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In the Pursuit of an Ecological and Enactive Theory of Affordances

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The Philosophy of Affordances. Manuel Heras–Escribano. Cham, Switzerland: Palgrave Macmillan, 2019, XI, 232 pages, $109.99 hardcover.

In *The Philosophy of Affordances,* Manuel Heras–Escribano immerses us into an exciting and original philosophical analysis of two fundamental concepts of Gibson's ecological approach to perception: *affordances* and *ecological information*. Heras–Escribano's inquiry is founded on pragmatist and naturalist philosophers. From this perspective, the author looks forward to setting more solid theoretical foundations for ecological psychology, considering the current challenges of post-cognitivist cognitive science. Despite the exciting proposals of Heras–Escribano, I am concerned about two problematic aspects of his work. First, the author mistakenly concluded that his naturalist account of affordances truly overcomes the subject–object dichotomy of mind and cognition. Indeed, I think Heras–Escribano leans in favour of an objectivist account of affordances that implicitly assumes the dichotomy. Second, his overfocus on natural selection as the causal origin of the link between organisms and the environment, and his narrow conception of biological agency, neglect the importance of the enactive approach claim that each living organism enacts its own norms of interaction with the environment. The enactivist perspective recognizes the crucial role of development in the emergence of affordances. It also offers a better account than Heras–Escribano's of the flexibility and plasticity of behaviour. The first part of the critical notice briefly reviews the main contributions of

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Heras–Escribano to Gibson's ecological approach. The second part focuses on the problematic issues of his view and recommends a more substantial connection between ecological psychology, phenomenology, and the enactive approach than Heras–Escribano suggests.

Summary of the Work

Heras–Escribano reasonably worries about how many contemporary authors in the field of embodied cognition use the term "affordances" in a way that differs significantly from Gibson's original definition (p. 4). The misuse of *affordances* is often due to its separation from the other central concept of Gibson's ecological framework: ecological information. This latter concept is fundamental to maintain the non-dichotomic character of Gibson's work (p. 49). Since both *ecological information* and *affordances* are concepts that hardly fit into the usual conceptual frameworks of modern sciences and philosophies of mind, which are dichotomic, we need to do a careful conceptual analysis of their significance. Heras–Escribano aims to highlight the pragmatist roots of Gibson's psychology and proposes innovative interpretations from the same philosophical perspective.

Pragmatism is a philosophical movement aspiring to overcome the traditional subject–object dichotomy of modern philosophies and sciences of mind. Like pragmatists such as William James and John Dewey, Gibson thought that mind and world are not two separated entities but are mutually co-implicated (p. 6). Harry Heft (2001) was the first to systematically trace the pragmatist roots of Gibson's work in James's radical empiricism. Heras–Escribano makes a similar strategy in *The Philosophy of Affordances*, but he shifts our focus from the influence that James's metaphysics had on Gibson's thought to the role that Dewey's (1929) naturalism can play in a contemporary interpretation of Gibson's work (p. 68).

Heras–Escribano acknowledges two central aspects of Dewey's philosophy that can be helpful for ecological psychology: the understanding of nature as a temporally extended process, based on Darwin's theory of evolution (p. 192), and the claim that processes of causal circularity constitute living organisms and their environments (p. 200). In the twentieth century, evolutionary biologists like Richard Lewontin (1983) and the niche construction theory defenders (Laland et al., 2000) have supported Dewey's ideas. Therefore, for Heras–Escribano, Dewey offers an important connection between the pragmatist interpretation of Gibson's work and the project of naturalizing his approach on a firm biological basis (p. 192).

Among the many exciting ideas suggested by Heras–Escribano in *The Philosophy of Affordances*, there are three central ones that I will focus on here: (i) the definition of affordances as dispositions, (ii) the claim that affordances and ecological information are ontologically objective as relations of the agent–environment system, and (iii) the hypothesis that affordances are causally rooted in processes of natural selection.

(i) The claim that affordances are dispositions is not new in ecological psychology. Turvey (1992) had made this proposal first, but Heras–Escribano has deepened and refined this idea. Following Tugby (2013), Heras–Escribano distinguishes between two tendencies to define dispositions: Aristotelianism and Platonism. Dispositions are essentially properties of things that appear when the proper conditions are given. From the Aristotelian perspective, dispositions are not "real" or existent before the requirements for dispositional properties to show up are de facto given (p. 74). By contrast, from a Platonic standpoint, dispositions exist even if the right conditions for their actualization are never given (p. 75). That is, for a Platonist, the dispositional properties of a thing might be just potential and still be as real as any actual property of a thing. In this manner, an affordance, as an opportunity for action the environment affords to a perceiver, can exist even if no single perceiver can recognize it.

The Aristotelian standpoint is problematic because we cannot ignore that some properties of things, dispositional or not, are real, even if we do not know about them or have not seen them showing up (p. 74). We cannot say, for instance, that gold was not malleable before humans learned to make jewellery. Heras–Escribano is not sympathetic to the Platonic stance either. He defends dispositional properties are real properties of things, regardless of their actualization. Still, he acknowledges Platonism is problematic because of the metaphysical assumption that something can exist just abstractly or theoretically, violating the naturalist commitments of ecological psychology. Heras–Escribano thus offers a third alternative: a non-factualist account of dispositions.

Heras–Escribano roots his non-factual dispositionalism on Ryle's philosophy and holds that dispositions are real because they are "inference-tickets" (p. 82) that have explanatory power, helping us to understand the organism–environment relations (pp. 82–84). Hence, the claim that affordances are dispositions seems to be a heuristic resource for the scientific tasks of ecological psychologists. This definition of affordances as dispositions from a non-factualist perspective is a modest but helpful claim about the ontological status of affordances. Nonetheless, Heras–Escribano still endorses a *sui generis* form of realism based on his naturalist account of affordances (pp. 68–70) and the provocative notion of ecological information (pp. 88–89).

(ii) Heras–Escribano endorses a realist account of affordances, emphasizing Gibson's (1986/2015) claim that affordances perception depends on the existence of ecological information. However, the brain does not contain or produce this information as it happens in cognitivist models. The environment, for ecological psychologists, already has a structure, form, or meaning. This structure is constituted by the distribution of matter and energy in the surroundings of perceivers, which have variant and invariant aspects that help perceivers recognize the available affordances (p. 36). That does not mean that ecological information is not relative to a perceiver; on the contrary, it is only thanks to the perceiver's active movement that affordances exist and can be detected. Ecological information is

nothing over and above the affordances it specifies, it is the structure that makes possible their recognition, so there is a 1:1 relation between affordances and ecological information (p. 41).

Since affordances and ecological information are relational aspects of the organism–environment system, Heras–Escribano, like the rest of ecological psychologists, is not a naïve realist. Ecological psychologists recognize that the world of perception is necessarily relational and exhibits properties of the animal–environment system as a whole and not of any of these two system components in an independent manner (pp. 32–43). Relations are no less real than the intrinsic properties of objects (p. 7; see also Chemero, 2009; Heft, 2001). The realism of affordances, therefore, depends on the relationship established between organisms and the environment. Relations are not constructed within the brain of an animal like us. They are rather constituted in processes that are external to agents' heads. They are indeed constituted by processes of natural selection (pp. 136–142).

(iii) The relationship of individuals and specific groups of individuals with the environment does not constitute affordances. These are instead causally formed by natural selection processes (p. 141). Following Reed, Heras–Escribano claims that relational aspects of animal–environment systems have been shaped by an evolutionary history (p. 138). Nonetheless, neither Reed nor Heras–Escribano subscribes to an orthodox adaptationist view where the conditions of the environment select animals and species. Instead, like the niche construction theory, they think that not only animals are causally determined by environmental conditions, but the environment is also partially determined by the presence and actions of the agents that inhabit them (p. 32). There is, therefore, a dynamic and mutual transformation of agents and the environment at an evolutionary scale (p. 143; see also Heras–Escribano and de Pinedo, 2018). Reed's theory of action systems is the key to understand the naturalism of Heras–Escribano in *The Philosophy of Affordances*.

The theory of action systems claims that functional systems of action and perception have evolved in organisms to attune the behaviour of these organisms to the affordances of the environment (p. 138). This environment, however, can sometimes change due to physical processes and organisms' actions (p. 200). Hence, there is a causal entanglement in the evolutionary processes of organisms and the environment. This idea supports the inseparability of the organism–environment system, suggested by ecological psychology. That is the path that links Darwin's theory of evolution, Dewey's pragmatism, and Gibson's ecological approach: the trail drawn by Heras–Escribano in his interpretation of Gibson's theory of affordances (pp. 201–202).

There is, therefore, a coherent connection, in Heras–Escribano's work, among dispositionalism, relational realism, and naturalism of affordances. Affordances are dispositions because they imply organism–environment coupling. Nonetheless, they are real because their existence does not depend on concrete happenings of individuals or subjects but the establishment of causal connections of species

and their ecological niches. Causal mechanisms of natural selection have produced this causal connection. There is then nothing metaphysical about claiming that affordances are real and natural. On the contrary, there is a continuity between nature and mind because embodied cognition is rooted in processes of natural selection.

Despite the smart strategy of Heras–Escribano to link Gibson's work to pragmatism and naturalism, I think there are two significant problems in his view. First, the relational account of affordances does not necessarily overcome the subject–object dichotomy as the author assumes. Second, the selectionist account of affordances disregards the importance of recognizing living organisms as genuine agents, that is, as constitutors of their own norms of interaction. Indeed, he misses how phenomenology and the enactive approach can help ecological psychology to overcome these problems, thinking that both approaches are only convenient partners for explanations of higher cognitive skills. The second section unpacks these two issues.

The False Overcoming of the Dichotomy

Heras–Escribano states that one of the most significant achievements of Gibson's ecological approach to perception is overcoming the subject–object dichotomy (p. 25). This dichotomy has been at the core of many empirical and philosophical problems in orthodox accounts of perception (see, e.g., Noë and Thompson, 2002). Nonetheless, we must distinguish between overcoming the subjectivist and the objectivist stances of philosophies and sciences of mind and overcoming the subject–object dichotomy that characterizes life and cognition (see, e.g., Thompson, 2007). Gibson's ecological approach rightly addresses the first task but not necessarily the second.

Gibson overcomes the dichotomic theories of perception, building the notions of ecological information and affordances. These notions acknowledge the interdependency of the organism and the environment. Heras–Escribano understands this interdependency in relational and dispositional terms. For him and for other ecological psychologists (e.g., Turvey et al., 1981), it is possible to establish rigorous scientific descriptions of affordances as dispositions. Therefore, the theory of affordances is a non-dichotomic, scientific approach to cognition.

While this conclusion is proper about Gibson's work, it does not lead us to overcome the subject–object dichotomy as such because a relational account of perception does not exhaust the mutual implication of the agent and the environment in perception. At least not if we acknowledge the significant role of subjectivity and agency in this phenomenon.

A relational and dispositional account of the agent–environment system can explain the efficient behaviour of a machine that interacts with the environment as it happens in cases of embodied artificial intelligence (Beer, 1996; Brooks, 1991). That

does not mean that the same account explains the truly intelligent adaptive behaviour of a living agent. If affordances relate the skills of an agent and the possibilities for action in the environment, then a robot designed to exploit these possibilities could constitute a perceptual system from an ecological perspective. Following Heras–Escribano's evolutionary account of affordances, we can say that processes of nature have shaped the design of organisms, so they can efficiently exploit the possibilities for action in the environment and fulfill their biological functions. Namely, processes of nature determine the dispositional realm of affordances.

However, perception does not only consist in the efficient exploitation of environmental resources from agents, as Heras–Escribano's ecological view suggests. Although robots of embodied artificial intelligence can interact with the environment efficiently, exploiting the affordances of the environment, we can hardly say that these robots are genuinely minded or they perceive something (cf. Froese and Ziemke, 2009). Mental and cognitive phenomena depend on a particular sensibility or sentience that involves the affective bodily states of agents (Colombetti, 2014; Colombetti and Thompson, 2008; Fuchs, 2018).

The Intrinsic Subjectivity of Life

The enactive approach to cognition (Di Paolo et al., 2017, 2018; Thompson, 2007; Varela et al., 1991/2016) claims that only living systems possess the sensibility required to attribute meaning to the environment. The behaviour of organisms is guided by the systemic constitution of the living body, which is autonomous (Thompson, 2007). The autonomy of organisms implies that they are systems composed of an interdependent network of processes that must be maintained to preserve their systemic constitution (Di Paolo and Thompson, 2014). Organisms interact with the environment to maintain the viability of their autonomy (Di Paolo, 2005). This is an intelligent adaptive behaviour guided by living systems' interests (Weber and Varela, 2002). The efficiency of this adaptive behaviour is not a matter of external interpretations (i.e., an observer point of view) but a bodily affectivity that organisms possess (Thompson, 2007). I will call this phenomenon "affective sentience."

In this enactivist picture, the environment is lived by organisms as an opportunity to change its bodily affective states. That is, affordances are affective, and the sentience of organisms is crucial to determine their meaning (what they afford). Therefore, affordances of this sort are subjective because they are affectively lived, and their meaning depends on such affectivity (Kiverstein and Rietveld, 2018). They are still also objective or, more appropriately said, worldly because they rely on the relationship between the agent's body and the environment (Rietveld et al., 2018).

The subjective aspect of affordances, from this perspective, is not an ornament or a by-product, like the known qualitative character of experience (e.g., Nagel, 1974). The sentience of organisms matters because organisms determine the meaning or

the significance of affordances. An apple is edible not just because our ancestors were selected thanks to their digestive, perceptual, and metabolic systems, but because our bodies need the chemical nutrients of apples, and because apples are often at hand thanks to the big industry of apple agriculture in modern societies.

Moreover, the subjective aspect of affordances is relevant for our scientific account because it helps us to distinguish between truly cognitive and non-cognitive but efficient interactive systems. Non-living systems, in contrast to living systems, follow blindly the computational instructions preprogrammed by their creators or the systemic consequences of their complex design (cf. Froese and Ziemke, 2009). Therefore, if the enactive approach is correct, the sentience or the minimal subjectivity of organisms matter to determine their exploitation of affordances because the autonomy of organisms determines the value of those affordances. Additionally, if this autonomy determines the norms of organisms' interactions with the environment, developmental aspects and — not only phylogenetic ones — are crucial to understanding behaviour.

Heras–Escribano's account seems to presuppose that heteronomous processes, like the processes of natural selection, suffice to explain the adaptive behaviour of organisms and the establishment of affordances. I think this is not the case. Reed (1996) acknowledges that organisms are highly flexible in their behaviour and adapt to unexpected circumstances. However, suppose we attribute the origin of the relational field of affordances and ecological information to evolutionary processes alone. In that case, we risk neglecting the significance of development and how concrete interactions of the agent and the environment determine the intelligent behaviour of agents.

An approach that focuses more on the ontogenesis and autonomy of intelligent behaviour can better explain the plasticity and flexibility of many living organisms. Heras–Escribano, like Reed, recognizes this flexibility, but he hardly explains it with his dispositional account of affordances, predetermined by evolution. The creative improvisation of living agents often occurs at smaller temporal scales (Chemero, 2009). Organisms need to adjust the development of their skills and their own body to respond to the current circumstances of the environment. We should be aware that there are different degrees of flexibility in the behaviour of organisms. Simple organisms, like cells and bacteria, do not possess the flexibility that multicellular organisms with complex processes of development have. However, even the simplest organisms are sensitive to environmental conditions and shape their development according to the circumstances (see, e.g., Barandiaran and Moreno, 2008).

Sentience, and therefore subjectivity, also matters at every stage of life and cognition. Living organisms do not simply react to the given contextual conditions and the inherited characteristics of their phylogenetic lineage — something the dispositional account of Heras–Escribano also suggests. Every organism develops its own body and skills differently, according to its developmental

circumstances. This is not to deny the importance of evolutionary processes and phylogenetic determinations but to call for a more significant focus on how bodily and behavioural ontogenesis affects an organism's actions and perception of affordances (cf. Thompson, 2007).

We can acknowledge that regular patterns of typical behaviour exist in natural groups (species) and cultural ones, as in the case of humans. However, this is not equal to accepting that nature predetermines the constitution of life and cognition. Regularities may happen because the environment affords a sort of stability that constrains the development of agents and sustains the typicality of an organism's behaviour (cf. Walsh, 2018). The theory of behavioural settings already suggests this hypothesis at the scale of human social cognition (Barker, 1968; Heft, 2018). Nonetheless, we need an account that acknowledges the open-ended character of life and cognition. Many individual agents deviate from the normality, and deviations are not necessarily due to chance; they may happen due to interaction processes in the agent–environment system (cf. Oyama et al., 2001).

Living agents are creative and spontaneous in nature and even more in culture. Heras–Escribano defends a Wittgensteinian account of norms that restricts normativity to the actions of humans regulated by social conventions. I think this is also problematic. Individuals often vary their behaviour and skills, creating dynamic tensions in social interactions that lead to the reshaping, abandonment and acquisition of new norms (Di Paolo et al., 2018). I don't think a dispositional account of affordances can offer the best picture for the dynamicity of social interactions. The dispositional understanding of affordances certainly is scientifically more ambitious, but the production of general ecological laws can lose the grip on real cognitive phenomena, quite like what happens in neurocentric cognitive science. If skillful human agents need to be creative, dynamic, and spontaneous in dealing with the ever-changing environment, then the enactive approach can reinforce the arguments of ecological thinkers (see, e.g., Sepúlveda–Pedro, 2020).

For this reason, I think the sort of explanation offered by the enactive approach needs to enhance any evolutionary account of affordances, including the one suggested by Heras–Escribano. The enactive approach focuses more on development and the concrete history of living agents (see, e.g., Thompson, 2007). Unfortunately, Heras–Escribano thinks the enactive approach framework is not suitable to explain the basal levels of cognition (intelligent adaptive behaviour) because the enactive approach is overfocused on individual agents (p. 135).

Rethinking Subjectivity

My second concern is about the obsession of ecological psychologists to eliminate subjectivity from the study of cognition, resembling the ambitions

of neurocentric eliminativism (Churchland, 1981). Heras–Escribano is not the exemption. If subjectivity as sentience is a constitutive aspect of life and cognition, then we need to address the study of subjectivity as seriously as the scientific side. The enactive approach has often appealed to phenomenology for this task. Heras–Escribano, however, thinks that such endeavour needs to be restrained to certain aspects of cognition because phenomenology is overfocused on subjectivity, and for this reason, it does not overcome the subject–object dichotomy as ecological psychology does (pp. 127–128). I disagree.

Overcoming the dichotomy is not to eliminate subjectivity and objectivity but to rethink what subjectivity and objectivity mean. Subjectivity is embodied and world-involving and does not implicate a radical separation between mind and word. Objectivity is not the reach of a true statement about how the world is in itself. Instead, the agreement of communities in their practices establishes the criterium of fulfillment for a theory to be interpreted as right (Kuhn, 1962/2012; Longino, 2006). These practices are bodily and cultural, so they are contingent and dependent on the agents that constitute the community.

Phenomenology and the enactive approach agree on this subject and, if ecological psychologists aim to overcome the dichotomy, they should be careful about their treatment of subjectivity. Eradicating subjectivity from our conception and study of cognition is equal to leaning in favour of an objectivist stand that would remain trapped in the same dichotomy that ecological psychologists aim to overcome. Claiming that affordances are neither subjective nor objective is not enough to overcome subjectivity and objectivity but to rethink affordances' subjective and objective aspects. Ecological psychologists need to stop being skeptic about the use of rigorous methodological analyses of subjectivity if these methodologies recognize that the mind is not disembodied nor constitutor of the cognitive world, as it happens in cognitivist models.

Ecological psychologists also need to realize that any account of cognition elaborated from a purely third-person stance is not only misleading but impossible. For this reason, Gibson needed subjectivity to create his descriptions of the ecological realm. This does not impede us from thinking that such discoveries can become scientific thanks to theoretical, practical and technological tools for measuring and establishing intersubjective criteria to determine the plausibility of these descriptions. For this reason, although phenomenology differs methodologically from science, phenomenology can help scientists to establish and improve their empirical frameworks. Likewise, phenomenologists can rethink their own discoveries thanks to well-founded empirical evidence (Gallagher, 2012).

It is not uncommon to believe that phenomenology, as a systematic analysis of experience, assumes the enclosure of subjects into their own minds, not entirely unlike Descartes intended to do it with his analytic method of doubt. Such interpretations disregard, however, what is at the stake of the phenomenological *epoché*

and the meaning of the phenomenological reduction (Husserl, 1913/1982), the two most essential steps of the phenomenological method (Zahavi, 2003).

The phenomenological *epoché* consists of bracketing our beliefs of the world based on our everyday knowledge (a natural attitude) and on our scientific knowledge (a naturalistic attitude) to disclose how objects are given in experience (a phenomenological attitude) [Husserl, 1954/1970]. This bracketing is not a skepticism à la Descartes because phenomenologists do not doubt "the existence of something that transcends consciousness," i.e., the world (Zahavi, 2003, p. 46). Phenomenologists bracket instead our acquired and often unanalyzed beliefs of the world, including the assumptions about "the existence of the objects" we experience, for the sake of uncovering the fundamental structures of experience.

Let's think about the typical theories of perception of modern philosophy. Empiricist theories like Locke's presuppose that we perceive ready-made physical objects with intrinsic properties (object qualities). These properties are, in this picture, progressively recovered by our minds thanks to our senses, although some features of perceptual experiences (qualities of experience) are properties that emerge from our subjectivity. Intellectualists like Kant, by contrast, conceive the world beyond consciousness as a formless matter that our rational capacities need to order and categorize to constitute the objects of perception. Both accounts depart from the belief that the things we perceive are fully constituted objects, either in the world in itself or in the rational mind (Merleau–Ponty, 1945/2012).

A more careful analysis of our own experience shows that perceived objects are never sensorially given in their totality. Instead, it is only a profile, what these objects show to our perceptual consciousness (e.g., when I look at my laptop, I do not directly see its back, but I still experience its presence). From a phenomenological perspective, we cannot simply presuppose that perceptual objects are ready-made or fully constituted to which we have access from one of their multiple profiles. We instead need to analyze the constituents of the relation between the profile of an object and the total object that perceivers live, despite that fact that not all of it is sensorially given (Noë, 2012). The phenomenological analyses made by Husserl (1997) and Merleau–Ponty (1945/2012) suggest that our bodily expectations are constituents of our perceptual experience of objects. These expectations partially define the object's hidden or not actually present profiles, indicating to our bodies the possibilities of objects to be explored and manipulated (Merleau–Ponty, 1945/2012). We must highlight that these expectations are corporeal and not mental. They have been constituted as bodily habits thanks to previous body interactions with the object perceived or other similar objects in the world (Kelly, 2005). There is no Cartesian subjectivity at play here. Instead, there is the overcoming of the subjectivist and the objectivist stance that Gibson's followers also ambition (cf. Sanders, 1993).

The goal, for phenomenologists, is not to eradicate subjectivity from our understanding of the world but to acknowledge that our experience of the world is

unavoidably rooted on an embodied and enculturated (inter) subjective ground, and that includes science (Husserl, 1954/1970). Let's be clear about this: there is no pure subjectivity or pure objectivity. The bodily nature of subjectivity attaches us to the world, but the world is never given to us without the implication of our subjectivity. Therefore, the objects we perceive are not as they are in the world as such or constituted by the active powers of the mind. They are rather constituted in the intercrossing of our bodies and the world (Morris, 2004). They are enacted (Di Paolo, 2016).

The methodology of phenomenology indeed departs from the analysis of subjective experience, but this analysis is not a mere introspection as many philosophers think (e.g., Dennett, 1991). It is the uncovering of the conditions of possibility for a phenomenon to be given. Phenomenology is a transcendental philosophy, and adopting a transcendental stance is precisely adopting a phenomenological attitude (Zahavi, 2003). A transcendental philosophical analysis is undoubtedly different from the causal analysis of science. For the causal explanations of science, the objects we experience are always already constituted as objects in one way or another. For a transcendental philosophy, the fundamental question lies in analyzing the conditions for these objects to be constituted in the first place (Zahavi, 2003).

As Gallagher (2012) and others (e.g., Thompson, 2007) have claimed, both analyses, the causal and the transcendental, are methodologically limited and need to work together to improve their own paths, but attribute a subjectivism to a transcendental analysis, as Heras–Escribano does, is a mistake. Although phenomenologists depart from subjective experience to analyze worldly phenomena, they do not pretend to detach the world from consciousness in doing phenomenology. Instead, the inseparable relation of consciousness and the world, given in the experience of human beings, is at the core of phenomenological studies. Phenomenology indeed can help us to see science as a worldly phenomenon, that is, as a human bodily and enculturated practice (Varela et al., 1991/2016). Thomas Fuchs (2018) has remarkably shown how the study of cognition can be seen from the transcendental and the scientific perspective, referring to the same object but changing the references, so the fear of any non-natural entity at work is not justified.

An Ecological, Enactive, and Phenomenological Approach to Life and Cognition?

Heras–Escribano recognizes the importance of phenomenology to analyze some levels of explanation from a radical embodied cognition perspective (p. 208). He relegates the role of phenomenology to the analysis of subjectivity in levels of cognition higher than the behavioural one, which is the proper level of study of ecological approaches. Although this is an exciting pluralist strategy, it neglects the importance that phenomenology has in disclosing the structures of embodiment and enculturation, and that has been the most critical contribution of phenomenology to the field of embodied cognition thus far.

Heras–Escribano acknowledges that enactivism and phenomenology are potential allies of ecological psychology in constructing a post-cognitivist cognitive science. However, these approaches should restrain their study of cognition to levels higher than the basal ecological level (p. 208). I believe this is a mistaken strategy.

Phenomenology and the enactive approach do not assume the subject–object dichotomy like cognitivism and Cartesian philosophies did. They instead acknowledge that our embodied and enculturated subjectivity is part of our study of cognition, so either we recognize this fact and analyze this embodied subjectivity with a rigorous methodology, or we remain naïve, thinking that we can observe "objectively" cognitive phenomena (cf. Varela et al., 1991/2016). Moreover, the enactive approach and the phenomenologist Hans Jonas, at least, claim that individual agency is not only a constitutive aspect of any form of cognition but of life as well (Thompson, 2007). Defining life and cognition as intrinsically subjective and *truly* agential does not seem to fit with the ecological view of Heras–Escribano. He defines cognition as adaptive behaviour and thinks that agency is a functional capacity causally constituted by blind processes of nature (dynamic processes of natural selection). This is insufficient to attribute intelligence and cognition to a system, as it has been extensively argued by the enactive approach (Di Paolo et al., 2017; Froese and Ziemke, 2009) and remarked by detractors of post-cognitivist approaches such as Aizawa (2014). Such a view is problematic to characterize intelligent behaviour and may fail to explain the plasticity of behaviour and creativity of living cognitive agents at ontogenetic and behavioural scales. Therefore, I think the enactive approach and phenomenology should also guide ecological psychology to construct a more robust account of cognition from a post-cognitivist stance, instead of thinking that ecological psychology suffices with the help of pragmatism.

References

Aizawa, K. (2014). The enactivist revolution. *AVANT*, *5*(2), 19–42.

Barandiaran, X. E., and Moreno, A. (2008). Adaptivity: From metabolism to behavior. *Adaptive Behavior*, *16*(5), 325–344.

Barker, R. G. (1968). *Ecological psychology: Concepts and methods for studying the environment of human behavior*. Stanford University Press.

Beer, R. D. (1996). Toward the evolution of dynamical neural networks for minimally cognitive behavior. In P. Maes, J. A. Meyer, M. J. Mataric, J. Pollack, and S. W. Wilson (Eds.), *From animals to animats 4: Proceedings of the fourth international conference on simulation of adaptive behavior* (pp. 421–429). MIT Press.

Brooks, R. A. (1991). Intelligence without representation. *Artificial Intelligence*, *47*(1–3), 139–159.

Chemero, A. (2009). *Radical embodied cognitive science*. MIT Press.

Churchland, P. (1981). Eliminative materialism and the propositional attitudes. *Journal of Philosophy*, *78*(2), 67–90.

Colombetti, G. (2014). *The feeling body: Affective science meets the enactive mind*. MIT Press.

Colombetti, G., and Thompson, E. (2008). The feeling body: Toward an enactive approach to emotion. In W. F. O'verton, U. Müller, and J. L. Newman (Eds.), *Developmental perspectives on embodiment and consciousness* (pp. 45–68). Taylor and Francis.

Dennett, D. C. (1991). *Consciousness explained*. Little, Brown.

Dewey, J. (1929). *Experience and nature*. George Allen and Unwin.
Di Paolo, E. A. (2005). Autopoiesis, adaptivity, teleology, agency. *Phenomenology and the Cognitive Sciences*, *4*(4), 429–452. doi.org/10.1007/s11097-005-9002-y
Di Paolo, E. A. (2016). Participatory object perception. *Journal of Consciousness Studies*, *23*(5–6), 228–258.
Di Paolo, E. A., Buhrmann, T., and Barandiaran, X. E. (2017). *Sensorimotor life: An enactive proposal*. Oxford University Press.
Di Paolo, E. A., Cuffari, E., and De Jaegher, H. (2018). *Linguistic bodies: The continuity between life and language*. MIT Press.
Di Paolo, E. A., and Thompson, E. (2014). The enactive approach. In L. Shapiro (Ed.), *The Routledge handbook of embodied cognition* (pp. 86–96). Routledge.
Froese, T., and Ziemke, T. (2009). Enactive artificial intelligence: Investigating the systemic organization of life and mind. *Artificial Intelligence*, *173*(3), 466–500. doi.org/10.1016/j.artint.2008.12.001
Fuchs, T. (2018). *Ecology of the brain: The phenomenology and biology of the embodied mind*. Oxford University Press.
Gallagher, S. (2012). On the possibility of naturalizing phenomenology. In D. Zahavi (Ed.), *The Oxford handbook of contemporary phenomenology* (pp. 70–93). Oxford University Press.
Gibson, J. J. (2015). *The ecological approach to visual perception*. Psychology Press. (originally published 1986)
Gould, S. J., and Lewontin, R. C. (1979). The spandrels of San Marco and the Panglossian paradigm: A critique of the adaptationist programme. *Proceedings of the Royal Society of London. Series B. Biological Sciences*, *205*(1161), 581–598.
Heft, H. (2001). *Ecological psychology in context: James Gibson, Roger Barker, and the legacy of William James's radical empiricism*. Psychology Press.
Heft, H. (2018). Places: Widening the scope of an ecological approach to perception–action with an emphasis on child development. *Ecological Psychology*, *30*(1), 99–123.
Heras–Escribano, M., and de Pinedo, M. (2018). Affordances and landscapes: Overcoming the nature–culture dichotomy through niche construction theory. *Frontiers in Psychology*, *8*, 2294.
Husserl, E. (1970). *The crisis of European sciences and transcendental phenomenology: An introduction to phenomenological philosophy* [D. Carr, Trans.]. Northwestern University Press. (originally published 1954)
Husserl, E. (1982). *Ideas pertaining to a pure phenomenology and to a phenomenological philosophy I: Vol. II* [F. Kersten, Trans.]. Kluwer Academic Publishers. (originally published 1913)
Husserl, E. (1997). *Thing and space: Lectures of 1907* (R. Rojcewicz, Ed.). Springer Netherlands.
Kelly, S. D. (2005). Seeing things in Merleau–Ponty. In T. Carman and M. Hansen (Eds.), *The Cambridge companion to Merleau–Ponty* (pp. 74–110). Cambridge University Press.
Kiverstein, J. D., and Rietveld, E. (2018). Reconceiving representation-hungry cognition: An ecological–enactive proposal. *Adaptive Behavior*, *26*(4), 147–163.
Kuhn, T. S. (2012). *The structure of scientific revolutions* (50th anniversary edition). University of Chicago Press. (originally published 1962)
Laland, K. N., Odling–Smee, F. J., and Feldman, M. W. (2000). Niche construction, biological evolution, and cultural change. *Behavioral and Brain Sciences*, *23*(1), 131–146.
Lewontin, R. C. (1983). The organism as the subject and object of evolution. *Scientia*, *118*, 63–82.
Longino, H. E. (2006). Philosophy of science after the social turn. In M.C. Galavotti (Ed.), *Cambridge and Vienna: Frank P. Ramsey and the Vienna Circle* (pp. 167–177). Springer.
Merleau–Ponty, M. (2012). *Phenomenology of perception* [D. Landes, Trans.]. Routledge. (originally published 1945)
Morris, D. (2004). *The sense of space*. State University of New York Press.
Nagel, T. (1974). What is it like to be a bat? *Philosophical Review*, *83*(4), 435–450.
Noë, A. (2012). *Varieties of presence*. Harvard University Press.
Noë, A., and Thompson, E. (2002). *Vision and mind: Selected readings in the philosophy of perception*. MIT Press.
Oyama, S., Griffiths, P. E., and Gray, R. D. (2001). *Cycles of contingency: Developmental systems and evolution*. MIT Press.
Reed, E. S. (1996). *Encountering the world: Toward an ecological psychology*. Oxford University Press.
Rietveld, E., Denys, D., and Van Westen, M. (2018). Ecological–Enactive cognition as engaging with a field of relevant affordances: The skilled intentionality framework (SIF). In A. Newen, L. de Bruin, and S. Gallagher (Eds.), *The Oxford handbook of 4E cognition* (pp. 41-70). Oxford University Press.

Sanders, J. T. (1993). Merleau–Ponty, Gibson, and the materiality of meaning. *Man and World*, *26*(3), 287–302. doi.org/10.1007/BF01273397

Sepúlveda–Pedro, M. A. (2020). Levels and norm-development: A phenomenological approach to enactive–ecological norms of action and perception. *Frontiers in Psychology*, *11*(1666). doi.org /10.3389/fpsyg.2020.01666

Thompson, E. (2007). *Mind in life: Biology, phenomenology, and the sciences of mind*. Harvard University Press.

Tugby, M. (2013). Platonic dispositionalism. *Mind*, *122*(486), 451–480. doi.org/10.1093/mind/fzt071

Turvey, M. T. (1992). Affordances and prospective control: An outline of the ontology. *Ecological Psychology*, *4*(3), 173–187. doi.org/10.1207/s15326969eco0403_3

Turvey, M. T., Shaw, R. E., Reed, E. S., and Mace, W. M. (1981). Ecological laws of perceiving and acting: In reply to Fodor and Pylyshyn (1981). *Cognition*, *9*(3), 237–304.

Varela, F. J., Thompson, E., and Rosch, E. (2016). *The embodied mind: Cognitive science and human experience* (second edition). MIT Press. (originally published 1991)

Walsh, D. M. (2018). Objectcy and agency: Towards a methodological vitalism. In J. Dupré and D. J. Nicholson (Eds.), *Everything flows: Towards a processual philosophy of biology* (pp. 167–185). Oxford University Press.

Weber, A., and Varela, F. J. (2002). Life after Kant: Natural purposes and the autopoietic foundations of biological individuality. *Phenomenology and the Cognitive Sciences*, *1*(2), 97–125. doi.org /10.1023/a:1020368120174

Zahavi, D. (2003). *Husserl's phenomenology*. Stanford University Press.