Thickening Descriptions with Views from Pragmatism and Anthropology

A Commentary on J. Scott Jordan & Brian Day

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How can we as biological systems that are self-organizing and constantly adapting make sense of our surroundings? How can the rich connections between organisms and environment lead to our particular lifeworlds, lifeworlds that allow individual experiences and that are themselves constantly changing in reaction to them? This commentary suggests, extending the framework provided by Scott Jordan and Brian Day, an integration of recent neuroscientific evidence with perspectives from pragmatism, anthropology, and phenomenological thought. Much experimental evidence demonstrates that human beings are systems comprised of a brain as part of a body and an environment, which is constantly regulating and adapting. This evidence resonates with reasoning from pragmatism and anthropology that describe the continuous, dynamic interaction of mind, body, and world. Employing those various perspectives leads to a dense description of human experience and cognition that specifies details and patterns, which considers contextual factors that allow us to enrich human self-understanding, and which aids attempts to answer the questions raised at the beginning of this paper.

Keywords
Anthropology | Circular causalities | Enactivism | Mind-body-world-relationship | Pragmatism | Systems approach

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> *Mind as background is formed out of modifications of the self that have occurred in the process of prior interactions with environment. Its animus is toward further interactions. Since it is formed out of commerce with the world and is set toward that world nothing can be further from the truth than the idea which treats it as something self-contained and self-enclosed.* (Dewey 1934, p. 269)

> *Knowing does not lie in the establishment of a correspondence between the world and its representation, but is rather immanent in the life and consciousness of the knower as it unfolds within the field of practice set up through his or her presence as a being-*

> *in-the-world […]. Like life itself, the unfolding does not begin here or end there, but is continually going on. It is equivalent to the very movement—the processing—of the whole person, indivisibly body and mind, through the lifeworld.* (Ingold 2001, p. 159)

1 Introduction

Philosophers and scientists alike have long been interested in the question of how our being-in-the-world allows us to experience in a plethora of ways and to behave meaningfully. In extending the framework suggested by Scott Jordan and Brian Day, this commentary suggests integrating recent neuroscientific evidence with perspectives from pragmatism, anthropology, and phenomenological thought. The commentary shall be programmatic in the sense that it prepares the way for further argument and discussion by making available new perspectives that invite the reader to look beyond the "classical" argument and thus benefit from various disciplines. The driving questions are: How can we as biological systems that are self-organizing and constantly adapting make sense of our surroundings? How can we grasp our world via perception? How can we skillfully engage with the world? How can the rich connections between organisms and environment lead to our particular lifeworlds; lifeworlds that allow individual experiences and that are themselves constantly changing in reaction to them?

One dominant approach to reality and truth has been the correspondence approach of computational cognitive sciences that assumes that reality can be revealed by science, independently of the personal perspective of an observer. The task of correspondence theories is to understand the relation between observer and observer-independent reality; a task that assumes dichotomies between inner and outer, between objective and subjective. Facing the limits of those approaches, Scott Jordan & Brian Day (this collection) suggest bridging the riff between the inner and the outer by acknowledging that there is in fact no gap between the organism and its environment. If one wants to avoid the dualistic trap that asks how something inside the "mind"—such as thoughts or ideas—can represent the outside world, one challenges the seemingly essential dependence of cognitive science on representations.

Much neuroscientific, psychological, anthropological, and philosophical work, both old and new, suggests that we understand cognition as arising from the actions of embodied agents that engage skillfully in a meaningful world (Beauchamp & Martin 2007; Brooks 1991; Clark 1997; Graziano et al. 1994; Lakoff & Johnson 1999; Noë 2004; O'Regan & Noë 2001; Thompson 2010; Varela et al. 1991; Wilson & Knoblich 2005). This understanding can ultimately help us avoid the correspondence theorists' notorious problem, how the external is connected to the internal. Organisms that are embedded and situated do not need to represent the external environment as they are always already about the contexts in which they live. Moreover, for the situated organism, "the situation is organized from the start in terms of human needs and propensities which give the facts meaning, make the facts what they are, so that there is never a question of storing and sorting through an enormous list of meaningless, isolated data" (Dreyfus 1992, p. 262). Understanding organisms as always already existing in meaningful interaction[1] with their environment and thereby constantly adapting and changing is relevant not just for topics in philosophy of mind but also for epistemology and metaphysics. The metaphysical question of how mind, body, and world are related is tightly linked to epistemological questions about how we can experience the external world. The central tenet is how experience can happen at all, i.e., how the experiencing organism can relate meaningfully to the world.

This commentary furthers the line of thought described by Scott Jordan & Brian Day

1 Due to lack of a better concept, the term "interaction" will be used throughout this article even though it entails clearly separable entities that have previously been independent—an assumption that is contested by the approach suggested here. Moreover, due to limited space, this commentary cannot take into account the aspect of intersubjectivity. The relevance of others with whom interaction takes place is inherent in the concept of mind and its interdependence with the environment (see e.g., De Jaegher & di Paolo 2007).

(this collection) by suggesting further perspectives from neuroscience, pragmatism, and anthropology for approaching cognitive systems as experiencing, bodily systems that are in constant, value-laden interaction with the world; rather than as systems that primarily mirror an external reality from a position separated from the world. Here, I will combine arguments from John Dewey, in particular his work on experience, and anthropologist Timothy Ingold, with recent neuroscientific approaches that support a view that challenges classical correspondence approaches. This will allow a thicker description, i.e., a dense description specifying details and patterns and considering contextual factors, of human experience and cognition.

2 Pragmatism and anthropology meet the neurosciences

In line with much neuroscientific work today, Dewey describes how life is about constantly striving for greater adaptation and for a balance of energies. He beautifully elaborates:

> Life itself consists of phases in which the organism falls out of step with the march of surrounding things and then recovers unison with it—either through effort or by some happy chance. And, in a growing life, the recovery is never mere return to a prior state, for it is enriched by the state of disparity and resistance through which it has successfully passed. If the gap between organism and environment is too wide, the creature dies. If its activity is not enhanced by the temporary alienation, it merely subsists. Life grows when a temporary falling out is a transition to a more extensive balance of the energies of the organism with those of the conditions under which it lives. (Dewey 1934, p. 535).

This view resonates with Wild Systems theory, as suggested by Jordan & Day (this collection), which explains an organism not as a computational input–output system but as an open energy-transforming system that must absorb, transform, and use energy to sustain itself. This does not forestall computation, of course, but it describes the computational process in a different context.

The description of this context can be developed further to challenge correspondence theories: correspondence theories suggest that we understand cognition when we understand how humans represent the external world internally, and when we understand how they process this representation. The focus on a potentially disembodied input–output machine that passively receives information about an observer-independent reality and that has an isolated computational system processing representations cannot tell us how the internal relates to the external—the notorious problem of traditional cognitivism—or how the internal can be enacted in real-world situations that are often vague and constantly changing. As Andy Clark explicates:

> Real embodied intelligence [...] is fundamentally a means of engaging with the world—of using active strategies that leave much of the information out in the world, and cannily using iterated, real-time sequences of body-world interactions to solve problems in a robust and flexible way. The image here is of two coupled complex systems (the agent and the environment) whose joint activity solves the problem. In such cases, it may make little sense to speak of one system's representing the other. (Clark 1997, p. 98)

Cognition and experience arise from ongoing interaction with an unstable, changing environment. The entanglement of the brain, the rest of the body, and its particular environment—which includes other organisms—is essential for experience and reason. This is not the trivial claim that the brain cannot exist without a body; even though the bodily context is often neglected in research studying brain processes.[2]

2 The importance of the body was put forward by Maurice Merleau-Ponty in the *Phenomenology of perception:* "[t]he body", he wrote," is the vehicle of being in the world, and having a body is, for a living creature, to be involved in a definite environment, to identify oneself with certain projects and be" "continually committed to them"" (1962, p. 82), and further: "[o]ur bodily experience of movement is not a particular case of knowledge; it provides us *with a way of access to the world* and the object, with a 'praktognosia', which has to be recognized as original and

The message is that reason, cognition, mind arise from this very entanglement. How the body relates to the environment structures experiences; there is an immediate coupling between perception and action. Cognition is not a transcendent aspect detached from "matter" (the brain and the rest of the body in particular) but is constantly shaped, fostered, and constrained by the environment and the body's peculiarities.

Anthropologist Timothy Ingold consequently questions whether it makes sense:

> to attribute that quality of the operation of a cognitive device [...] which is somehow inside the animal and which, from its privileged site, processes the data of perception and pulls the strings of action. Indeed it makes no more sense to speak of cognition as the functioning of such a device than it does to speak of locomotion as the product of an internal motor mechanism analogous to the engine of a car. Like locomotion, cognition is the accomplishment of the whole animal, it is not accomplished by a mechanism interior to the animal and for which it serves as a vehicle. (Ingold 1993, p. 431)

It is thus the interaction of the different systems that is the most fascinating research topic in cognitive science—a topic that requires a holistic approach. Such reasoning that considers circular causalities can be traced back to earlier thinkers such as Bateson 1973, Kelso 1995, Maturana & Varela 1980, Thompson 2010, Varela 1996 or von Uexküll 1940. This idea of circular causality as a property of living, self-organizing systems refers to the connection of perception and movement that underlies the ongoing co-constitution of organism and environment. There is continuous top-down-bottom-up interaction that captures the interrelations between several levels in a hierarchy. The general underlying idea is that individual small-scale parts enable the existence of order parameters that in turn determine the behavior of the individual parts. Thomas Fuchs (2012) refers to physicist Hermann Haken's 2004's work on synergetics, the science of self-organization, to further illustrate the mutually-constraining relation between the microscopic and macroscopic elements of a complex system. Dynamic system modeling in various fields relies on multi-level causal processes in which higher-order processes are mutually entrained with lower-order processes, without one taking precedence over the other (Engel et al. 2001; Freeman 1995; Lewis 2005; Thelen & Smith 1994).

While a purely cognitivist approach that fosters "The Myth of the Inner; The Myth of the Hidden; and The Myth of the Single" (Torrance 2009, p. 112) is still fairly mainstream, in recent years we have seen a growing interest on the part of cognitive scientists and neuroscientists in particular in the relevance of the complex interplay of brain, body, and world. Today, this interplay is finally considered in the empirical study of cognition, which resonates in the growing body of work in cognitive science.[3] The importance of embodiment is widely appreciated in cognitive science today. There is a large body of evidence from the neurosciences on how an ongoing organism–environment interaction is essential for cognition (Beauchamp & Martin 2007; Brooks 1991; Chiel & Beer 1997; Engel et al. 2001, 2013). While we still see attempts to describe what has been termed the "'filing cabinet' view of mind: the image of the mind as a storehouse of passive language-like symbols waiting to be retrieved and manipulated by a kind of neural central processing unit" (Clark 1997, p. 67)—there is growing consensus that cognition can best be studied and understood in dynamic, interactionist terms, as bound to bodily organisms that are confronted with particular problems in specific environments.

perhaps as primary. My body has its world, without having to make use of 'symbolic' or 'objectifying function'" (1962, p. 140–141; emphasis mine). This has been elaborated and enriched in the last years with views on recent empirical work by Shaun Gallagher (2005), who offers an account of the body that emphasizes the role of embodied action in perception and cognition.

3 Curiously, there is little direct reference to the pragmatists and in particular to John Dewey's work. Notable exceptions are Mark Johnson (e.g., 2007) and Jay Schulkin (2009), who offer nuanced and explicit pragmatist views on neuroscientific research. Philip Kitcher (2012) offers a wide and detailed demonstration of the importance of pragmatism for philosophy.

Dewey once again can serve as an inspiring reference point:

> To see the organism in nature, the nervous system in the organism, the brain in the nervous system, the cortex in the brain is the answer to the problems which haunt philosophy. And when thus seen they will be seen to be in, not as marbles are in a box but as events are in a history, in a moving, growing never finished process. (Dewey 1991, p. 224)

With this focus on the context and the ongoing interaction of the organism and its surroundings, one can avoid assumptions of ontological separations. Going one step further and elaborating on the moral dimensions that Dewey expresses, neo-pragmatist Robert Brandom, in his account of intentionality, explicates the very idea of pragmatism in a way that links it to the enactivist approach to cognition: "[a] founding idea of pragmatism is that the most fundamental kind of intentionality (in the sense of directedness towards objects) is the practical involvement with objects exhibited by a sentient creature dealing skillfully with its world" (Brandom 2008, p. 178). This skillful engagement with the world is crucial for challenging prevailing paradigms surrounding correspondence theories.

The respective holistic approach envisioned by Dewey that he powerfully elaborates with his conception of *continuity* (Dewey 1934), and which is furthered by some neo-pragmatists, is reinforced by research in the neurosciences that questions the understanding of cognition as a centralized mirroring process that uses perceptual input to generate the appropriate behavioral output. Brains are studied and described as embodied, situated, and embedded.[4]

3 Challenging the "myth of the inner" from within the Neurosciences

In the following, approaches in the empirical sciences that seek to consider the dynamic, interactionist nature of cognition will be introduced in order to enrich the view of the complexities of adaptive behaviour in self-organizing systems.

Computational cognitive neuroscientist Olaf Sporns provides a state-of-the-art synthesis of the sciences of complex networks in the brain and suggests a view beyond neurocentrism. He introduces his work as follows:

> To understand these systems, we require not only knowledge of elementary systems components but also knowledge of the ways in which these components interact and the emergent properties of their interactions […]. We cannot fully understand brain function unless we approach the brain on multiple scales, by identifying the networks that bind cells into coherent populations, organize cell groups into functional brain regions, integrate regions into systems, and link brain and body in a complete organism. (Sporns 2011, pp. 1–3)

While he does not (yet) consider the further complexities that come into play when one includes the environment of the organism, his description can be seen as a relevant, though timid first step away from a purely neurocentric view. The next step will be to recognize the relevance of environmentally attuned actions, i.e. to investigate how actions can be understood, rather than as isolated from the environment, as being in constant dynamic relation with it, adapting to requirements from the environment and in turn shaping it.

There is no doubt that the developmental perspective is crucial for understanding the dynamic interplay between social and biological processes and thus the role of the environment for experiences in developing cognition. From

4 For reasons of space, I cannot discuss the rich debate around the concepts of embodiment, embeddedness, and enactivism let alone their relation to the extended mind hypothesis (for parts of the discussion see: Adams & Aizawa 2008; Clark 1997, 2001; Clark & Chalmers 1998; Rupert 2009; Shapiro 2011; Sprevak 2009; Thompson 2010; Varela et al. 1991; Ward & Stapleton 2012; Wheeler 2011). These approaches vastly differ regarding their views on representations and their general approach to cognition and action. However, each of them can offer a way of moving beyond the traditional mind-body dichotomy. Specifically, enactivism focuses on the precise coupling of brain, body, and environment and might therefore be particularly promising for action-oriented approaches.

early childhood onwards, the brain is shaped by constant interaction with the world. Experiences impact on brain structure and function, as demonstrated by abundant evidence on the brain's plasticity (for classical studies, see: Buonomano & Merzenich 1998, Pascual-Leone et al. 2005). Susan Oyama, in her account of developmental systems theory, argues that the mind–world dichotomy inherent in descriptions that follow dualistic accounts claiming strong gaps between the biological realm and sociocultural realm cannot do justice to evolving systems. Oyama invites us to focus on change, rather than constancy. She points to the conglomerate of heterogeneous influences that allows development. A developmental system is "a heterogeneous and causally complex mix of interacting entities and influences that produces the life cycle of an organism" (Oyama 2000, p. 1). This multi-scale, interaction-driven dynamics requires an approach that does justice to context-dependency, since it is a particular context that leads to the emergence of a specific phenotype. Neglecting the context would thus necessarily lead to a failure to understand the developmental system.

Complementary to this view, Tim Ingold describes how the specificities of an environment and an organism's history with it matter for its very existence:

> What goes for the relations between internal parts of the whole organism also goes for the relations between the organism and its environment. Organic forms come into being and are maintained because of a perpetual interchange with their environments not in spite of it [...]. But since an 'environment' can only be recognized in relation to an organism whose environment it is—since, in other words, it is the figure that constitutes the ground—the process of formation of the organism is the process of formation of its environment [...]. Moreover, the interface between them is not one of external contact between separate and mutually exclusive domains, for enfolded within the organism itself is the entire history of its environmental conditions. (Ingold 1990, p. 216).

Consequently, rather than speaking of distinct organisms, Ingold suggests that we would be better served by speaking of the "whole-organism-in-its-environment" (Ingold 2001). In a similar way, Richard Menary suggests cognitive integration as a dynamical account of how the bodily processes of an organism in its environment lead to cognition (Menary 2007), and elaborates how manipulation of the organism's specific environment, development in that environment, and the resulting transformation of cognitive capacities in this cognitive niche matter for actual cognitive processes and our explanatory models thereof (Menary 2010).

In line with such descriptions, Andreas Engel et al. (2013) recently noted what they saw as a "pragmatic turn" in cognitive science, a turn that leaves aside frameworks focusing on computation over mental representation to instead study cognition as being essentially action-oriented. Building on reasoning from Clark (1997) and Varela et al. (1991), Engel and colleagues focus on the relevance of action for cognition. They discuss evidence of perception as not being neutral with respect to action but rather as part of sensorimotor couplings that are always specific for the organism, given its previous learning, experiences, and expectations. This focus implies embodiment and situatedness just as the context-sensitivity of processing. The "pragmatic turn" is based on much experimental evidence from studies on sensorimotor integration and neuronal plasticity that highlight how cognition is, in a fundamental way, grounded in action.

Taken together with many more research lines in the experimental field, these approaches can further our understanding of the essential value of what beforehand was seen to be "merely" subjective, and not necessarily real. Experience and skillful engagement with the world have a relevant, even an essential role for cognition. This insight opens the way for a more encompassing view of human experience and thus enriches Jordan and Day's account with phenomenological, anthropological, and pragmatist perspectives.

4 Why a systems approach matters

While Wild System Theory primarily seems to offer new possibilities for how to study human experiences and engagement with the world, it actually does more: it helps to develop a "theory 'of what people are'" (Jordan & Day this collection, p. 20) by shifting our understanding of the relationships between brain, mind, body, and world. These possibilities challenge dichotomies that have for a long time dominated classical philosophical views of what human beings are and how they reason and experience. John Dewey argued against a series of dichotomies that were abundant in philosophy, such as those of mind versus body, fact versus value, internal versus external, and experience versus nature by explicating the role of continuities, e.g., between mind and body, and the importance of action for experience. A better understanding of circular causalities is necessary in order for us to be able to see humans as continually changing bodily organisms that incorporate their histories of past interactions with their environments, successful adaptations, and learning processes—each shaped their particular way of being in the world.[5] Such a systems perspective does not seek to understand the brain in isolation, but a person in his or her idiosyncratic context.

Crucially, the approaches fostered already by John Dewey, which have today been rediscovered by philosophers and neuroscientists alike, are in fine accordance with phenomenological descriptions of what it is like to experience. How those perspectives converge into a science of mind is still to be elaborated and might receive inspiration from neurophenomenology, with its call to take seriously introspective phenomenological reports (Lutz & Thompson 2003; Varela 1996). In particular, it can be worthwhile to take this view to psychiatry, as a clinical field deeply dependent on a sensitive understanding of the relation between mind, brain, the rest of the body, and the environment. In psychiatry it becomes particularly evident that dealing with persons is not the same as dealing with brains. For example, explaining depression as a mere chemical imbalance based on a lack of serotonine (a popular statement that does not by any means hold universally, even if one follows a strong reductionist account) does not do justice to the complex causal relationships leading to the pathology. Thomas Fuchs compellingly suggests giving up the classic physical–mental dichotomy that is present in biomedical reductionism, to develop a proper understanding of the circular causality between an organism and its environment (Fuchs 2009, 2011). Fuchs explains how an ecological concept of mental illness does justice to findings about how disorders are a product of the complex interaction of subjective, neuronal, social, and environmental influences. This does not only matter for our understanding of mental illnesses, but also importantly impacts on how we approach treatments at various levels. The essential relevance of recognizing circular causalities in the brain–body–world interaction can also be seen in neurological treatment and in the psychological reactions of patients to treatments. Beliefs about the relationship between brain and mind and how they relate to one's personality and psychological well-being might influence reactions to neurological or neurosurgical interventions. In particular, for treatment with deep brain stimulation it has been argued that a framework that is neither dualistic nor brain-centric, but which offers a perspective that recognizes the manifold interaction between mind, body, and world can have beneficial effects on patients and their surrounding (Mecacci & Haselager 2014; Keyser & Nagel 2014). Thus, the quality of therapeutic approaches might benefit from examining more holistic approaches to psychiatric disorders and therapies. Ultimately, these theoretical considerations can be crucially relevant for life in all its facets.

5 Outlook

Abundant experimental evidence demonstrates that human beings are systems comprised of the

5 *The implied essentialisation of biology as a constant of human being, and of culture as its variable and interactive compliment, is not just clumsily imprecise. It is the single major stumbling block that up to now has prevented us from moving towards an understanding of our human selves, and of our place in the living world, that does not endlessly recycle the polarities, paradoxes and prejudices of western thought* (Ingold 2004, p. 217).

brain as part of a body and the environment in a constant regulatory, adaptive process. Consequently, we suggest a systems view that considers such complex feedback loops in terms of circular causality (Crafa & Nagel forthcoming). As there are manifold fluctuating organismic levels that create feedback loops for continuous adaptation, studying those feedback loops will in all likelihood improve our understanding of how our experience is action-oriented and based on skillful engagement with the world. Notably, this approach does not in itself forestall by definition the assumption of representations (see e.g., Dennett 2000). I suggest that a computational view of cognition might not be opposed to the dynamic, embodied view. It is likely that we need both approaches in order to understand how self-organizing dynamic systems constantly adapting to their environment are able to reason, solve abstract problems, use language, etc (c.f., for another synthesizing suggestion, Grush 2004). Computational explanations of how the body and the environment interact can be useful tools here, possibly benefiting from ideas such as predictive coding or deep learning in Artificial Intelligence.[6] Such a step includes blurring the boundaries between cognitive and sensory-motor processes. So-called low-level and high-level processes cannot be understood independently, since they constantly interact and influence one another. While symbolic abstraction is necessary for reasoning, problem solving, or language, those are strongly coupled to lower-level processes, such as perception, object manipulation, or movement. Much conceptual and empirical work must be undertaken, for which a mixed methods approach considering multiple dimensions seems to be necessary and most promising. Such an approach —or better, combination of approaches—can help to integrate multiple levels of analysis. It might combine neurobiological concepts (and these on different levels as well, reaching from molecular studies up to studying systems and interacting systems) with psychological, anthropological, and philosophical studies. For the laboratory, a systems approach would ask for frameworks that allow us to study ‘active’ subjects using a variety of methods. Mobile technologies for physiological measurements are an important step towards this goal, as are set-ups that combine different physiological measurements. This is an ambitious task, which demands technological and computational innovation and effort. And, not least, studying mental capacities can be massively enriched by combining phenomenological accounts of experience with cognitive science approaches as suggested from the field of neurophenomenology (Varela 1996).

It is likely that a more holistic view on human cognition and experience will help us focus on topics that truly matter to people and that do justice to their experience. One practical consequence of a different understanding of the relationship between mind, body, and world is its potential effect on human self-understanding, which in turn can have significant psychological effects (e.g., Vohs & Schooler 2008). As Gregory Bateson frames it: “[t]he living man is thus bound within a net of epistemological and ontological premises which—regardless of ultimate truth or falsity—become partially self-validating for him” (Bateson 1973, p. 314). Thus, theoretical considerations in the field of philosophy of mind, together with the pragmatists’ understanding of experience and neuroscientific findings on the relevance of the interdependence of the brain, the rest of the body, and the environment shall lead to thicker descriptions of the multifaceted human condition.

6 Predictive coding is a framework for understanding the reduction of redundancy and efficient coding in the nervous system. It is suggested that highly redundant natural signals are processed by removing the predictable components of the input, thereby transmitting only what is not predictable. Hierarchical predictive coding can explain response selectivities in networks (Clark 2001; Hohwy et al. 2008, Friston et al. 2010; Friston & Stephan 2007; Rao & Ballard 1999). Inspired by neural network processing, deep learning methods in machine learning aim to produce learning of features at multiple levels of abstraction, thus allowing learning of complex functions (e.g., Arel et al. 2010; Bengio 2009; Hinton et al. 2006).

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