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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