1942), I first propose a way to better understand the "worldly offerings". The key idea, which is shared by many authors from the traditions just mentioned, is that environments we humans find ourselves situated in when we are absorbed in our everyday routines do not consist of abstract objects like a 50 cm high, hard black block. Rather, we immediately perceive our environments in terms of possibilities of, and even demands for actions, seeing a chair as inviting sitting, or a glass of water as inviting drinking. While talking, one might get thirstier and thirstier, and the glass nearby might become a strong invitation to drink from it. According to Gestalt psychologist Kurt Koffka (1935, 7), "[e]ach thing says what it is […] a fruit says 'Eat me'; water says 'Drink me'; thunder says 'Fear me'." Less metaphorically, and following phenomenology (and recent cognitive neuroscience) one might call the action invitations experienced by embodied agents in interaction "solicitations". A glass of water, for instance, can solicit drinking from it. Deliberately departing from the established way of using the term, I suggest calling potential solicitations "affordances". For example, a fruit, which would be a solicitation for me if I were hungry, is no solicitation but only an affordance for me when I am not hungry.

Some thinkers working in the tradition of ecological psychology hold on to a strong realism about affordances, assuming that affordances exist in a mind- or creature-independent way (Gibson 1979, Noë 2004, 2012). Other thinkers emphasize the importance of

animals' abilities for acting on particular affordances (Turvey & Shaw 1979, Rietveld & Kiverstein 2014). Now I suggest going one step further and combining the ecological theory of solicitations and affordances with the second, more ambitious idea of enactivism outlined above. Then, affordances would not exist mind-independently. Rather, they have to be understood as environmental relatum of an animal-environment-relation. There are, I suggest, subjective background conditions of a particular animal which constitute that that particular animal can enact particular objective environmental features as solicitations. By analogy, a human animal (arguably) has to have the concept "purple" in order to enact light of a certain wave length as looking purple. Likewise, a human animal has to be able to digest milk, and be able to grasp a glass, in order to experience a glass of milk as a solicitation to drink from it. If this is so, it seems that there are many such factors that contribute to which objective situational factors are solicitations for a particular animal, for instance the animal's abilities, habits, expectations, moods, energy, and so on. To have a name for it, I suggest calling the subjective background conditions for enacting objective environmental factors as solicitations "acceptances". For example, a book on quantum physics is only an affordance for a given agent if she understands the basics of quantum physics – her ability of understanding quantum physics would be an acceptance in virtue of which the book would be an affordance in her world. A performance of an opera can be an affordance to attend it for an agent who has the habit of occasionally attending opera performances – her habit would be an acceptance in virtue of which the performance is an affordance in her world. "Affordances" and "acceptances" are then the names of the relata of inseparable affordance-acceptance relations. If this is accepted, at least for the sake of argument, it would – I suggest – allow for developing an anti-cognitivist conception of an embodied agent, or of an acting, active self. The active subject of embodied interactions would not be a ready-made, natural born autonomous individual. Rather, the subject of embodied interactions would be a mere animal, a bodily organism, to be characterized by the entirety of its acceptances. In this way, a one cell organism could be an embodied agent when it swims towards nutrients, and its subjective contribution to the environmental interaction would consist in the facts that it enacts the nutrients as solicitations against the background of its acceptances, and that it reacts to the solicitation to swim towards the nutrients by swimming toward them.[8] We can very well say that the self of embodied interactions is an enacting animal self, constituting a whole world of affordances against the background of its acceptances, acceptances which make it the self it is.

This notion of an enacting animal self is different from, but compatible with the phenomenological notion of embodied subjectivity. Drawing on work by Husserl and Sartre, Dan Zahavi (2005, 2014) has suggested that all our experiences and interactions carry a minimal trace of mineness, a non-thematic feeling that it is me acting. Certainly, we need such a feeling in order to act successfully, because we must be able to distinguish which changes in perception are the result of a changing environment, and which are the results of our own movements (Vosgerau & Newen 2007). But Zahavi's notion of embodied subjectivity is not concerned with the agent, the active element in minimal embodied interactions, and this is why the new notion of an enacting animal self is (I suggest) a very helpful addition.

Yet it is important to note that the conception of the enacting animal self is importantly different from other conceptions of selfhood: The enacting animal self does not have the reflexivity which normally associated with the concept "self" – the enacting animal self is not self-conscious at all. To explain: When an animal interacts with solicitations, it might of course have a minimal experience of mineness, a sense that it is it who is acting – that is, that it is an embodied self in the sense

[8] This proposal can also be understood as contributing to the important research on "primitive agency", see Frankfurt 1978 and Burge 2009.

described by Zahavi. But the animal does not know that it only experiences solicitations because it has enacted them. The animal only experiences invitations for action, but has no sense for what makes experiencing those invitations possible in the first place – the world-constituting power of its acceptances.

This conception of an enacting animal self is based on an important distinction which is not made explicitly by enactivists, but which can be viewed as rooted in Varela's thinking: the distinction between the enacted contents of our experiences, and the mechanisms for enacting the contents. Departing from "radical" enactivists who, at least for "basic minds", argue against using the notion of content in the form of the truth conditions of propositions, I suggest that it is helpful to analyze all experiences as a having (often non-propositional) minimal content. "Minimal content" is just meant to conceptualize the phenomenon that the world shows up as meaningful for us. For example, a solicitation can be the minimal content of an experience (cf. McDowell 2007, 2009). But this content would be different from the conditions of the possibility of the content, from the mechanisms for enacting the content. For example, we might experience a purple flower, but among the mechanisms for enacting this experience is that we possess the concept "purple", something we do not experience.

Turning to the nature of action, I suggest that action, as a biological phenomenon, consists in a dynamical interaction with solicitations. Action would be a constant sensorimotor loop of enacting some objective features of the current situation as solicitations, of reacting to them by doing what they solicit, of enacting new solicitations, and so on. For example, a dog might spot a squirrel and perceive it as a solicitation to chase it, and react to this solicitation by chasing it; on the way, the dog might spot another dog and perceive it as a solicitation to get in contact, and react by getting in contact, and so on.[9]

In order to be able to perceive and interact with solicitations, we have to have an implicit knowledge of so-called sensorimotor contingencies. Or this is at least the suggestion of the sensorimotor theory of consciousness which I propose to integrate at his point (O'Regan & Noë 2001, O'Regan 2011). A sensorimotor contingency is the law of how our motor movements relate to change in sensory input (O'Regan 2011). For example, the sensorimotor contingencies are different depending on whether one sees, hears, or tastes something, and on whether one hears a symphony or a bird. It seems obvious that we have to master such contingences in order to cope successfully with the physical world.

The outline of the enactivist view on basic bodily interactions might hold true even of a lonely bacterium which is the last of its kind. But it is important to note that there is sociality even at this level. As Shaun Gallagher (2001) has emphasized, there is the important phenomenon of primary intersubjectivity – for instance in affective bodily interactions of baby and mother. According to Gallagher (2009), primary intersubjectivity starts at birth, entails sensorimotor capacities for child–other interactions, and is found in neonate imitation, infant's interactive eye-tracking and discerning expressions of emotions.

This enactivist account of embodied interactions is, I propose, the first building block for a new approach to moral selfhood which is in line with cognitive and social science. It should be clear at this point that the enactivist account I proposed is not only compatible with the scientific findings mentioned at the beginning of this paper – the enactivist account even offers a conceptual framework for systematizing and integrating them. For example, the situational factors which have been found to influence behavior tremendously can now be conceptualized as affordances and solicitations. The many different unconscious "inner" factors which have

[9] Of course, fully developing such a sensorimotor account of action, and showing its advantages, is an ambitious task, which cannot be accomplished here (but see Weichold 2015: ch. 3).

been found to influence human behavior can be conceptualized as acceptances. The non-existence of a real autonomous disembodied individual self behind actions is no surprise for the proposed version of enactivism, because all what is needed for bodily interactions is an enacting animal self. Finally, the fact that most reason-giving is just a post hoc rationalization can be easily explained by pointing out that most interactions just consist in reactions to solicitations, and not in carefully carrying out plans resulting from conscious deliberation about moral reasons.

However, it is still essential for our everyday life that we do conceptualize ourselves as autonomous individuals who think about moral reasons, are responsible for their deeds, and can autonomously criticize the social order. This was part of our initial problem. And so far, it seems far from clear how enactivism should solve that problem, given that it does not seem able to make sense of our self-conception as autonomous individuals. What we need, I propose, is a further building block for a new account of moral selfhood – and this further building block is Mead's pragmatist account of social self-constitution.

5. Mead's Theory of Social Self-Constitution

Mead is introducing an important new explanatory resource, namely society. But Mead is going further than others: Mead is not only interested in how two or more humans can make sense of their environment together ("participatory sense making") (de Jaegher & di Paolo 2007), or how humans understand others ("social cognition") (de Bruin & de Haan 2012), or how humans can intentionally cooperate as a group ("collective intentionality") (Searle 1990, Gilbert 1990). Instead, Mead is going much deeper by investigating how social structures constitute the individual self, and how social structures constitute individual action. According to Mead, there are no ready-made, natural-born autonomous individual selves who could later team up in order to construe a society – rather, it is the other way around: It is social structures which transform human animals into autonomous self-conscious individuals (Mead 1934, 222ff.).

In this section, I will provide an own interpretation of Mead's account of social self-constitution. Most of what I say will be familiar and uncontroversial. Yet I will add a few new ideas and interpret Mead through enactivist lens. This, at least, will prove very helpful for construing a new account of moral selfhood. Moreover, it will be helpful for bringing out the innovativeness of Mead's position, which is easily missed, partly for systematic reasons. This is because it is difficult to correctly interpret Mead's claim that the self is constituted by society. In one interpretation, this would be correct but trivial: Surely, it depends on society that we are members of a family or citizens of a state. If this were so, however, society would only provide some social clothing for pre-existing autonomous agents. And this would not be an interesting hypothesis. In another interpretation, Mead's account would be false: If individuals are in their very being constituted by the social roles they play, we must ask who is doing the role playing, and who is engaging in social relationships. So claiming that society constitutes the beings which are necessary for society to exist would be circular. By contrast, I aim to provide an interpretation of social self-constitution which steers a middle way between triviality and falsity, relying on the enactivist account of animal selfhood outlined above.

Mead starts where enactivism stops. Just like enactivism, Mead assumes that humans are essentially animals shaped by evolution, bodily biological beings which are in constant interaction with their environments (Mead 1934). Mead calls human organisms "individuals", but this should not mislead one to assume that Mead believes in the existence of natural-born autonomous agential moral individuals (Mead 1934, 1). The notion of an enacting active self might arguably be used for having a more concise conception of how Mead views our pre-social existence.

Even the account of action implicit in Mead's writings (Mead 1934, Mead 1938) bears striking similarities to the enactivist account I have outlined. This is the case partly because Mead holds on to an improved version of behaviorism (Mead 1934, 2). But partly, I contend, this is also the case because Mead was a very careful observer of the phenomena of human existence. In any case, Mead suggested that human behavior essentially consists in responding to environmental stimuli (Mead 1934, 6). But which hypothetical stimuli a particular organism is sensitive to depends on subjective factors, which Mead conceptualizes as impulses and attitudes (Mead 1934, 5f.). Moreover, Mead thinks of behavior as constant interaction of organism and environment. Those ideas are particularly well-developed in Mead's *The Philosophy of the Act*, where he also put forward an action-oriented theory of perception. For example, discussing the example of seeing a penny, Mead (1938, 128) suggests: "We see the oval penny as round […]. A movement will give us the round penny, and there is the same entrance of the movement as that which we find, for example, in seeing the hammer as that with which we drive the nail. The percept is a collapsed act." At least if the matter is viewed from some distance, Mead's accounts of action and of action-oriented perception are very similar to the enactivist conceptions outlined before. Mead's stimuli correspond to enactivist's solicitations, and Mead's attitudes to the acceptances. If one zooms in, however, more subtle and detailed points of convergence and divergence become visible. But even though an elaborate comparison would be a promising philosophical project in its own right, this paper has to move on to discuss Mead's account of the emergence of selfhood.

As far as the nature of selfhood is concerned, Mead is most interested in the question how the human animal can become an object to itself (Blumer 1968, Blumer 2004: 57f.). In a way, it can be said that Mead has discovered a new philosophical problem here. According to the philosophical agenda of a Cartesian, there is just no problem of becoming an object to oneself, of thinking of oneself: A Cartesian thinker has just to turn his focus of attention inwards in order to have privileged epistemic access to its own nature as *res cogitans*. But if human beings are primarily animals whose attention is focused on the solicitations of the environment, and who have no sense for the subjective background conditions which contribute to the constitution of the experienced environment, we must ask how it is that humans can think of themselves as objects. An animal can perceive solicitations to flee, drink, and eat. But a human animal can also entertain the thought that he weighs so-and-so-much kilograms, that he would prefer to weigh 5 kilograms less, and that he therefore should not react to the solicitation of the chocolate cake over there. We are not only placed in an environment, we can explicitly think of our selves as objects placed in an environment; we can have explicit conceptions of who we are. We might think of our selves as friends, teachers, writers, or team-members – but the crucial question is how it is possible to think *of* our selves at all. How can human animals develop such an objective-self concepts? In a way, this might be understood as an empirical question to be answered by developmental psychology. Be that as it may, it is important that Mead offers an unusual and potentially inspiring new way of thinking about this question, a way of thinking which might guide future empirical research.

Mead's answer is that human animals develop explicit self-conceptions by playfully getting into social structures which transform the human animals' minds. Or, more precisely, the social structures transform the human animals' acceptances, and *constitute* the human animals' mind. We have already seen that there is a bodily primary intersubjectivity. But Mead contends that there is a whole new level of sociality once humans get themselves immersed in the world of language. Approaching the phenomenon of language from bottom up, Mead locates the origin of language in the usage of gestures, and in particular in vocal gestures. Analyzing Mead's account in detail would be a topic in its own

right, partly because Mead might be seen as offering resources for a new account of the natural origins of linguistic meaning, an account which might be superior to, say, classical teleosemantic accounts. But in this context, it is necessary to make a long story short. For a small dog, a thunderstorm can be (minimally and pre-linguistically) meaningful by being a solicitation for fleeing. Likewise, another, large and dangerously looking dog can be a solicitation for fleeing. But likewise, a large dog which looks ambiguous can become a solicitation for fleeing when the large dog does something, for instance when it snarls. And now, it is even possible that the large dog becomes a solicitation for fleeing when it makes a sound, for example when it barks intensely. But this last case is importantly different from the previous cases. For, the barking has not only a meaning to the small dog, by being a solicitation for fleeing. Rather, the barking also gets a new kind of meaning to the larger dog who hears its own barking: it can now realize that its own barking can make other dogs flee. So this is knowledge of what one can do with sounds – it is the knowledge of a social meaning, of what one can make others do by producing vocal gestures. The meaning of a vocal gesture consists in the social consequences of its usage – an account which brings Mead in the vicinity of Wittgensteinean thinking (cf. Wittgenstein 1953: §43). Then, this is how, very roughly, Mead thinks that more complicated forms of linguistic meaning arise from the more minimal forms of meaning in embodied interactions.

Using Wittgensteinean terminology for expressing a Meadian point, it can be said that human social life consists in playing language games (Wittgenstein 1953: §7). For instance, we play the language games of selling goods, of having a discussion, or of giving a talk. In these language games, the rules of the games define what moves in the games we can make: For instance, we can ask for a price, make an offer, buy a product, and so on. Moreover, different human animals have different functions and different social roles in these games, which define which moves in the game they are allowed to make: The customer is not allowed to just carry away the goods she likes, and the shopkeeper is allowed to fix the price. In addition, there are often what one might call "materialized behavior settings": a shop is the place for the language game of selling, a room in the university the setting for academic discussions.

If this is on the right track, it would mean that we have to distinguish between two notions of action. On the one hand, there is embodied agency, the embodied dynamic interactions with a material environment which have been described before, and of which even primitive organisms are capable. On the other hand, there is social agency, the making of moves in language games, which requires the embeddedness in social practices. If this is true, even individual actions, such as buying a good or preparing a talk, are social affairs (cf. Gergen 2009).

As it has been suggested before, organisms learn to successfully perform embodied interactions by exploring their environments and by seeing what happens in response to their bodily movements, so that the organism eventually grasp the relevant sensorimotor contingencies. Now how do young human children who already master relevant sensorimotor contingencies go on to eventually make moves in language games? Do their brains grow capacities like "the will" and "reason", so that the children first become full-fledged agents, who then, in a second step, use their agency to engage in language games? But we have already seen that such a view does not find much support from the sciences, and we have agreed with Mark Johnson that such a presupposition of faculties is outdated. So I want to suggest an arguably more plausible explanation. The idea is that human animals not only have to learn mastering sensorimotor contingencies, but also to learn mastering sociocultural contingencies. Mastering a sociocultural contingency would mean to know which bodily movements count as movements in a language game, and which social consequences making those moves in the language game have (Weichold 2016). Using Mead's account of the meaning of vocal gestures, we can say that this is how a child understands the

meaning of the moves in language games. Obviously, learning to make moves in language games depends on social feedback, on what others acknowledge as counting as a move in a language game. And it suggests itself that young children learn to master such sociocultural contingencies by exploring their social environments playfully. Clearly, this "mastery" or "knowledge" of sociocultural contingencies is a bodily knowledge (like "knowing how" in an anti-intellectualist interpretation, cf. Dreyfus 2005, Noë 2005), and not a grasping of contentful true propositions (*pace* Hutto & Myin 2013, 24-32).

Consider a baby which already masters sensorimotor contingencies. It produces weird sounds which have no particular meaning to anyone. But then, by trial and imitation, the baby produces the sound "mom". The production of this particular sound suddenly has social consequences, and the baby suddenly receives attention and care in reaction. In this way, the sound acquires a meaning for the baby. It is a social meaning, depending on the social reactions of others.[10] In a similar way, we learn to play new language games throughout our whole lives. For instance, first year students at the university often do not know which kind of help they can ask for from their professors. So they have to try it out, and learn to master the academic sociocultural contingencies in virtue of being ignored, rejected, or helped, and being taken care of.

It is important that learning to play a language game necessarily goes together with a sense of one's own position in the game. We have certain positions, or functions, in the language games, and these positions define which moves in the game we should and are allowed to make. Those positions are our roles. Even though the idea of using theatrical metaphors for analyzing human life is already found in antiquity, and even though the notion of a social role is already discussed in Confucianism and British Idealism (Bradley 1876), Mead has to be credited for making this important concept prominent in philosophy and social theory. Most of the time, we play roles such as being a friend, daughter, teacher, or sports team member. For example, when we are in a shop, we might play the role of a customer, and in this role, we can make the moves of buying a product, or making an inquiry about a good. But singing a song, just eating a product, talking to the shopkeeper about the meaning of life, and many other things are not legitimate moves in the particular language game.

Importantly, which precise moves in a game we can make depends on which moves others allow us to make, on how they see us. One can only grade papers if there are others who accept the grading as legitimate, who see one as occupying the role of a teacher. And what exactly others allow us to do also depends on how interesting, smart, rich, or noble-born others take us to be. Consider one and the same new philosophical idea which is once proposed in a talk by a famous American professor, and once by an undergraduate student. It is not unlikely that the professor is praised for brilliance in exploring new ways, whereas the undergraduate will be blamed for departing from orthodoxy. So the American professor will think of herself as a genius afterwards, while the undergraduate might think of herself as a mere beginner.[11] Then, this should show: Who we are depends on who others take us to be.[12] Our positions in the games of life depend on which positions others take us to have, which positions we think others view us as having, and which positions we implicitly accept. In a way, this is a boiled down, social enactivist version of Hegel's master-slave-dialectic. And so it might now be

[10] Based on work from Michael Tomasello (2016), one might say that *human* animals possess a *higher degree of shared attention* than other animals – and this higher openness for social learning is what enabled humans to develop an unparalleled world of culture.

[11] Let us assume for the sake of the argument that the American professor and the undergraduate student show equal skills in defending the idea against objections.

[12] Even the following, more complicated version is true: Who we take our selves to be depends on who we take others to take our selves to be.

tempting to say that we can only recognize our selves in the eye of the other. But this would be too weak, because others *constitutes* our selves in the first place, constitute that we exist in the social world at all.

This is why Mead suggests that we have to take the role of the other in order to have an objectified conception of ourselves (Mead 1934). I have to put myself mentally in the shoes of the shopkeeper to see myself as a customer, and to put myself in the shoes of a student to see myself as a university teacher. However, often we have already internalized the attitudes of the others, and then it might be enough to just hear one's own speech: When I hear myself having to beg for a small favor, I understand that my position in social space is inferior to the position of the other. When I hear myself giving instructions, I understand that I have a higher position.

Mead suggests that children develop such an objectified conception of their selves by playfully engaging in role play and by taking the attitude of others towards themselves. In the first stage, the "play" stage, children just playfully explore different roles. But later, children move on to a second stage, the "game" stage, where they grasp all the relevant sociocultural contingencies of a particular game. In reference to children, Mead says: "In that early stage he passes from one rôle to another just as a whim takes him. But in a game where a number of individuals are involved, then the child taking one rôle must be ready to take the rôle of everyone else" (Mead 1934, 151).

In the further development, children even develop the conception of the so-called "generalized other": "The organized community or social group which gives to the individual his unity of self may be called 'the generalized' other.' The attitude of the generalized other is the attitude of the whole community" (Mead 1934, 154). The idea is that we understand the rules of the whole game, of the whole social institutions, and can abstract away from particular others. We might then have a sense of being a teacher independently from which particular students show up, or of making an academic proposal independently from whom exactly is in the audience.

This, then, is how we develop an objective conception of ourselves. We acquire a sense of being someone, of existing in and having a position in social space, through others treating us as being someone. Our sense of being someone solidifies once we master whole games and play more or less fixed roles. And by the time, we can abstract away from particular roles and particular others, and think of our selves as being particular persons who can play this role or that.

If we interpret Mead creatively, this is also, roughly at least, how we acquire our self-conception of being autonomous individuals. We are playing games such as making moral demands, criticizing and changing social norms, and distancing ourselves from certain social roles (cf. Mead 1934, 168). Abstracting away from the details, this shapes our conceptions of being persons: we now think of ourselves as autonomous individuals.

By providing this account, Mead also offers a highly unusual and very innovate conception of self-consciousness. Self-consciousness is no longer understood as the most private thing, something a Cartesian subject knows with first person authority once it turns its gaze of attention inwards. Rather, self-consciousness is a public affair. It is the consciousness of a conception of oneself which one has developed by abstracting away from one's social positions which, in turn, are constituted by how others treat and see one.[13]

Having an objective conception of oneself, and having objective conceptions in general, open up the possibility of interacting with oneself. In a kind of inner dialogue, a human animal can now, so to speak, talk to herself, and regard her own thoughts as solicitations to

[13] In other words, the consciousness of one's self-conception is genetically constituted in social interactions, is occasionally socially confirmed or disconfirmed, and is often a consciousness of how one would interact with the generalized other. But still, it is possible to think, at one very moment, (in a public language) a particular thought, the content which no one else will ever find out.

respond to. Obviously, this internalization of external practices may give rise to a rich inner life, and to delayed but more considerate reactions to environmental solicitations. Such an inner interaction is of course representational, but if representations are conceived of as special and extraordinary phenomenon, this is in line with enactivism.

Mead's account of the self can be regarded as a very helpful contribution to the literature on selfhood. Mead shares with no-self positions the rejection of a Cartesian autonomous self (Metzinger 2003, Albahari 2006). However, Mead would insist that it is still important that we have an objective conception of our selves. Mead's position is very well compatible with accounts of embodied selfhood (Zahavi 2005, 2014). However, Mead's position goes much further, and is thus a necessary complement. Moreover, Mead might agree with narrative accounts that we develop a unified outlook on our lives by telling stories about our selves. But this already presupposes that we have an objective conception of our selves. Mead's account is thus also a necessary complement to narrative accounts, explaining how we can be objects to ourselves.

But even though Mead's account social self-constitution seems to be so promising and powerful, it still cannot provide the whole story about moral selfhood. To see that there is a very important problem still waiting to be solved, I will discuss one last issue, namely Mead's prominent distinction between "I" and "me". Mead makes this complicated statement: "The "I" reacts to the self which arises through taking the attitudes of others. Through taking those attitudes we have introduced the "me" and we react to it as an "I"" (Mead 1934, 174). Obviously, the term "me" refers to our objectified self-conception which has developed in the light of how we think others see us. But what Mead exactly means with the "I" has created much puzzlement in the literature (cf. Cook 1993, cf. Lewis & Smith 1980). This is so, partly because Mead also emphasizes that we human beings can play our roles in new, creative, surprising, and characteristic ways, and because he explains this fact with reference to the "I". So is Mead, under the label "I", resurrecting the classical autonomous individual? However, this would run against all the findings from the cognitive and social sciences, against enactivism, and against Mead's own intentions.

Acknowledging that this is a complicated and controversial matter, here is a simple interpretation of what Mead might have meant with the "I" and the "me" (an interpretation sharing central ideas with the interpretations from Hans Joas (1985) and Gary Cook (1993)). On the classical Cartesian account, the self is subject and object at the same time: it can effectuate action in virtue of its mystical agent causal powers, and it can be an object to itself in virtue of its mystical self-transparency. Now Mead has provided a non-mystical, social account of the self as object. This is his account of the "me". However, the question has not yet been answered how the self can be a subject, how we human beings can be active, how it is possible to act in light of our self-conception. Mead's notion of the "I" can be considered as an attempt to solve this problem (cf. Joas 1985, cf. Cook 1993).

However, Mead-scholars such as Hans Joas and Gary Cook have emphasized that this view leads to problems: For instance, Cook (1993, 55) emphasizes that Mead holds that the "I" can be immediately experienced – but then, the "I" would not only be the self as subject, but also the self as object. Moreover, Joas (1985, 88f.) emphasizes that, at least at an early point in Mead's intellectual development, there is a tension between Mead's idea that the "I" can be immediately experienced, and his idea that the "I" is socially constituted.

Now I wish to suggest that those (apparent) problems can be avoided if my enactivist notion of an enacting animal self is brought into play. After all, the enacting animal self is a notion of the self as a subject. Yet the enacting animal self is not socially constituted (even if it can be partly socially transformed). Moreover, it is not immediately experienced (apart from the minimal sense of mineness discussed above), and is

instead the un-experienced condition of the possibility of experiencing. Against this background, the notion of an enacting animal self can do the job the "I" is assigned to do – namely, having an anti-Cartesian conception of the self as subject –, while it can at the same time avoid the problems Mead's notion of "I" has in the textually faithful interpretations of Cook and Joas. Consequently, I propose the charitable interpretation of understanding Mead's "I" as the enacting animal self. The idea is then that human action always consists in interacting with solicitations against the background of acceptances. This can explain how human animals can be active. Human beings are active in virtue of being enacting animal selves.

Moreover, the conception of an enacting animal self might explain how we human animals can play our roles in new, surprising, and characteristic ways, even if there is no such thing as a creative spontaneous autonomous individual. Importantly, interacting with the world shapes our mind, and thus how we look back at the world (Bourdieu 2000); interacting with the world transforms our acceptances. Now we always act against the background of acceptances, and our acceptances have been shaped in long histories of interactions with different material and social environments. Moreover, we bring different biological pre-conditions to the interactions. So, everyone has different acceptances, and thus enacts her world differently. This is, very roughly at least, why everyone plays her role more or less differently, and how surprising and new interactions can arise. Social structures enable us to become persons in the first place, but they do not preclude individuality. And this explanation is very well in line with Mead's ideas, in particular if the "I" is interpreted as enacting animal self.

Yet even if this is on the right track, the current analysis of moral selfhood is not yet complete. For, enactivism and Mead both suggest accounts of self- and world-constitution. Both suggest that our environments, and our self-conceptions are enacted, made, constructed, brought about. But this runs vehemently against the realistic spirit which is so important for our everyday self-understanding. In our everyday practices, we do not think that we are autonomous individuals in virtue of being recognized by others. Rather, we think that we just are autonomous agents with a particular personality, in virtue of our inner nature. We think that our environments are just out there, and are not enacted. And we think that our selves are just in here, and are not constituted. So how can this strong mismatch between the enactivist-constructivist spirit and the realism in our everyday practices be explained? Since realism is so important to our everyday self-understanding as moral selves, solving this problem is essential for developing a new conception of moral selfhood.

Thus, one further and final building block is needed, a building block which consists in a more complicated combination of enactivist cognitive science and Mead's pragmatism …

6. The Game of Selves

According to Mead's social enactivism, we human beings construe an objectified conception of our selves as distinct autonomous persons by abstracting from the roles others tread us as having in language games. But in our everyday social practices we do not think of our selves as construed, constituted, enacted self-*conceptions*. Rather, we think that we just *are* autonomous individuals. Our everyday social practices contain strongly realist conceptions of self and world. Consequently, it has to be acknowledged and appreciated that enactivism and Mead's account of social self-constitution strongly depart from common sense. Any other judgment would mistake the radical nature of enactivism and of Mead's account.

In this section I aim to complete the new social enactivist account of moral selfhood by showing how a more complicated combination of enactivist cognitive science and Mead's account is superior to common sense, and by explaining how it can even explain the

emergence of the realism in our common sense self-conception. To do so, I will start with rehearsing three important ideas which have already been alluded to.

The first idea is that Mead emphasizes that children go through the stage of play and the stage of the game in order to learn how to properly play their roles in serious language games. As described earlier, Mead suggests that children first playfully explore what it is to play a role, and then later learn to cope with the rules of organized games, understanding the interconnection of all the roles involved in the game. Today it is widely agreed upon, not only in Vygotskyian psychology (Vygotsky 1978), that playing is essential for a healthy development of personality. But most people might have the intuitions that in time, children learn to distinguish funny games from serious reality. But how does this crucial step happen? What exactly do children "realize"? Is this realization a momentary insight? Now, I want to propose a different view: We humans never stop playing. Our social reality is essentially nothing but an assembly of language games. Of course, the language games which make up our lives have existential importance, and might earn us the money we need to survive, or might be essential for achieving the life goals we might have set for ourselves. So we are often playing our roles in the essential language games not with a playful attitude, but rather with seriousness and a sense of existential gravity. Then, I propose, children do not suddenly "realize" a metaphysical reality behind the social games, but are rather trained to eventually play certain language games with a more serious attitude, and to not treat the relevant language games as funny games.[14] This view, after all, would fit very well with Wittgenstein's insistence on the importance of language games (Wittgenstein 1953), with Friedrich Schiller's insistence on the importance of play for being a human being (Schiller 1795), with Mead's account of the development of children (Mead 1934), and with Johan Huizinga's famous anthropological thesis that human culture originated from playing games (Huizinga 1938).

The second idea is the importance of the unconscious. This importance has already been mentioned in the description of the empirical findings in the beginning of the paper, and already Mead, being familiar with Freud's work, acknowledged the existence of an "unconscious self" (Mead 1934, 163). But it is important to appreciate how deep this idea goes: It implies that we humans might have no sense at all – at least not from introspection or a reconstruction of our intuitions – of the biological and social conditions of the possibility of our experience. We experience the world and our self-conceptions in a realistic fashion, but we have no idea about what actually gives rises to that experience. One might thus speak of "the transcendental unconscious".

The third idea is my enactivist distinction between the enacted content of our experiences and the mechanisms of enactment. For instance, we might have an experience of purple, but no sense that this experience is enacted, amongst other things, because we have certain (human) eyes and because we possess particular culture-relative color concepts.

Now the three ideas can be drawn together. I will start with an analogy. We might view the game of chess from outside: Then, we see how the game has evolved during the centuries. We see that playing the game only works because different players collectively accept the same rules. And we see that certain pieces of wood count as king, queen, or bishop. But we might also view the game from within, so to speak, and then there are no pieces of wood which *count* as kings, but just kings, and no rules which are valid because they are agreed upon, but rather plainly legitimate and illegitimate, and good and bad moves. Now I suggested that our enculturated human life essentially consists in playing language games. Enactivism and in particular Meadian social enactivism explain how our interactions with material and social environments really work, and how

[14] Of course, there is work in educational science on how this transition from playing to having a sense of "reality" takes place – see, e.g., Winnicott's *Playing and Reality* for a psychoanalytical perspective.

we gain our roles in language games. But once we are fully immersed in the language games, we experience our selves and the world *from within the game.*

Roughly, our "view from within" emerges like this: Others treat us as and count us as being autonomous individuals, or moral agents, or persons with a distinctive personality. We thus learn about our position in social space, learn which moves in language games others allow and expect us to make. We then develop an objectified self-conception, abstracting more and more form particular social roles and viewing our selves against the background of the generalized other. We become used to having this self-conception, our acceptances undergo a social transformation, and this shapes what we experience. We *embody* our social roles and experience reality from the point of view of our role-constituted identities. We start experiencing our selves in terms of the roles we play, as friends, teachers, and moral agents. And then, by the time, we start believing that we just are what we experience our selves to be. We reify our self-conceptions. However, as it should be clear, this way of thinking completely misses the real enacting conditions of our experiences: the acceptances, the sensorimotor and sociocultural contingencies and the constant social interactions. We might be experts in knowing how to master sensorimotor and sociocultural contingences, but we have no sense for our own mastery. Naturally, we are unconscious of the unconscious background conditions for enacting the experience of reality. So we end up believing just in what we see, and not in what makes this seeing possible. We then believe in an objective mind-independent reality with objective, eternal moral laws, and we take our selves to be autonomous individuals with libertarian free will, agent causation, autonomy, reason, and an inner moral compass. We start living in a kingdom of ends, in a noumenal world – but this noumenal world can now be recognized as a game world.

In one way, this self and worldview is an illusion, and in another way, it creates a new reality. It is an illusion from the point of view of philosophy and the cognitive and social sciences. After all, we are not really autonomous individuals, given both the evidence from our existential experiences and from the controlled experiments from the sciences. For instance, in our everyday practices we might believe in agent causation and think that we can make decisions without any causal preconditions. But this would be plainly wrong (cf. Pereboom 2007). Of course, philosophy and the sciences are also social practices which formulate their theories from particular points of view. But still, those views are more informed than our everyday self-conception; they take into account controlled scientific findings and our human experiences, and are developed by careful argumentation. Moreover, the content of the philosophical-scientific view is more stable than our everyday self-conception: It holds for all animals at all times that their actions consist in dynamic interactions with solicitations. By contrast, our everyday self-conception is radically contingent in the sense that it would be non-existent if human animals had not started to develop culture in the last few hundred thousand years, and that it would be entirely different if the cultural evolution had been different in the last 3,000 years (or even in the last centuries, insofar as rather new ideas such as individual autonomy are concerned).

But at the same time, our self-conception as autonomous individuals is – I contend – not a mere epi-phenomenon. Of course, the self-conception (so to speak) pretends that it is the whole story about moral selfhood and human agency; it pretends that action is to be explained solely with reference to autonomous individuals. This is wrong: What really goes on is to be best explained in terms of embodied interactions with material and social solicitations. But still, the belief that we are autonomous individuals is causally efficacious and plays a role in those interactions. The explicit conceptions others have of us really influence how they treat us, and the explicit conceptions we have of our selves really influence how we interpret our roles. In this sense, we are the beings we are because we play our selves.

There are many ways in which our real-life interactions are influenced by our self-conceptions as autonomous agents with distinctive personalities. For instance, if we have a strong sense of being a creative and independent person, we might interpret our roles, as speaker at a conference for example, differently, and propose more independent ideas. If we believe in objective moral laws and in our being on the right side, we might be more willing to criticize others. If we believe that we have in-born moral rights, we might find ourselves ill-treated in certain interactions. So even if we are no autonomous individuals in reality, believing that we are can bring about much criticism and conflict, which can be a productive element for social change. The other way around, interactions which go well, and being particularly well-treated, might let us develop a high sense of our selves. A famous rock singer, for instance, might reify the enthusiast reactions of his fans into believing that he, as a matter of fact, is a particularly worthy and extraordinary person.

Against this background, it becomes visible that the enactivist meadian account developed here is very much in line with Mead's position, but goes beyond it. Like Mead, the account suggested here holds that we human beings are socially shaped animals, which are likewise capable of reflective thinking and self-control. However, Mead does not appreciate that we conceptualize ourselves as pre-social, autonomous individuals with free will in our everyday practices, and that this is contradicted by findings from the cognitive and social sciences (which largely did not yet exist at Mead's time). Consequently, the critical element of the present proposal – that our self-conception in the game of selves is in one sense an illusion – is missing in Mead's account. Enactivist cognitive science and Heideggerian and Bourdieuian theories might thus be better resources for developing this aspect.

To sum up: We are autonomous individuals only in the game of selves, just like certain pieces of wood are kings only in the game of chess. We believe that we are pre-social autonomous individuals. But we have this belief only due to social interactions, by going through the stages of role play and the game, by learning how others see and react to us. The self is born in social space, but it denies its origin.

This social enactivist proposal then connects up to the received literature in interesting ways. Firstly, it allows steering a middle way between eleminitivism (Churchland & Churchland 1999) and realism about our folk-psychological self-conception (Fodor 1983):[15] Taking ourselves to be autonomous agents is an important game which enables many important social institutions such as holding people responsible.[16] And secondly, the proposal allows steering a middle way between classical theories which hold that human beings are autonomous persons, and post-structuralism theories which take the autonomous subject to be "dead" and think that social interactions are to be explained in terms of social power. The proposed account suggests that we are no autonomous agents in reality, but that playing autonomous agents is an important game which really makes a difference to human life.

In this sense, the proposal finally offers a new account of moral selfhood, an account which is in line with the empirical findings from the cognitive and social sciences discussed at the outset. We human beings are at root human animals, but we become more by social role play, by receiving a position and a self-conception in the game of selves.

Importantly, this new understanding of human beings as role-playing animals does not leave everything as it is. By contrast, it can sharpen our eye for the many disharmonies, tensions, frictions and conflicts in human nature – disharmonies which are of tremendous existential and ethical importance. In the next and last

[15] Of course, Fodor is a realist about representations, content, and mental states, but is just not interested in topics such as selfhood and autonomy.

[16] In this sense, my proposal is also different from Daniel Dennett's "intentional stance" view (Dennett 1991): According to my proposal, we do not just *see* certain events as intentional actions from an intentional stance, as Dennett would have it. Rather, we also *play* the roles of intentional agents.

section, I will briefly point to some of those crucial disharmonies, in order to give a sense of the important implications of the new social enactivist account of moral selfhood.

7. Unity and Disharmony in Human Nature

This paper started with showing how two views concerning human nature are both important for us, but in conflict with each other. Meadian social enactivism has shown a path for reconciliation: We can think of human beings as human animals who play the roles of autonomous persons in the game of selves. But even though this allows for conceiving of human nature as unitary, this proposal makes intelligible and visible that our human existence is by no means harmonious. Referring back to the earlier discussion about harmonism, the social enactivist account proposed here is both anti-dualist and anti-harmonist. In short, it is perfectly compatible with each other that humans are animals and that humans play games (like many other animals). But our human animal nature is often in disharmony with the *content* of our self-conceptions within the game of selves. In the following paragraphs, I will first discuss the unity of human nature and then point to the disharmony in human existence.

I started developing the Meadian social enactivist account neither from a scientific reductionist analysis in terms of neurons, nor from a naively realist analysis in terms of autonomous persons. Rather, as enactivists and phenomenologists would have it, I started from an analysis of human beings as biological organisms. Enactivism and Mead's account of social self-constitution have shown that there is a natural biological and cultural way from understanding humans as biological organisms to understanding humans as role players with objectified self-conceptions. The social role play transforms our acceptances in part, so that we are essentially enculturated beings. There are neither different parts of the soul (as Plato thinks), nor different substances of human nature (as Descartes would have it) nor different layers (as Dreyfus (2005) and Husserl (1989) would have it). Thus, according to the account on offer, human nature is unitary.

But this unity in human nature very well compatible with the possibility of disharmony. For, the content of the game of selves can be different from how things really are. Our self-conceptions can be in tension with our biological nature. For example, a person might start thinking of himself as Superman; still, he cannot fly once he tries. But of course, conceptualizing oneself differently from how one is in a biological sense can also sometimes be a good thing and change reality. If we are not born as autonomous individuals with human rights, responsibility, and self-control, it is certainly a tremendous cultural achievement to treat each other as if we were such autonomous individuals (cf. Margalit 1996). For instance, even if we do not have libertarian free will, believing that we do, and that we will be held responsible for our deeds, can really increase our self-control (cf. Nietzsche 1886). In any case, the important point is that the unity of human nature is compatible with disharmonies between our real biological nature and the contents of our self-conceptions.

Indeed, there are many such disharmonies – at least, if the social enactivist point of view suggested here is adopted. For instance, consider the nature of reality. Immersed in the game of selves, we think that there is an objective mind-independent reality which is equivalent to the reality we experience. But from a philosophical point of view (informed by social enactivism), we know that the reality we experience is something enacted, something brought forth against the background of unconscious conditions. Consider the nature of the self. Immersed in the game, we think that we really are the particular autonomous persons we take ourselves to be. But from a philosophical point of view, we are just sense-making animals whose self-conception is constantly reconstructed and modified in the course of social interactions. Consider personal identity. Immersed in the game, we take ourselves to be one and the same person from birth to death. But form a philosophical

point of view, we are ever changing creatures. Consider the body. Immersed in the game, we think that we are persons who happen to be embodied in one particular body, but who could, at least theoretically, be transferred to another body (cf. Parfit 1984, cf. Cassam 2011). But from a philosophical point of view, we are living bodies who happen to have one self-conception, but who could also have another self-conception. Consider sociality. Immersed in the game, we take ourselves to be pre-social autonomous agents. But from a philosophical point of view, we can only play the causally efficacious role of pre-social autonomous agents in virtue of social structures. Consider rationality. Immersed in the game, we think that we have a capacity called "reason" which allows us to tell good from bad. But from a philosophical point of view, considering reasons is imaginatively talking to the generalized other, which is, in turn, an abstraction from the real-life others we happen to have grown up with. Consider moral laws. Immersed in the game, we take moral laws to hold universally. But from a philosophical point of view, what we take to be universal moral laws is an abstraction from the social rules which hold in the communities in which we are thrown. Consider finally moral agency. Immersed in the game, we think that we are, so to speak, only weak-willed shadows of the ideal virtuous agents we could and should be. But from a philosophical point of view, we are human animals who live under the guidance of a view of ideal virtuous agency, which we have socially construed.

Appreciating these disharmonies is of ethical and existential relevance. If we, so to speak, wake up from our immersion in the game of selves, we can recognize the game as a game, and thus get a new sense of who we are as human beings. This can be important in many ways. For example, in a negative vein, we can realize that we often do not have the control over our action which we think we have, when believing in free will or autonomy; situational and unconscious factors always play a crucial role. But in a positive vein, we can also see that we often have much more control over our lives than we take ourselves to have: We can tremendously influence who we are by changing our self-conceptions, in particular by changing which language game we participate in. Connecting this to ideas from Heidegger (1927) and Sartre (1943), we can say that there is genuine sense of human freedom in being ready to dis-identify with ("to nothing") the particular role-constituted identity one happens to find oneself thrown into. This way of thinking can even be carried to the social level, and it suggests itself to think: We as a community are collectively responsible for ethically improving and re-designing the social roles which constitute our existence as individual persons. Maybe a better society would not be a society with more moral persons, but a society where the social institution of individual moral personhood is improved. But developing these ideas is, of course, a topic for another occasion (cf. Weichold forthcoming).

8. Conclusion

Summing up, I have started with describing how we human beings conceive of ourselves as autonomous moral selves. This self-understanding is deeply embedded in our everyday moral practices, and it enables important practices such as holding people responsible for their deeds. Yet the self-understanding is seriously challenged by findings from the cognitive and social sciences, as well as by careful observations of human life. Human behavior appeared to be not a matter of agency and autonomy, but of animality and automaticity. Fortunately, enactivist cognitive science and Mead's pragmatist account of social self-constitution could be teamed up and come to the rescue of our everyday self-understanding. Enactivism was able to synthesize the manifold empirical findings into a unified conceptual framework, and was able to develop an empirically supported view of the self as subject, of human beings as animal agents whose actions consists in a constant dynamical embodied interactions with experienced solicitations in the material environment.

With the help of Mead, it was possible to make intelligible that humans are also embedded in and even constituted by a social environment: Based on the feedback of others, human animals learn which of their bodily movements count as moves in language games, and what those moves mean in terms of their social consequences. This gives humans the idea that they occupy a certain place in the social world, which then leads to the development of an objectified self-conception. Given that humans are so used to thinking of themselves in terms of their self-conceptions, and that this is reinforced by many social interactions, humans reify their self-conceptions and think that they really are what they are taken to be within certain language games. Thus, the Meadian social enactivist account allows thinking of human nature as unitary – but it is a unity in disharmony.

Of course, many important questions are still open, for instance about the details of the social mechanisms in self-constitution, about the potential for integrating more ideas from enactivism and Mead and other sources, about potential applications of the account to topics such as personal identity, free will, agency, rationality, and morality, and about the existential and ethical implications only hinted at.

Yet the social enactivist account can already be considered as bringing with it many advantages: It saves moral selfhood from the cognitive and social scientific challenges, offers a fruitful combination of enactivism, pragmatism, and moral theory, has important existential implications, and opens up a new understanding of what we are as human beings: creatures whose minds are not only embodied, embedded, extended and enactive, but also enculturated, and whose finest cultural products are our selves.[17]

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I. PRAGMATISM, COGNITIVE SCIENCE, AND CULTURE

NEUROPHILOSOPHY AS CULTURAL POLITICS

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ABSTRACT: I discuss Rorty's view of philosophy as cultural politics in order to do cultural politics to challenge Rorty's cultural political rejection of ontology in favor of cultural politics. My primary source for this challenge is Patricia Churchland's neurophilosophy, which is itself in part a product of cultural politics. In drawing on resources in neurophilosophy, I am critical of Rorty's core distinction between causal relations and the space of reasons. This criticism, moreover, affords further reflection on the Sellarsian game that both Rorty and Churchland play in their physicalisms. I conclude with considerations about a naturalism more Deweyan than Sellarsian and the Deweyan neurophilosophy of neuropragmatism.

I.

Richard Rorty's view of philosophy as cultural politics develops out of his earlier reflections about philosophy as edification. Cultural politics is thus concerned not only with "arguments about what words to use" but also with "projects for getting rid of whole topics of discourse" (Rorty 2007, 3). Rorty "want[ed] to argue that cultural politics should replace ontology, and also that whether it should or not is itself a matter of cultural politics…" Rorty drew upon William James, who "often comes close to saying that all questions, including questions about what exists, boil down to questions about what will help create a better world" (*Ibid.*, 5). This edifying attitude is central to Rorty's philosophy. It is also central to neurophilosophy.

I want to argue that neurophilosophy, broadly construed, is a form of cultural politics. In itself, such a claim is unsurprising from a point of view like Rorty's. I also want to argue, however, that neurophilosophy, broadly construed, challenges Rorty's own commitments within cultural political debate, including the role of ontology. I shall argue that neurophilosophy as introduced by Patricia Churchland directly challenges key claims within Rorty's thought, namely the distinction between reasons and causes, and the claim that "all awareness is a linguistic affair." I shall also argue that regardless of whose arguments win — Rorty's or Churchland's or whomever's — the rising chorus of neurophiles — people who argue that neuroscience is currently revolutionizing our world — needs to be met by cultural politicians because much of the neurophilia is nothing above and beyond a recapitulation of ancient and modern philosophy in a crass and representationalist materialism as especially exemplified by Descartes. In short, while there are many brands of cultural politics, practicing cultural politics does not commit one to Rorty's particular brand. As I make clear, there are myriad varieties of cultural politics – even within neurophilosophy itself.

II.

By *Cartesianism*, I mean the metaphysical commitments of dualism (not only that there are two substances mutually exclusive but also that one of those substances, as Descartes himself conceived them, could accomplish what the other substance does; e.g., Cartesian materialism claims to account for the immaterial soul via the material brain); the endorsement of the epistemological method of introspection, including the warrant attributed to the results of such a method; the epistemic standard of absolute and indubitable certainty; the foundationalist epistemology that drives both the method and the standard; the ontology of representations that, combined with the epistemology, produces the host of epistemological problems that characterize modern philosophy (such as the problem of the external world, the problem of other minds, and the hard problem of consciousness); and the atomism that has led to popular and influential conceptions of moral personhood as rooted in rational self-interest. Despite the efforts of philosophers like Rorty and Churchland to fight off Cartesianism, it continues to infect both scientific inquiry and the conversation that follows from it.[1] While many thinkers who are focused on the sciences

[1] John R. Shook and I have called this *creeping Cartesianism* (Solymosi and Shook 2013). Others have articulated similar (if partial) perspectives. Such as Bernstein's *Cartesian anxiety* (Bernstein 1983, 16–25);

of mind/brain are either hesitant to or simply silent on the consequences of the science for values, the very question of the relationship between science (including how to talk about it among other scientists and how to talk about it with non-scientists) and value is a question of cultural politics that, following Dewey and Churchland, is inescapable. These conversations are not merely academic, for they raise questions about our democratic practices, whether in the rise of neurolaw or in the growing consideration of non-neurotypical experience as we see in autism or Alzheimer's. For Rorty, such democratic and moral concerns have been at the heart of the fear of science and scientism or eliminativism, to which I now turn.

Churchland has recently offered a cultural political reason she and her husband Paul embraced the position of eliminative materialism for their neurophilosophy. It was a matter of academic capital: they were nobodies and Rorty was somebody (Baggini 2012, 70).[2] Early in his career, Rorty articulated and advocated the position, only to move slightly away from it in *Philosophy and the Mirror of Nature* (1979). This move away begins with a qualified acknowledgment of physicalism, namely that it is probably the right ontology but that given the nature of causal prediction, it is uninteresting (because impractical) for what most concerns humans and their lives. Concern for edification develops over Rorty's career into the cultural political denial of ontology's preceding cultural politics (Rorty 2007, 4, 5). Churchland, for her part, does not share Rorty's desire to replace ontology with cultural politics. But she does believe that a neuroscientifically robust ontology is a tool for doing cultural political work. That is part of the reason why she regrets the embrace of eliminative materialism, as it suggests the elimination of the things that matter most to human beings. If she "had to do it all over again, [she]'d call it really nice guy materialism" (Baggini 2012, 70). The question over labeling is itself cultural politics.

In *Touching a Nerve* (2013), Churchland reflects on her teaching this really nice guy materialism and what neurophilosophy means. She writes,

> Having taught neurophilosophy to undergraduates at the University of California San Diego for many years, I understand well that the sciences of mind/brain can be unsettling. Neurophilosophy, as I have described it, works the interface between philosophy's grand old questions about choice and learning and morality and the gathering wisdom about the nature of nervous systems. It is about the impact of neuroscience and psychology and evolutionary biology on how we think about ourselves. It is about *expanding* and *modifying* our self-conception through knowledge of the brain. (*Ibid.*, 20)

The unsettling effects of neurophilosophy have their roots in the rise of modern science and philosophy, from the unsettling of the divine right of kings and the rise of democracy to the concern over what Owen Flanagan and David Barack call neuroexistentialism (Flanagan and Barack 2010).[3] Rorty was no stranger to this unsettling; in fact, how he took up this historical unsettling was itself unsettling to professional philosophy in his removing philosophers from their position as guardians of reason and truth.

Two brief examples of Rorty's shift away from philosophy's grand old questions to new questions of cultural politics come from his 2007 essay. These are the

Barrett's *Cartesian disease* (Barrett 2011, 171–172); and, of course, Dennett's *Cartesian materialism*, *Cartesian theater* (Dennett 1991), and, most recently, *Cartesian gravity* (Dennett 2017, 20).

[2] Rorty's influence on the development of neurophilosophy has been recognized by Dennett 2000, Dennett 2015, and Churchland 2015; cf. Chemero 2009, and Solymosi 2014.

[3] Some readers may find that the threat Flanagan and Barack see in so-called neuroexistentialism is overrated and not on par with the Spanish Inquisition, during which philosophers and scientists risked not only their careers but also their very lives. Churchland's skepticism about the threat lends further credibility to this position. My point is not to make such an evaluation here but, rather, to note that there is unsettling, no matter the degree. While my own view is that this unsettling is healthy for it opens the door to inquiries that are ameliorative, this amelioration is by no means guaranteed. After all, uninformed and closed-minded people are often hostile to new ideas.

question of the existence of God and the question of the nature of consciousness. For Churchland, these two questions are answered ontologically. There is no good scientific evidence to warrant belief in an anthropomorphic God. As for qualia as David Chalmers and others have presented the issue, there simply are none because by definition they cannot be experimented upon. Rorty agreed with Churchland on such answers, but, unlike Churchland, he did not find the questions all that interesting or worth investigating. Rather, he questioned the questions, asking whether we are better off regularly raising these perennial issues instead of creating new ways of talking about ourselves that would create a better world.

Neurophilosophy through ontology does offer ways of thinking about ourselves that can create a better world. Churchland offers several examples of how our growing understanding of various medical conditions affords new ways of being morally responsible. Prior to having scientific understanding of a condition, many people thought themselves to have weak moral characters for not being able to do what one ought to do. An easy example is homosexuality. Another is Klinefelter's syndrome (in which a male has an extra X chromosome, causing effete characteristics), which Churchland's brother has. She tells us that "he found tremendous consolation in the physical explanation, along with release from the fear that somehow it was all owed to a character flaw for which he was wretchedly responsible. Most admirably, perhaps, it gave him a graceful determination to find harmonious ways of living with what he is" (Churchland 2013, 29). Similarly, members of the LGBTQ community may find scientific understanding of sex and gender to be consoling if not empowering. They are able to take responsibility for living their lives without having to live by (yet still having to struggle with) the old oppressive and intolerant religious discourse.[4]

Rorty may have responded to this line of argument by stating that these scientific inquiries began with and are concluded by cultural politicians: the community of scientists themselves who determine the problems to investigate and the methods by which to do so. Perhaps so, but this reply is simply to move the goal posts — a question of cultural politics no doubt. Where Churchland's perspective, however, differs strongly from Rorty's comes in the entangled issues of cause, reason, and the nature of awareness.

III.

Rorty's Sellarsian inheritance makes a sharp distinction between causal relations, which natural science investigates, and the linguistic relations of the space of reasons. The latter is concerned with providing justifications to the members of one's linguistic community (those who are playing the same language game); it is a normative enterprise. The world of causal relations, however, is not normative; it is strictly descriptive and, according to Sellars, not the source of norms or values. For Rorty, the causal relations include the neural world of C-fibers. This world is not the world of justification, the space of reasons in which persons rationally argue with one another. The space of reasons, moreover, is where awareness matters insofar as it is a linguistic affair. The awareness of non-linguistic or pre-linguistic things is nothing above and beyond a causal affair. On this view, the cries of a baby are on par with the squeak of a wheel. It also follows a favorite metaphor of Rorty's for thinking about the relationship between mind and brain. According to the computer metaphor, the mind is to computer software as the brain

[4] My use of homosexuality as an example is not intended to endorse a distinction between biology (or nature) and culture. In fact, I would argue that doing so is tantamount to establishing the Sellarsian distinction between the world of causal relations and the space of reasons. The continuity of culture and nature is elaborated upon later in this essay. The diversity of cultures illustrates the diversity of sexual interests and practices. A case in point is the sexual practices of the ancient Greeks, which are better described as homoerotic than homosexual.

is to computer hardware. Understanding every detail about the hardware or the brain, on this view, tell us nothing about the software or the mind, especially since different hardware can run the same program and different brains can have the same thought. The causal mechanisms do not matter for awareness, so long as the symbolic representations or programs are similarly computed. Hence, Rorty's disinterest in objectivity or truth when it comes to how to make life better for humans.

The computer metaphor, as has been noted since it was first proposed, is deficient. The brain is nothing like a computer, and the mind nothing like software. The metaphor is attractive to many because it materializes Cartesian dualism. As problematic as Cartesian *dualism* is, it's not just the dualism that is problematic. Cartesianism creeps in with the conception of mind as representational and computational. It is not just what the mind is made of but what the mind does that maintains the Cartesianism Rorty and Churchland both seek to evade. Materializing the mind into computer software was a novel way of reimagining the mind-body relationship. But it falls woefully short as the difference in operation between mind and computer could not be more stark.

Churchland describes the difference between computers and brains as follows:

> The slow dawning of deep ideas by human brains stands in stunning contrast with electronic computers. Computers can do many things much faster than we can, such as calculate. But computers — so far, anyhow — cannot do these things that human brains do slowly. They do not come up with new hypotheses about the nature of matter or the origin of DNA. (*Ibid.,* 25)

The Cartesian mind — regardless of its ontology — is a calculator, insofar as thinking is calculation, in which imagination is reducible to deductive inference. For all his talk about the problems of Cartesian philosophy, Rorty's excitement over Daniel Dennett's *Consciousness Explained*, in which Dennett offers an imaginative interpretation of the computer metaphor, illustrates just how pernicious the Cartesian disease is (Dennett 1991).[5] This creeping Cartesianism also finds its way into Churchland's representational view of the brain, for much of her and her husband's neurophilosophical writings are concerned with how the brain, not the mind, *represents* the external world.

For Churchland, the external world is causally closed and determined: so is the internal world of the brain. Here the distinction between reason and cause returns in the problem of free will. For Rorty, there is no problem because asking-for-and-giving-reasons-for-one's-actions is not addressed by causal relations. For many philosophers, contracausal free will seems to be served by such a distinction between physical cause and mental reason: somehow the reason to do something causes the physical body to act accordingly. Rorty finds such an approach confusing. He is not alone: Churchland and most non-philosophers do too. But for this set of people who don't think of contracausal free will as meaningful, the distinction between reason and cause just doesn't hold. Churchland finds the notion that rationality works outside of a "cause-free zone" to be nonsense. For her and the many nonphilosophers with whom she talks about free will, "A reason can be a perception, an emotion, a memory, a solution to a problem, an evaluation of the future consequences of an action, a judgment about the weight of the evidence, and so forth. *Any* of these can be

[5] See Rorty 1993, Rorty 2000, Dennett 1993, and Dennett 2000 for their conversation over realism and metaphor. Others contend that Dennett loses this debate, insofar as he does not proffer a theory of (scientific) inquiry, cf. Elton 2003, Zawidzki 2007, and Thompson. 2009. In Dennett 2017, Dennett comes closest to explicating his understanding of Sellars and his jargon (manifest and scientific image, reasons and causal relations, and so forth) as well as how the Pittsburgh school of Sellarsians (Robert Brandom, John Haugeland, among others) relates to Dennett's position (see pp. 40–43). Further work is necessary, not only on Dennett's relation to the Sellarsians and Pittsburgh philosophers, but also on Dennett's evolutionary account of reasons (what he calls "free-floating rationales") and Dewey's evolutionary account in Dewey 1925/LW1.

reasons, and all involve functions carried out by the physical brain" (Churchland 2013, 180).

The distinction Rorty held between causal relations and the space of reasons becomes blurred in light of neuroscience. Indeed as other proponents of brain research have argued, the brain is the cultural organ. Without nervous systems, there simply would not be human culture. This line of argument — coming from interdisciplinary fields like neurosociology (Franks 2010) and neuroanthropology (Lende and Downey 2012) — suggests that the continuity between nature and culture or nature and spirit is funneled, in part, through embodied nervous systems. Cultural politics cannot be limited to examination of the relations between propositions without understanding that these propositions are of the world, including the en-brained bodies embedded in the world in which they enact. Propositions are not about the world in an epiphenomenal sense. The world not only causes such propositions but is also altered by them.

IV.

Rorty's view of natural scientific inquiry in distinction to humanistic conversation is blurred further by the developments of socio-cultural neuroscience. The early history of neuroscience can be usefully understood as either investigating non-human nervous systems, which are then understood to be natural or non-cultural, or by investigating human nervous systems, most especially the brains of people who have suffered some trauma, such as Phineas Gage or HM.[6] The consideration of neurons in professional philosophy, especially in the 1970s, was focused on rather atomistic examples, notably that C-fibers had something to do with pain. Other popular examples included the lone brain in a vat or hordes of scientists studying single neurons firing. Through the 1980s and 1990s, neural networks were receiving more attention by both practicing scientists and by neurophilosophers. Cultural politics accounts for this shift by noting that the mathematical models (which are expressed in formal mathematical language) developed better accounts of the phenomena under examination. The community of inquiry took the language of networks to be more useful for materially explaining mental representation.

Over the past three decades, our understanding of neural networks has advanced thanks to various imaging technologies that afford us real-time images of neural functions.[7] To consider neuroscience as a programmatic inquiry into a non-human reality is to show a nearly willful ignorance of the science, its methods, its tools, and its problems. Indeed, as exciting as the development of fMRIs, for instance, has been, they can only address questions capable of being handled within a magnetic tube, in which the body within the tube must remain very still. No question we spend part of our lives at rest; but so much of it, especially within the evolutionary-historical context of human being, is active. Moreover, this activity occurs in a world that is both natural *and*

[6] Phineas Gage is now remembered for having survived in 1850 an accident in which an iron bar entered at high velocity through his "head just under the left eye and emerged from the top of his skull on the right side" (Glickstein 2014, 311). It is not simply that Gage survived this traumatic event. Rather, his entire personality was significantly affected by it. He went from being an involved and cooperative member of society to not being able to commit to friends, family, or a job. From his accident and temperamental change, neuroscientists began inquiring into the relationship between the brain and personality. In the first half of the twentieth century, HM suffered a bicycle accident as a child that caused brain injury, which led to a series of epileptic seizures. Doctors hoped to help HM by "remov[ing] a sizable portion of the hippocampus and adjacent structures of the temporal lobe on both sides" (Glickstein 2014, 237). Unfortunately for HM, he was left with anterograde amnesia, the inability to form new memories but still holding on to long-term memories from before his operation. As Glickstein reports, "When looking through a family photo album he would encounter a picture of an uncle he was particularly fond of. Each time when his mother told him that the uncle had died, HM wept yet again" (2014, 237). Fortunately for science, we have learned much from decades of studying HM about the brain and memory.

[7] On the relationship between brain imaging and pragmatism (especially Rorty), see Shulman 2013, 49–53.

cultural. The world is natural insofar as it is not supernatural, but the natural human world is culture. Human brains are cultural artifacts as much as they are natural developments.

V.

As artifacts, humans and their brains are the product and producer of human individuals and cultures. To understand how human nervous systems operate is to understand the bodily and environmental context in which they operate. This context is symbolic; it is linguistic; it is also affective and dynamic. The awareness is far more than a linguistic affair. How we move forward with the new advances coming out of the neurosciences that are anti-Cartesian requires cultural political work.

The anti-Cartesian advances I have in mind are the following three. First, human beings are socio-cultural. Our conversations and our inquiries require human relationships that begin in utero. Second, human intelligence is not modular. Our perceptions, feelings, thoughts, etc., are not separate faculties run by different parts of the brain; rather different parts of the brain contribute to various functions through creative reuse; so, for example, one part of the cortex may contribute to memory during one event but several hours, weeks, or years later, that memory could be handled by another part of the brain while that part of the cortex is doing something else; to put it bluntly, the so-called modules are multitools put to ever new purposes.[8] Finally, human intelligence is not a strictly neural affair (the brain is necessary but not sufficient for mentation; not only are other brains required but so are other enabling conditions like bodies and cultures).

This new neural view, however, remains very much in the minority, as the growing chorus of neurophiles are not finding continuities between nature and culture but are busily reducing spirit to matter. Moral psychology is chock full of such egregious moves, from Jonathan Greene's attempts (Greene 2013) to locate utilitarian ethics and deontic ethics in separate modules of the brain to Jonathan Haidt's recapitulation of Plato's tripartite soul that misrepresents our cognitive processes as predominantly unconscious (Haidt 2012).[9] Indeed, Haidt's view complements other neurophile views of free will and responsibility. The argument, in brief, is that since so much of our daily lives is orchestrated by neural operations below conscious awareness, we have little reason to believe that our conscious lives, notably our rationality and ability to control our behavior via conscious intervention, are not illusory.

Consider Haidt's metaphor of a rider on an elephant, in which the rider is conscious reason and the elephant unconscious cognitions.[10] The rider is under the illusion that his decisions determine where the elephant goes, when the fact of the matter is that the elephant goes where it pleases. The Platonic ideal of the rider having mastery over the elephant is a dream, on Haidt's view. To draw together Haidt and Rorty is to see the rider as the space of reasons, where the rider provides ad hoc rationalizations for why the elephant does what it does, while the elephant represents the causal relations investigated by natural scientific inquiry. Haidt would say that this causal world is the real world; Rorty resists that easy assertion. But the parallel I draw here is at odds not only with Plato but also with Churchland's view of neurophilosophy as modifying, expanding, and enriching our self-conception, which has its ancestral roots in Plato and Aristotle.

[8] This follows from Anderson's neural reuse theory (Anderson 2014) that is not only a thorough criticism of the computer metaphor of mind but also a detailed alternative to the metaphor that develops out of the early pragmatists, notably Dewey's critique of the reflex arc in Dewey 1896/EW5. Cf. Chemero 2009, 18–20.

[9] Haidt and Greene are just two of a growing plethora of works relating brain science to ethics and politics. To provide an exhaustive list goes well beyond this essay's limits.

[10] Cf. Haidt 2012, 44–48, and Johnson 2014, 89ff.

Rorty advocated for philosophy as conversation, notably the conversation of humankind that reaches back to the Socratic dialogues. Humans as conversationalists may well be at the core of our self-conception. That self-conception becomes complicated, however, with greater neuroscientific understanding. On the one hand, we are beginning to understand how it is possible to have conversations — not in a transcendental manner but in a thoroughly natural one — with advances such as polyvagal theory, which inquires into the orchestration of facial nerves and muscles with the larynx and the cortexes of the brain. On the other hand, with neuroscience comes neurodiversity. The Western self-conception that begins with Plato and culminates in the Cartesian-Kantian ego is directly challenged by the growing recognition that non-neurotypical experience is not abnormal but occurs within a normal range of human life. Two examples are autism and bipolar disorder. As we learn more about the neural mechanisms underlying these ways of being human, our cultural politics faces new questions that must reckon with the ontology in order to create a better world, for neurodiversity forces the question of what it means to be human.

Teaching philosophy as the conversation of humanity presupposes that to be human is to be able to converse. For many autistic people, they struggle with everyday conversations because they are not able to pick up or understand unconscious behavioral cues. In my own teaching, I have seen some autistic students struggle with Plato – yet others prove to be master dialecticians from the start. The growing awareness of neurodiversity raises further questions about our communities. For the sake of illustration, consider the difficulties that come with labeling students autistic and thus requiring assistance with their learning difficulties. Some autistic students may struggle with both reading dialogues and participating in them in class. Some autistic students may struggle with the reading but not with participating; others with the participating but not with reading. And still others will struggle with neither reading nor participating, perhaps being adept at both. The cultural political questions that arise from this admittedly oversimplified sketch are many, ranging from questions about objective standards by which to sort students to best aid in their learning to questions about whether there really is such a thing as autism and not a plethora of non-neurotypical experiences hitherto inadequately labeled autism. Other questions are pedagogical, for example, what training should instructors have to aid autistic students with assignments designed for the neurotypical? Further questions are social-political: consider an extreme example, if humans are incapable of conversation, do they deserve full rights and duties in a society designed for conversationalists, or do they deserve protections but not the responsibilities? To treat the causal mechanisms as strictly descriptive and thus carrying no normative weight about how to create a better world is to undermine scientific and democratic endeavors entirely.

It is not only autistic people who may struggle with conversation. Various mood disorders may prevent people from engaging in the critical dialogue. Further still are the difficulties presented by Alzheimer's. Socrates was concerned with the loss of memory that writing would bring about because it would undermine conversation. Without being able to recall facts, stories, past events, etc., as we see with Alzheimer's, conversation devolves into mere gossip, into cooing. Furthermore, without understanding and appreciating the neuroscience of these conditions, our conversations with humans who suffer directly from them and our conversations about these humans are left lacking. Such humans could be reduced to relatively complex squeaky wheels.

VI.

The positions of Rorty and of Churchland, of course, are not the only viable ones in the larger debate about the standing of normativity within a naturalist framework. For example, Michael P. Wolf and Jeremy Randel Koons

argue in *The Normative and the Natural* (2016) for a naturalism in which the normative is not descriptive but about how the world should be, from how inquirers should act according to epistemic norms to how persons should act according to moral norms. But these norms are not simply to be discovered as facts about water and H_2O are. Epistemic norms may guide inquiries into water and H_2O, and social or moral norms may motivate inquirers to examine water and H_2O. But for Wolf and Koons, as it is for many naturalists, science is strictly descriptive and normative claims cannot be descriptive. Wolf and Koons believe that normative claims can be true in some sense (and thus escape relativism) by maintaining the distinction between the world of causal relations (the nonnormative discourse) and the space of reasons (the normative discourse). And so, with Rorty and Churchland, Wolf and Koons carry forward a naturalism influenced by Sellars that creates the conflict between the scientific and manifest images.

But the opposition between causal relations and the space of reasons is simply at odds with our lived experience. The pragmatic naturalism of John Dewey influences the version of neurophilosophy I call neuropragmatism.[11] The key difference between this naturalism and Rorty's or Wolf and Koon's is the conception of inquiry. For Dewey, inquiry of any sort – scientific or otherwise – is never strictly descriptive and thus nonnormative. The scientific realism of many naturalists never arises, nor does the accompanying anti-realism of the opposing naturalists. With Dewey, Rorty and Wolf and Koons reject representationalism, but unlike Dewey they take the linguistic turn. Where Churchland resists that turn through a neural or bodily turn, Wolf and Koon take a different route than Rorty toward embodiment. Dewey, however, never makes any of these turns because he begins with the lived experience of living creatures in dynamic environments.[12]

Rorty resists talk of truth and objectivity (which Churchland, and Wolf and Koons seek to maintain) because such talk brings to (his) mind the mirror of nature. An idea is objective insofar as it accurately mirrors/reflects/represents/corresponds to the real thing in the world that the idea is about. But that view of objectivity is not the only one. Dewey's view of experience as a transaction between organism and environment circumvents the dualism implicit in representationalism. Instead of experience as a passive and removed spectator of the world or of ideas reflecting the world, experience is a doing and an undergoing. An organism does things to its environment. Such doings feedback to the organism as the environment responds. The organism thus undergoes. Such undergoings bring about further doings, and so forth. When an intelligent organism, like a human being, deliberately does something to the environment in the anticipation of bringing about a specific set of consequences, the environment will *subject* the organism to those consequences. If those consequences are amenable to the intentions of the organism, then the organism has found a way to work with the world for the time being. But if the environment responds otherwise, that is, if the organism's anticipations are not met, then the environment has effectively *objected* to the organism's plans. Such a view is the one Dewey

[11] Since Dewey, the word *pragmatism* has come to denote more than an epistemology or philosophy of science. It now means an entire philosophical tradition of which Dewey is a main figure. Nevertheless, it is worth noting both Dewey's later reservations about using the word *pragmatism* (1938/LW12, 4) and his description of his position as *cultural naturalism* (1938/LW12, 28). For more on the historical context of Dewey and the call for a neuro-informed cultural naturalism, see Dalton 2002, 278–292.

[12] Dennett 2017, 291, n. 89 directs the reader to the work of Azzouni 2013, in which we find "his divorce of quantification and ontological commitment". Consideration of this point goes well beyond this essay, but it is one worth much further discussion with regard to cultural politics. Another position worth further consideration because of its rejection of the Sellarsian premises of Rorty, Churchland, Dennett, and others is the Danish philosopher, Jan Faye – whose position is close to Dewey's, despite Faye's becoming influenced by Dewey much later. See Faye 2016, chapter 1, "Evolutionary Naturalism," pp. 1–30.

proffered as a naturalistic way of maintaining objectivity while respecting the situatedness of the inquiring subject. Such a view, however, does not require the further distinctions between nonnormative descriptions and nondescriptive norms.[13] To paraphrase one of Dewey's quotidian examples, if a gardener wants to grow lush tomatoes, then the gardener needs to maintain specific conditions of sun, shade, water, and soil for the specific seed of tomato.

When it comes to neurophilosophy more generally – that is, without concerning ourselves with the differences in variety, such as neuropragmatism – hypothetical imperatives may abound without giving up on objectivity or truth. Rorty's resistance to awareness beyond the linguistic simply does not fit with evidence ranging from gardening to primatology. Take, for example, modern domestic tomatoes (*Solanum lycopersicum*), which share "no more than 5 percent of the total genetic variation present within the wild species and primitive varieties" (Estabrook 2015). The wild ancestor of tomatoes is the *Solanum pimpinellifolium* and "is no bigger than a shelled pea" (*Ibid.*). The tomatoes we have come to recognize at the market are not natural but artificial: they are products not simply of cultural politics – we are not simply redescribing that which was otherwise around – but are the products of agriculture. Agriculture, for Dewey, is a variety of technoscience – both an art and a science, so to speak – that draws methodically and deliberately on historical traditions of cultivating the earth in order to develop better ways of farming. Through technoscience we have created not simply new things to talk about but the things themselves.

Primatology also provides many examples of the limitations of the linguistic turn. A particularly relevant example is Santino, a male chimpanzee housed at the Furuvik Zoo in Sweden. Santino was observed to behave with foresight by deliberately stockpiling rocks within his enclosure that he would later hurl at visitors. The primatologist to first report this behavior, Mathias Osvath, concluded that this was unequivocal evidence of future planning in Santino (Osvath 2009).[14] Louise Barrett discusses this case in terms of autonoetic consciousness, which is just another way of discussing the unique form of awareness that is commonly believed to be possible only with language. For Osvath, Barrett notes, Santino and thus non-human apes have an awareness that is supposed to be uniquely human but evidently is not. Barrett goes on to caution against abusing the anthropomorphizing that is not only tempting but also very useful in evolutionary approaches to life and mind. This cautioning is not an a priori rejection of anthropomorphizing, but rather a call for fallibilism and experimentalism. That is, we should not just assume that an organism of one species is *necessarily* similar to an organism of another species simply because of a shared lineage or similar physiology. Her reasons include the fact that these different species are different because these organisms adapted to different environments. Without understanding those differences in situatedness, Barrett argues, we can easily fall into a trap of anthropomorphizing without evidence: we give a causal explanation that simply reads the space of reasons into the situation without further cause or justification.[15] In some cases, anthropomorphizing works; in others, it ends up

[13] Two contemporary philosophers, who are influenced by both Dewey and Sellars (and in different ways), Owen Flanagan 2007 and Peter Godfrey-Smith have independently taken up a distinction between subjective and objective theories of consciousness or experience. Flanagan seems to succumb more easily to Cartesianism than Godfrey-Smith; nevertheless both would benefit from Dewey's reconstruction of subjectivity and objectivity here. See Flanagan 2007, 7ff., and Godfrey-Smith 2016, 137ff.

[14] Osvath 2009 is originally cited and discussed in Barrett 2011, 1–6.

[15] Indeed, Barrett draws upon Dennett's intentional stance, which, it is worth noting again, Rorty found to be in the spirit of his project despite Dennett's realist objections. See Barrett 2011, 1–19. Cf. n. 5 above, and Churchland 2013, 233ff, where she criticizes Dennett's view of consciousness, which she finds too linguistic as well.

overreaching in light of further evidence. To return to the example of Santino, perhaps he does not have any awareness because he isn't linguistic in the way humans are. Perhaps he does have some awareness much like humans because he is much like humans. Or, perhaps, he has a variety of awareness that is not linguistic but is nevertheless a real feature that we humans struggle to comprehend. Which of these three it is (or if it is some other possibility) is a matter of doing the experimental work of technoscience.[16]

VII.

Neurophilosophy as cultural politics, then, challenges the conversation of humanity that Rorty advocated as the on-going role of philosophy. This challenge is, to be sure, part of this conversation. Rorty valued the capacity conversation has for self-creation. The old systematic ontology of modern philosophy did not fit well with this hope for edification. However, Rorty relied too much on the linguistic turn. Neurophilosophy, broadly construed, opens the possibility for a cultural politics in which ontology plays an ameliorative role. This role is eliminative, but perhaps not in the way Rorty or Churchland would suspect. Instead of worrying that scientific facts will eliminate moral facts or values, the elimination that neurophilosophy is well situated to effect is the elimination of the worry about elimination, about reducing the human to the natural, about reducing values to facts. The classical pragmatists began this reconstruction of inquiry and culture with the aim of democratic amelioration. Rorty welcomed democratic amelioration via conversation; Churchland welcomed the results of scientific inquiry. Neither has taken up the philosophical project of reconstruction that Dewey advocated. Rather, they remain within the Sellarsian project of reconciling two incompatible images.[17] The hard distinction Rorty held between the space of reasons and causal relations requires reconsideration, as Churchland suggests in her claim that causes can be reasons. This reconsideration is especially pertinent to how we think about the relationship between inquiry and conversation. For not only do our inquiries challenge just what it means to have a conversation or to be a conversationalist, our inquiries are blind without conversation, and our conversations empty without inquiry.

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[16] Godfrey-Smith 2016 offers a further and illuminating example of animals that are both seemingly anthropomorphic (because of seeming mischievous and intentional behavior) and utterly alien to human experience (because of differences in natural environment, neural organization, physiological variation, and otherwise different evolutionary history): cephalopods. See especially chapter 3, "Mischief and Craft," pp. 43–76, which focuses primarily on the octopus.

[17] I have argued that classical pragmatism broke into the explicit but scientifically short-sighted neopragmatism of the linguistic turn and the implicit and experimentally-informed neurophilosophy. I propose that the next phase for both pragmatism and neurophilosophy is neuropragmatism. See Solymosi 2014.

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GROUP COGNITION IN PRAGMATISM, DEVELOPMENTAL PSYCHOLOGY AND AESTHETICS

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ABSTRACT: From embodied pragmatic and phenomenological standpoints, the body is a system that falls into synchrony by coordinating around worldly contours. This engenders sensorimotor organization that constitutes perception, a view also defended by enactivists. I examine how similar coordinations occur in group contexts. I begin with a Deweyan account of perception. I then consider group action, locating Colwyn Trevarthen's developmental research in a Deweyan framework, later linking it to Dewey's aesthetics, which helps explain how perceptual and cognitive coherence emerge. I connect all this to the notion of "social affordances" with the aim of expanding on Dewey's idea of experience as culture. I conclude that our psychological landscape begins as overwhelmingly social and remains so throughout life. By asserting this, I do not deny that physical movement is at play from day one, but suggest that it is intertwined with social life and social affordances all along, rather than the latter being built upon the former.

I. Introduction

From the standpoint of John Dewey, along with phenomenologists such as Maurice Merleau-Ponty, the body is not a collection of adjacent organs, but a synergistic system that falls into synchrony by coordinating around worldly contours. From embodied pragmatic and phenomenological standpoints, moreover, not to mention that of enactivists such as Kevin O'Regan, Alva Noë, Daniel Hutto and Eric Myin, this brings about sensorimotor organization that constitutes perception, as when fingers—which could in principle move this way and that—cohere around explorations of a bottle, integrating movement and sensation into perception.

In what follows, I examine how comparable coordinations occur in group or social contexts and have similar integrative outcomes in our experiential landscape. However, I also look at differences between the two cases. I start by considering some of what Dewey and like-minded thinkers say about perception. I then discuss group action, attending especially to the developmental research of Colwyn Trevarthen, who in fact cites influences in embodied philosophical traditions (see Trevarthen 2015a, 403). I later connect this to Dewey's aesthetics, which helps explain how perceptual and cognitive coherence develop. After this, I consider research on aesthetic and social affordances—all of this in order to fill in and expand upon Dewey's idea of experience as culture. A little against certain recent accounts insinuating that, on a Deweyan account, physical movement is primary in experience (see Crippen 2014, 2016a, 2017), I conclude that our psychological landscape begins as overwhelmingly social and remains so throughout life. By asserting this, I do not deny that physical movement is at play from day one, but suggest that it is intertwined with social life all along, rather than the latter being built upon the former. I also argue that the social world affords and constrains actions and therewith experiences in ways similar to the primarily physical world, and, at the same time, that social affordances introduce something new insofar as many are not present in the immediate brute world. Taken together, this emphasizes that the notion of experience as culture is more than a standard sensorimotor account, even while intimately related to it. This is the main point I hope to establish, along with the continued fruitfulness of Dewey's ideas in contemporary work on mind.

II. The Body as Synergistic Activity

We reach out for things and press into them, giving into and receiving their form. When handling a round, lacquered table leg, our fingertips glide over a surface that somewhat pulls but does not bite flesh, so that grainy, slightly oily smoothness is undergone in the course of the interaction. So too is the roundness of the leg as our fingers wrap around it and receive its form. As Dewey (1934) accordingly argued in a mix of language that accepts some of what both rationalists and empiricists say, perception is "an act of the going-out ... in order to receive" (53), and the qualities experienced are consequences of our explorations and

manipulations. This idea has roots in many places, including ancient philosophy, C. S. Peirce's pragmatic maxim and psychological theories emphasizing the motor-body that were in vogue in the late 19th and early 20th century (see Crippen 2016a, 2017). It continues in the work of Mereau-Ponty (1945), who emphasized that things handled utilize "the time occupied by our tactile exploration[s]" and "modulates the movement of our hand" (315), thereby patterning perceptual experiences. The idea remains a cornerstone in enactive theory, with Noë (2004, 73) and Erik Myin and Jan Degenaar (2014, 91) offering examples nearly identical to Merleau-Ponty's.

What applies to tactile experience pertains broadly to perception, which is generally an effect of bodily coordinations with sensory phenomena. That it involves bodily coordinations means it is also a product of changes introduced to the world. On a trivial level, the cornea bends light reflected from the lacquered wood, with the lens adjusting and modifying it further to bring it into focus. This involves a bodily coordination and a change to the world, namely, the bent light. On a less trivial level, our gaze is exploratory, and consequently involves more than the eye. When looking at the surface of a wooden table, to use Dewey's (1934) words, "[i]t is not just the visual apparatus" that becomes active, "but the whole organism" (122). Though we tend to isolate "the optical apparatus ... in anatomical dissection" and philosophical discussion, "it never *functions* in isolation. It operates in connection with the hand in reaching for things and in exploring their surface, in guiding manipulation of things, in directing locomotion" (100). At a Christmas party, the sight of a table overflowing with food and drink invites outstretched arms, grasping, clinking, inhaling aroma, opening of mouths, chewing, gulping and more, not to mention gathering and chattering. All of this together characterizes the experience. Notice, moreover, that although we sometimes look without grabbing and so forth, we in fact spend most of our waking life handling and ambulating. This means coordinating actions around contours of environments and things in them, and introducing changes. Consequently we come to see the world in terms of possibilities of action, even when not moving, a view prominently expressed not only by pragmatists, but also in Merleau-Ponty's phenomenology, J. J. Gibson's (1979) theory of affordances and enactive theory.

For such reasons enactivists, along with earlier commentators such as Dewey and Merleau-Ponty, suggest visual experience, like the example of tactile perception, is constituted through action. Noë (2004) explains:

> Like touch, vision is *active*. … You and your eyes move around the scene the way you move your hands around the bottle. As in touch, the content of visual experience is not given all at once. We gain content by looking around just as we gain tactile content by moving our hands. You enact your perceptual content, through the activity of skillful looking (73).

Enactivists consequently maintain that visual experience and indeed all perception "is constituted by the exercise of a range of sensorimotor skills" (Noë 2004, 90). Numerous experiments testify to this. One is Paul Bach-y-Rita's (e.g., 1983, 1984; and Kercel, 2002) work on tactile-vision substitution devices where a head-mounted camera delivers stimulation via vibrations on skin or electrical current on the tongue. After actively exploring their environment for a time, users are able to identify positions and numbers of objects, to grasp them and acquire an analogue to vision. The point, again, is that perception is a matter of how sensation coordinates with bodily action directed at the world. This suggests not only that seeing is constituted through action, but that it is also "an affair of readiness on the part of motor equipment" (Dewey 1934, 98). Thus when we encounter doorknobs or sidewalks, we perceive things we can grab and pathways for walking, even if we chose not to reach or move.

According to Dewey and more recent commentators (e.g., Varela, Thompson and Rosch 1991, Ch. 8; Kühle 2017), we in fact learn to see by virtue of how our bodily actions and sensations have synchronized with the world; and when we act, as already emphasized, it is never with just one capacity. Eating popcorn, for example, mobilizes many modalities, including seeing, hearing, tasting, smelling, reaching, chewing, swallowing and much more, not to mention socially integrative emotions when it is shared in movie theaters. All of this joins to become "members of *a single act*" (Dewey 1934, 256), so that "[m]otor and sensory structure form a single apparatus and effect a single function" (Dewey 1934, 255), and perception occurs insofar these capacities and sensitivities, along with emotional and intellectual ones (Dewey 1934, 22, 53), "work in relation with one another" (Dewey 1934, 175). They do this insofar as they synchronize and "intercommunicate by opening on to the structure of the thing," as Merleau-Ponty put it (1945, 229). It is for reasons like this that he said that "the body is not a collection of adjacent organs, but a synergic system, all the functions of which are exercised and linked together in the general action of being in the world" (1945, 234).

III. Group Activity and Nascent Social Life

Anthony Chemero (2016), who is influenced by both pragmatism and phenomenology, notes that "a bicycle responds to your action, while simultaneously constraining it" (148). The responding and constraining form what Dewey understands to be perception of the world, in this case a predominately kinematic one. The oft-cited situation with a blind person tapping and perceiving with a cane is similar, only in this case its point becomes "an area of sensitivity, extending the scope and active radius of touch, and providing a parallel to sight" (Merleau-Ponty 1945, 143). Introducing two or more organisms into the interaction changes things, but with similarities also preserved. Two dancers "engage in constant push and pull so that they form a unit" (Chemero 2016, 148), much as the blind individual, cane and world do. As with individual bodies, multi-organism activity can thus form synergic systems that coordinate around environmental contours. An illustrative example is beetles falling into coordinated activity around balls of dung, gravitational forces and so forth to roll dung rapidly over significant distances. A more impressive example is the Portuguese man o' war (see below). Although it resembles a jellyfish, complete with venomous tentacles, it is not in fact a single organism, but a colony of them that form a synergic unity to the point that the group appears as one animal. This shows that what goes on with individual bodies also occurs in group settings. There are numerable examples of group activity in the human world, whether in sports, raising glasses at a Paris dinner or in back-and-forth banter, and they are not unlike coordinations that are the bases of our perception with the world.

Group coordination can become more complex still. John Steinbeck (1939) provides a nice example and one reminiscent of Martin Heidegger, not to mention Dewey. In *The Grapes of Wrath*, he described Great Depression migrants flocking to California:

> The cars of the migrant people crawled out of the side roads onto the great cross-country highway, and they took the migrant way to the West. In the daylight they scuttled like bugs to the westward; and as the dark caught them, they clustered like bugs near to shelter and to water. ... [T]hey huddled together; they talked together; they shared their lives, their food, and the things they hoped for in the new country. Thus it might be that one family camped near a spring, and another camped for the spring and for company, and a third because two families had pioneered the place and found it good. And when the sun went down, perhaps twenty families and twenty cars were there.
>
> In the evening a strange thing happened: the twenty families became one family, the children were the children of all. […] In the evening, sitting about the fires, the twenty were one. They grew to be units of the camps, units of the evenings and the nights. A guitar unwrapped from a blanket and tuned—and the songs, which were all of the people, were sung in the nights. Men sang the words, and women hummed the tunes.

> Every night a world created, complete with furniture—friends made and enemies established; a world complete with braggarts and with cowards, with quiet men, with humble men, with kindly men. Every night relationships that make a world, established (264-265).

Steinbeck added that "[a] certain physical pattern is needed for the building of a world" (266). This might include "water, a river bank, a stream, a spring, or even a faucet unguarded. And there is needed enough flat land to pitch the tents, a little brush or wood to build the fires" (266-267).

Chemero and his research team have developed fairly cogent laboratory demonstrations of group synergy, albeit nothing of course approaching the Steinbeck or Portuguese man o' war example. As Chemero (2016) explains:

> In our collective problem solving research, pairs of individuals engage in a joint sheep herding task. They control 'sheep dogs' that work to corral sheep into the centre of an arena over the course of a series of 60-second trials. In a successful trial, the pairs keep all of the sheep (three, five, or seven of them, depending on the trial) in the inner circle of the arena in for 70% of the last 45 seconds of a trial. If any sheep touches the edge of the arena or if all of them are outside the outer circle for any portion of the trial, the trial is halted. The pairs were not allowed to speak with each other. Nearly all of the pairs managed to succeed at the task, and nearly all of them had the same progression of strategies. In early trials, pairs engaged in what we call search and rescue, in which each player tries to round up the sheep on their side that is furthest from the centre. This strategy does not work. After several failed trials at this strategy, many of which include participants bumping into one another while trying rescue sheep, successful pairs switch to a strategy in which they coordinate with one another in an oscillatory pattern, either in phase or antiphase (145).[1]

A central point for Chemero is that activity rapidly becomes joint, so that two people become one synergy, or, in a way, an organism since the root of the word "organism" is organization (see Abate 1999, 698). Insofar as these activities are sensorimotor coordinations, there are grounds for positing that experience to can become joint.

Although lacking this kind of experimental verification, Dewey of course recognized the relevance of group activity in experience. He did so by explicitly equating the two, and also by drawing from Greek thinking that understood experience as custom and cultural habit. In drawing on ancient ideas, Dewey emphasized that having experience meant being experienced and hence skilled, an observation reinforced by etymology. Since skills are overwhelmingly acquired in social contexts, for example, apprenticeships, whether formal or informal, this again highlights the potentially cultural and thus group nature of experience.

The cultural side of experience is a point that enactivists of a Noëian vein came to late and have elaborated on too little given that the outlook explicitly equates perception to sensorimotor skill. A reason that the cultural side has historically been understated may relate to an obstacle Dewey faced in advancing his concept of experience, namely, that Modern era thinkers had overwhelmingly reduced it to impressions hitting passive sense organs. This understanding excludes the role of active bodies and group activity, and makes experience an essentially internal phenomenon, an idea Dewey of course challenged. Dewey thus lamented that his concept had been misunderstood, which is why, late in life, he famously declared that he would, were he to rewrite *Experience and Nature*, be more explicit, and give it the title "Culture and Nature" (see Dewey c. 1951, 361). While sounding a little odd to Modern ears, everyday language sometimes equates experience to culture and also worlds, as when we speak about the French experience, world or culture, or the world, culture or experience of student life; and Dewey in fact suggested that our first experiences and those that follow are overwhelmingly social.

[1] To see get compelling sense of this phenomenon, see videos at: http://www. emadynamics.org/bi-agent-sheep-herding-game/.

In *Human Nature and Conduct* (1922), he noted that "each person begins a helpless, dependent creature" (62), and added in *Reconstruction in Philosophy* (1920) that "the contacts of the little child with nature are mediated by other persons. Mother and nurse, father and older children, determine what experiences the child shall have" (92). Then, summing up, he wrote: "[t]here is doubtless a great mystery as to why any such thing as being conscious should exist at all." However, "there is no mystery in its being connected with what it is connected with. By this, Dewey meant "both that it will be shared by those who are implicated in the associative custom, or more or less alike in them all, and that it will be felt or thought to concern others as well as one's self (1922, 62). Dewey accordingly maintained that our behavioral and psychological landscape is intertwined with that of others from the very beginning and that this continues through life.

Trevarthen has advanced a highly detailed version Dewey's insight, illustrating the emphatically sensorimotor nature of connections between infants and caregivers, and showing the two are coupled units, defining one another's behavioral and psychological terrain. His research and that of likeminded scholars shows that neonates coordinate the rhythms of their movements and gaze with those of caregivers, responding to purposeful activity and emotional expressions, while also engaging in behaviors that are "seductive" insofar as they provoke caregivers into particular interactions (e.g., Trevarthen 2011, 2015a). He cites evidence that sympathetic adjustments of heart rates even occur during interactions. Together this suggests that infants are finely attuned to their environment, which at early stages centers on caregivers, and that for interactions to proceed, caregiver and infant must be attuned to one another. Consequently infants become avoidant and distressed when "the mother's behavior, however friendly and expressive, is inappropriate in timing and unreactive to what the baby is doing" (Trevarthen 2015a, 405). Caregivers, likewise, are sensitive to noncongruent expressions from their infants. The conjunction of all this indicates that infants undergo actions in response to—as opposed to mere imitation of—caregivers, from whom they also elicit reactions.

In these intersubjective situations, expressions occur in a sensorimotor loop within which, for example, the infant makes eye contact, the mother smiles, the baby coos, the mother vocalizes in response, then the infant, and so it goes back and forth with the cycle continuing. In Deweyan language, parent and child engage in mutually provoking and receptive expressive behavior, and undergo affectively charged actions of doing and undergoing as coupled units. Adopting this theoretical framework and backed by years of observation, Trevarthen accordingly insists on the following, obvious in pragmatic circles, but apparently less so in his: that infants are not passive receptivities of stimuli and are not wholly governed by the actions of others since they are also elicitors of behaviors in the dyad.

This points to something else obvious, but nonetheless important: that organisms change their environments. As Dewey (1920) remarked:

> Even a clam acts upon the environment and modifies it to some extent. It selects materials for food and for the shell that protects it. It does something to the environment as well as has something done to itself. There is no such thing in a living creature as mere conformity to conditions, though parasitic forms may approach this limit. In the interests of the maintenance of life there is transformation of some elements in the surrounding medium. The higher the form of life, the more important is the active reconstruction of the medium (84-85).

Explicitly advancing such a notion of world-making, Trevarthen (2011) quotes Alfred North Whitehead, who offered a position very similar to Dewey and numerous others when he observed that:

> There are two sides to the machinery involved in the development of nature. On the one side there is a given environment with organisms adapting themselves to it. The other side of the evolutionary machinery, the neglected side, is expressed by the word creativeness. The organisms can create their own environment (Whitehead 1926/1953, 140).

Whitehead added that creativity nearly always demands joint activity because single organisms are almost helpless. The adequate forces needed to fruitfully change environments require cooperating groups.

These observations apply emphatically to infants, only here the primary environment is social in that it centers on other people. In addition to exhibiting self-synchrony, so that their body and hand motions, facial expressions and vocalizations coordinate together, neonates display "inter-synchrony." That is, they show sympathetic alignment "with the movements of looking and speaking of an adult" (Trevarthen 2011, 128). As discussed, however, infants do no merely align with caregivers, but act to elicit behaviors from them, indeed, within hours of birth. Hence, almost from the beginning, they show a propensity to change their environments. Soon after they "can draw a sympathetic adult[s] into synchronized negotiations […], which can develop in coming weeks and months into a mastery of the rituals and symbols of a germinal culture, long before any words are learned" (Trevarthen 2011, 121). From almost the time they are born, accordingly, infants begin enacting and developing sensorimotor skills geared specifically at provoking, responding to and maintaining interpersonal dialogues. Thus along pragmatic and enactive lines, skill is central to sensorimotor coordinations, even at early stages. On such grounds, Trevarthen concludes that infants spontaneously direct well-formed movements that exhibit selective awareness and affective appraisals; they show coherent, rhythmic and purposeful consciousness.

All of this reinforces the thesis that infants come equipped to actively evoke responses and to form coupled-units with caregivers, and, soon after, other children and therewith communities. A few more passages from Trevarthen are worth quoting at length. He writes that "[c]ultures depend on a ceaseless, highly creative learning process, which does not just come from instructing the young" (2009a, 507). Rather, it is also "motivated by an innate human talent for companionship in experience, which is mediated by an intersubjective transfer of intentions, interests, and feeling in conversations of rhythmic motor activity" (2009a, 507). Thus, "[b]efore language is learned, the child is already becoming a thinker and actor in cultural ways. The motivation for this learned transformation in activities and experience appears to be a direct outgrowth of the integrated mobility" (2009b, 25-26). Trevarthen goes on to say: "What may be called socio-ceptive regulation of actions, in relationships and communities, leads to development of collective ways of behaving that provide an environment of common understanding: a habitus for cooperative life" (2009b, 33). Though these are Trevarthen's words, this is precisely the point Dewey made in the opening quotations from *Reconstruction in Philosophy* and *Human Nature and Conduct*, as well as the revised introduction to *Experience and Nature* drafted in his last years. In these and other writings, he repeatedly emphasizes the emphatically shared and cultural nature of experience, which begins at infancy and continues through life.

IV. Social Experience and Nascent Aesthetic Experience

Anything that can be called "experience" in Dewey's sense of the term has a basic level of integration. Suppose a cross-country skier thrusts her poles and edges her skate-skis into snow. In consequence of this doing, of this combination of actions directed at the environment, her body undergoes motion. It propels forward. She keeps repeating the same actions, each time undergoing forward motion. Her doings and undergoings fall into a rhythmic connection of "means-consequence." Integrated experience is the result.

While a basic level of sensorimotor integration is a precondition of experience, it is not sufficient for "having *an* experience," a phrase Dewey (1934) used to describe an aesthetic experience. He wrote: "we have *an* experience when material runs its course to fulfillment. Then and then only is it integrated within and demarcated in the general stream of experience from

other experiences." Such an experience "is rounded out so that its close is a consummation and not a cessation." It "is a whole and carries with it its own individualizing quality and self-sufficiency. It is *an* experience" (35).

Imagine, for example, that the aforementioned woman skis on a day when the sun shines; when fresh snow sparkles on pine bows; when birds sing, and squirrels scurry; when the air is refreshingly crisp, but not bitingly cold; and when the ski conditions are optimal. The trail has interesting twists and turns, ups and downs; sometimes it burrows through snow-laden trees, sometimes through meadows; at one point it crests a steep hill and comes upon a breathtaking view; at another point it wanders alongside a gurgling creek. Some portions of the trail are demanding; others are traveled with ease. Imagine further that the woman is engrossed in the activity of skiing through this varied environment. Her mind does not wander to the office meeting she has tomorrow or to the books she forgot to return to the library yesterday. She "loses herself" in the environment with which she interacts.

A first point to note is that this experience stands out from the general stream of day-to-day experience. It also stands out from the woman's general experience of skiing in the past. It is an enduring memorial to what skiing can be. A second point to note is that the woman is especially integrated with her environment. Under normal circumstances, her bodily movements coordinate around her interactions with the trail, but her attention often drifts elsewhere. On this day, her movements, her perceptual faculties, nearly her entire conscious self coordinates and engages with the things she encounters. A third point to note is that her experience has a highly dramatic structure. Shifts between demanding and less demanding portions of the trail introduce rhythms of tension and repose, and variations in scenery introduce mini-climaxes. A particular highlight is the view she discovers after struggling so hard to crest the steep hill. For these reasons, her experience stands out as *an* experience. To re-quote Dewey (1934), it is "demarcated in the general stream of experience from other experiences" (35). It is highly integrated. It runs "its course to fulfillment" (35), or rather a series of fulfillments, with especial highlights. As with focal points in a painting, these fulfillments and highlights pull the experience into a unified whole that "carries with it its own individualizing quality and self-sufficiency. It is *an* experience" (35).

Trevarthen's account of parent-child coupling in many ways parallels what Dewey says about aesthetic experience, and this is not entirely surprising given the former's early training. His work began in Jerome Bruner's laboratory where he and colleagues investigated whether young infants expect and build trusting social engagements through shared games that develop into story-making and linguistic communication (see Trevarthen 2013, 2015a), in effect, emphasizing the dramatic or narrative-like structure of early behavior. In addition to Bruner, Trevarthen acknowledges a kinship to Edward Tronick (e.g., 1989, 2005; Weinberg and Tronick 1994), among others, who advances a dyadic theory of consciousness, and also a kinship to Lou Sander's (2012) systems theory, which characterizes co-consciousness as mutual regulation of emotions through which caregiver and infant "join their separate conscious brain activities to generate a more highly organized state of awareness" (Trevarthen 2015, 396). Thus Trevarthen also highlights the loss of self into the world—the world, however, primarily being the caregivers interacting with the infant, at least at early stages. His account simultaneously illustrates how a grasp of self and the individuality of others arise from these early interactions—a point to be discussed later.

Connecting findings to what Dewey would have understood as nascent aesthetic experience, Trevarthen (2011) notes that "[d]ialogues with 2-month olds exhibit … rhythmic steps, affective melodies and narrative envelopes of energy cycles" (129). Proto-conversation occurs early, at about four weeks, and play emerges around three months. After five months, games develop a level of sophistication such that caregivers may tease in captivating manners, and infants reciprocate by

"acting in provocative 'disobedient' ways for fun" (Trevarthen 2015b, 137). The development of games and narrative arguably plays a role in integrating experience and increasing coherence of the world. By three months, infants and mother invent game routines, "practiced repetitively and remembered with pleasure," and by about six months "narrative forms in games and songs" enter the exchanges (2015a, 407). Trevarthon cites Stephen Malloch's (e.g., Malloch 1999; Malloch and Trevarthen 2009) theory of communicative musicality, which suggests that expressive sounds and movements exchanged between infant and caregiver have a pulse and drama such that proto-conversation forms a melodic story (see Trevarthen 2012, 30). More broadly, Trevarthen suggests that "meaning grows by confirming and 'cultivating' innate rhythms and values" and hence dramatic structure "in communication, and it is fabricated with *aesthetic sensibility*" (2009a, 512).

For thinkers such as Dewey, narrative—or more broadly, dramatic structure—is at the basis of experience. Moreover, because experience has narrative structure, it is also reconstructive. Leon de Bruin and Sanneke de Haan (2012) likewise observe that narrative practices are reconstructive, but add that they represent developments that cannot be explained in terms of sensorimotor coupling (see 236-237). However, while an exclusively sensorimotor account is impoverished, basic narrative in experience arguably cannot be explained without it either. Dewey (1920), for example, wrote that:

> The organism acts in accordance with its own structure, simple or complex, upon its surroundings. As a consequence the changes produced in the environment react upon the organism and its activities. The living creature undergoes, suffers, the consequences of its own behavior. This close connection between doing and suffering or undergoing forms what we call experience. … [S]uppose a busy infant puts his finger in the fire; the doing is random, aimless, without intention or reflection. But something happens in consequence. The child undergoes heat, he suffers pain. The doing and undergoing, the reaching and the burn, are connected. One comes to suggest and mean the other. Then there is experience in a vital and significant sense (86-87; also see 1934, 43-45).

Here, also, basic narrative emerges, with a chain of events culminating in a climatic movement that welds them together meaningfully. Moreover, although the experience is not exclusively sensorimotor, it predominately is. The proto-games Trevarthen describes have much the same structure. This is not to deny that more is involved. For example, at points games may entail, at least on the side of the caregiver, a level of abstraction that involves de-coupling. However, this does not undermine the claim that embodied sensorimotor engagements—linguistic and pre-linguistic—are primary from very early stages. Moreover, if de-coupling goes on, ultimately re-coupling also occurs insofar as narratives organize and structure environmental interactions (see de Bruin and de Haan 2012, 238), something also central in Trevarthen's scheme.

Aesthetic experience is of course more emphatically dramatic than the example with the burn. Hence it is more integrated. A movie, for instance, coheres around climactic movements that pull incidents in it together, so that we see it as *a* movie, that is, a whole (Crippen 2016b; Chudoba 2017). The same principle is at play in paintings. Drama develops in time by virtue of the way the eye roams the canvas and rests on culminating focal points, so that we experience the work as a unified whole (see Dewey 1934, 174). This happens in everyday life as well, as when somebody skis a trail with interesting twists and turns, and comes upon a climactic view after a strenuous climb, and remembers the day as a single episode that held together as *an* experience (see Dewey 1934, Ch. 3). From early stages onwards, it appears that many infant-caregiver interactions satisfy these conditions. At its height, aesthetic experience in the Deweyan sense can involve a dissolving of self into world (see Kestenbaum, 1977, 27), as when we lose ourselves in a movie, painting or day of skiing. Interestingly, this last aspect appears to be the default starting point of human experience. As Noë puts it, echoing Trevarthen seemingly without knowing it, "[c]hildren are not separate; they are not observers;

they are regulated by their mothers' soothing or alerting tones, eye contact, gestures, and touch. A mother is literally one of the structures constituting a child's psychological landscape" (Noë 2009, 31).

At the same time, infants, by six months, come to have a greater sense of themselves as individuals, sometimes "showing off" and exhibiting "a proud performer's personality" (Trevarthen 2011, 129). They appear to recognize others as agents. For instance, they manifest a grasp of others' intentionality, turning to look at the same object as caregivers, as opposed to merely mimicking their movements (Merleau-Ponty 1964, esp. 34). They show sensitivity to identity and a grasp of manners, exhibiting "teasing happiness in the company of familiar playmates, shyness with intrusive approach of a stranger, and shame when unable to sustain … a familiar performance with someone who does not play their part" (Trevarthen 2011, 129). To perhaps overstate the case, they almost seem to encounter themselves and others as *an* experience, a more or less "unified whole that "carries with it its own individualizing quality and self-sufficiency," to re-quote Dewey once again (1934, 35).

More plausibly, however, caregivers form loci around which behaviors and arguably experiences of infants coordinate. Infants do the same for those engaging with them. In the same way that brush strokes tumble and cohere around focal points; in the same way, that the two fuse in relations of means-consequence, so that a focal point is what it is by virtue of the strokes leading to it, whose function is simultaneously defined by where they lead, the integration of doing and undergoing between caregiver and child is tightly bound and united; and it dramatically builds in such a way to bring about aesthetic experience or at least pre-conditions of it. Consequently what might otherwise be isolated fragments of sensation and behavior pull together into episodes that have structure and endure as a whole over time. Insofar as these aesthetic or proto-aesthetic social interactions entail coordinations of sensory and motor capacities, they arguably form bases for sensorimotor perception, and out of this a cognitive grasp on the world emerges.

V. Perception and Group Activity

I will conclude by returning to Dewey's theory of perception, which is in the historical lineage leading to Gibson, and very similar to Merleau-Ponty's, who also influenced Gibson (see Reed 1988; Heft 2001; Chemero and Käufer 2016). Using some observations from husband and wife team, Rachel and Stephen Kaplan, I will elaborate a little on how aesthetic perception falls within the domain of what J. J. Gibson (1979) calls affordances; and applying recent observations from Joel Krueger (2011), I will specifically endeavor to explain how Dewey's sensorimotor account of perception, and therewith those of Merleau-Ponty and more recent figures in the enactive movement, apply on a cultural level.

In a vein loosely reminiscent of Dewey, the Kaplans argue that everyday perception is aesthetic. To consider one of their more prominent examples, they have conducted experiments suggesting that people are particularly tempted by well-lit clearings partly blocked by foliage or trails disappearing around bends (e.g., S. Kaplan, R. Kaplan and Wendt 1972). So as some pieces of art have an enticing quality drawing audiences in, some settings induce people deeper into them. They possess what the Kaplans call "mystery," here defined as an allure that arises from things "partially hidden," which "tempts one to explore further" (R. Kaplan and S. Kaplan 1989, 58). Mystery, in other words, involves the promise of discovery (S. Kaplan 1988, 50). Building on cases such as this, the Kaplans (1989) propose that aesthetic perception reflects "a very rapid (albeit unconscious) assessment of what it is possible to do in the setting" (37), and conclude that it falls within what Gibson called affordances (S. Kaplan 1987; also see Crippen, 2016c). Though the Kaplans focus predominantly on natural environments, what they say applies on a social level as well. Thus, for instance, an infant's seductive smile might possess an aesthetic sense of mystery that draws caregivers into engagements, whose provocative actions and responses might do the same for the child; playfully

disobedient behavior might have similar effects; and, as discussed, infant and caregiver might accordingly coordinate into rhythms of doing and undergoing. In consequence of this joint activity, integrated behavior and arguably coherent if not aesthetic experience results.

Krueger (2011), in defending an extended account of cognition, has argued something along these lines, emphasizing affordances and suggesting that human expression is an interactive form of space management. Some expressive actions—for example, touch, body movements, facial expressions and gestures, all basic to Trevarthen's account—are ways by which we bring about and manipulate what Krueger calls we-space, that is, interpersonal space. This implies that not all cognitive processes are driven by neural scaffolding, a point on which Dewey, Merleau-Ponty and enactivists agree. For a we-space to form, there has to be a co-presence between two or more humans, Krueger argues, and co-presence is not merely about physical proximity; it depends also on subjects becoming accessible to one another. As we have seen, infants' actions are continuously and self-consciously influencing and responding to caregivers, and vice-versa. And while these interactions precede the emergence of the ability to formulate concepts of self and other, Krueger argues that they are nevertheless characteristic of "an early, proto-joint-attentional, perceptual and affective grasp of others as intentional agents" (646). For reasons already discussed and to be elaborated upon, they also bring about great potentiality for aesthetic form in human space.

Such conduct includes tracking and responding to intonation of adult frequencies and co-vocalizing with caregivers, and these behaviors emerge as early as three days, according to researchers Krueger (2011) cites (see Lieberman 1967; Rosenthal 1982). People within this we-space focus on the faces of partners and the complementarity of reciprocal actions, and this cultivates affective intimacy that is a framework for interpersonal communication. So far this adds little to what Trevarthen has been saying for years, not to mention Dewey and Merleau-Ponty in less developed form, along with numerous psychologists on which Trevarthen and in fact Merleau-Ponty draw. But where I think Krueger adds something important—though others have too insofar as "social affordances" are a hot topic—is in his observation that "gestures actively structure we-space by simplifying choice" (650; also see Solymosi 2013). Specifically, writes Krueger, "gestures and other kinds of bodily expressiveness draw attention to social affordances within we-space that both constrain as well as cue trajectories of available interaction" (650). This is very similar to points Chemero, Dewey and the Kaplans, among others, make, only in this case the constraining factors are social, as opposed to being in the brute physical world.

According to Krueger, interactive, jointly-constituted or co-regulated aspects of social affordances mean that the experience of bodily co-presence of other people is different from that of a piece of equipment or other physical objects. This is because ''[t]he latter, as affordances, are ignored or used up according to present interests, whereas the presence of another opens up, whether you like it or not, a world of constraints and possibilities that cannot be ignored in the same way" (Still and Good 1998, 56; quoted in Krueger 2011, 650). Krueger argues, in other words, that social affordances constrict we-space so that people, if attuned, feel that socially available options are less than they were a moment ago. It can be added that options can simultaneously be more, though Krueger does not emphasize this. For example, if someone extends a hand, an option heretofore unavailable for physical contact emerges, but simultaneously it is difficult to forgo this option in most social settings, meaning space is simultaneously constrained. With these simultaneously constrained and expanded options, there also comes a possibility of increased drama insofar as handshakes, welcoming smiles and the like help integrate group activity by joining it into connections of means-consequence, while also forming mini-climaxes that bring about increased unity and further

define interactions as identifiable wholes. In the words of Krueger, who also emphasizes aesthetic dimensions, albeit without emphasizing it, gestures and other types of social body language scaffold "spatial arrangements that simplify choice by constraining or cueing social affordances," and they "also scaffold spatial arrangements that sculpt the attention of [the] receiver—and thus ease their epistemic burden—by simplifying perception" (Krueger 2011, 652).

These last points are helpful. While differentiating social affordances from standard perceptual ones, which at the same time can sometimes be identical, they also connect the idea of experience as culture back to basic sensorimotor explanations that Dewey and Merleau-Ponty have advanced, along with enactivists. On Deweyan or Merleau-Pontian accounts—not to mention Gibsonian ones—we perceive things as we do, in large part, because of actions afforded by both the structure of our body and things our bodies encounter, and also because the same structures exclude certain actions. Thus whereas we can roll pencils between our palms, the same action and hence same experience is impossible with cinderblocks. For this reason, among others, we also encounter cinderblocks and pencils as affording very different things, and thus come to perceive and conceptualize them differently.

In this scheme, the structure of the hand and other organs and the form of things encountered become something like transcendentals that limit possibilities of experience by limiting possibilities of action—points Dewey expressly acknowledged (see Dewey 1920, 90-91), despite the common hostility to Kantian frameworks among today's pragmatists. And insofar as we spend most of our waking life handling and ambulating, it is not surprising that we develop habits of seeing bottles as graspable, walls as obstacles and hallways as traversable. Nor is it surprising that concepts relate back to movement, as thinkers ranging from Merleau-Ponty (1945) to Lakoff and Johnson (1999) have suggested. Solidly built chairs bear our weight. Impenetrably solid fogs impede vision and movement. Unlike liquid or gas, we can handle solid ice, walk on it or risk falling through it. Smell, sound and other modalities follow a like pattern. Bad smells and grating sounds are offensive, which is to say, repulsive, that is, they repel and push us away.

But while this is so, and while bodily movement remains primary, it is also the case that our first world is overwhelmingly social. As de Bruin and de Haan (2012) observe, "neonates and young infants are perfectly capable of interacting with others in a dyadic way; but primary intersubjectivity alone does not allow them to interact with other agents in a world-involving way" (231). When infants enter "secondary intersubjectivity" embodied practices become triadic. This means "they involve a referential triangle of child, adult, and environment: an outside object or event to which they jointly attend" (231). This shows, on the one hand, that interactions are sensorimotor from the beginning, yet also that our first world is social since the primary entities with which young infants interact with are other human beings. It also shows that experience remains social since human beings remain primary throughout life, only with greater capability of enacting joint intentionality with others towards objects in the world.

So while some commentators are wont to start with examples of handling pencils, balls and whatnot, and build up theories of perception and cognition from there, such movements are not prior to social engagement, but intertwined with it. Moreover, the social world affords and constrains actions and therewith experiences in ways similar to the primarily physical world, as Trevarthen and Krueger's accounts cogently show. Yet there is also a difference insofar as social affordances introduce constraints not present in the immediate brute world. Thus the notion of experience as culture is more than a standard, basic sensorimotor account, even while intimately related to it. This lends further value and sophistication to Dewey's notion that experience is equivalent to culture, while also flushing out nuances that result from thoroughly following the point through, therewith expanding in important ways on what Dewey offers.

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