lection principle (thermodynamic fields will behave in such a fashion as to get to the final state – that is, minimize the field potential or maximize the entropy – at the fastest possible rate given the constraints);

b the inexorability of order production (order production is inexorable because order produces entropy faster than disorder);

c evolution as a global phenomenon (the Earth system at its highest level evolves as a single global entity); and

d information in Gibson's specificational sense.

In the coordination of self-organizing autocatakinetic dynamics with (d), access is provided to otherwise inaccessible opportunities to produce ordered flow and to dissipate, thereby, the geo-cosmic potential at faster rates.

« 13 » These four properties fix the definition of autocatakinetic and its explanatory role. The definition and explanatory role of autopoiesis are much less secure. Varela (2000) expresses some skepticism about the contemporary extensions of autopoiesis, particularly the equating of inter-person dynamics with autopoiesis dynamics. For him, it is an abuse of language. Luisi is similarly disposed:

> "Another source of difficulty in autopoiesis is the use of various neologisms, such as cognition, enacting, 'creating its own world,' embodiment. The acceptance of all these terms and concepts is certainly one stumbling block, both from the scientific and psychological point of view." (Luisi 2003: 58)

With respect to this disquiet about enactivism, we can only concur.

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The Ontology of Perception: Agency, Evolution and Representationalism

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> Upshot • The aim of my commentary is to complement some of the main points defended in the target article. In particular, I want to explore further the central role of agent-level explanations and of evolution for our understanding of a meaningful environment. I finish by wondering whether an excessive focus on ontological questions could be problematic for a proper defence of ecological psychology.

Introduction

« 1 » In their target article, Martin Fultot, Lin Nie and Claudia Carello offer an insightful and careful contrast between ecological psychology (EP) and enactivism(s). They show how the former can avoid the main pitfalls of the latter, and question whether enactivism is in a position to do justice to some its dearest principles – most importantly, its antirepresentationalism and its commitment to the indivisibility of the organism-environment system. I deeply sympathize with their approach and have very little to object to in their arguments. The purpose of this commentary is to complement some of their ideas, to pursue further some of the issues that are raised and, very briefly, to suggest that there might be ontological traps behind some incidental remarks regarding affordances.

Agential vs. subagential

« 2 » The authors rightly insist on two related issues: EP is a psychology for all organisms or even for all end-directed physical systems (§§2, 17), and it focuses on aspects of the environment that are relevant for the organism as a whole (§§3, 10). Though they do not phrase it in these terms, I think that it could be useful to place both ideas within the philosophical discussion regarding the need to distinguish between personal and subpersonal explanations. In doing so, I will also explore, as an example, an artificial agent, a pet case for enactivists, and try to show that EP is better placed to account for its behaviour. I will also suggest that there might be a different form of representationalism, linked with a descriptivist conception of language, lurking behind some forms of enactivism.

« 3 » In recent years, philosophers drawing their inspiration from Ludwig Wittgenstein (1953), Gilbert Ryle (1949) or Donald Davidson (1970) have claimed that our understanding of human behaviour makes ineliminable use of intentional, rational or normative vocabulary that, furthermore, cannot be reduced to the vocabulary of explanations of the subpersonal mechanisms that enable perception, cognition and action (see, for instance, McDowell 1994 and Hurley 1998). John McDowell, in particular, goes one step further and argues that "personal-level" explanations are essential to understanding all kinds of organisms that successfully inhabit their environment. Contrasting James Gibson with David Marr, he claims that the philosophy of perception's main point of interest should be the interaction between the animal and features of the environment that are meaningful for the animal as a whole. In a catchy phrase, the question should be "What does the frog's visual experience tell the frog?" rather than "What does the frog's eye tell

the frog's brain?"[1] "Froggy," rather than "subfroggy," explanations are the speciality of EP, and this should be welcomed by the philosophy of mind.

« 4 » In collaboration with Jason Noble, I have defended the idea that such agential-level explanations are needed, not only for rational creatures or for living organisms, but also for any agent resulting from an evolutionary process (see Pinedo & Noble 2003, 2007). Although the authors of the target article suggest that their considerations extend to any "end-directed physical system," they also insist throughout the target article on the role of evolution in the emergence of agential meaningfulness (§§22, 27, 39). Our argument, in a nutshell, is this: consider an artificially-evolved agent, such as Randall Beer's circle-catching and diamond-avoiding agent, exhaustively analysed by its creator and his team (Beer 2003). If we restrict our attention to the mathematical description of the agent's activity, we would miss something central: the agent under analysis is the result of a history of selection from amongst the ancestors that are best at the task at hand, namely, catching the circles that fall towards them in a bidimensional space and avoiding the diamonds. The dynamical system analysis tells us *how* the agent performs the task. The agent-level concepts (circle, diamond, catching, etc.) give us essential information about the history of the agent–environment system (Michaels & Carello 1981). For this reason, our understanding of the agent must take circles and diamonds to be meaningful for it as a whole, though not for the few "neurons" that enable its activity, as a consequence of the role that such a history plays. Our aim was to show that evolution is sufficient, though perhaps not necessary, for an agent to deserve agent-level, ecological explanations. Furthermore, wherever there is an explanatorily relevant evolutionary history, we cannot dispense with agent-level concepts. Whether such concepts will be needed in other cases is, I believe, a more controversial question. (I will briefly come back to it in §6).

1| "Rather, what tells the frog things is the environment, making features of itself apparent to the frog, equipped as it is with frog perceptual apparatus" (McDowell 1994: 197).

Evolution and the meaningful environment

« 5 » The simultaneous insistence on the centrality of the agent, on the extension of psychology beyond humans (shared by EP and enactivism), and on the role of evolution (highlighted in §§22, 27), may help to shed some new light on the clash between EP and enactivism. One fears that enactivism shares with the phenomenologists from which they draw inspiration a deep distrust of Darwinism, as if evolutionary explanations were reactionary and incompatible with the autonomy and creativity of the agent, and the only way to be genuinely subversive was to place all the emphasis on the organism's structure, activity and self-production. This is, ultimately, an inheritance of Nietzsche's reaction to Darwin: if Spencer's social Darwinism is a bourgeois theory, Darwin's biological Darwinism must be one, too. In contrast, I have suggested in §4 that an appeal to the evolutionary history of the agent may be a powerful explanatory supplement for EP in accounting for the meaningfulness of the environment.

« 6 » Fultot, Nie and Carello carefully dismantle the enactivists' claim that Gibson excludes the agent by emphasizing the environment (see §§20ff). In §4, I have suggested that being the result of an evolutionary process is sufficient to deserve agential-level explanations. Now, I would like to apply this idea to the issue of the meaningfulness of the environment for the agent. How does meaning emerge, if it is not through the constructivist and projectionist process of "sense-making," criticized by Fultot, Nin and Carello? Their target article offers a powerful suggestion (§27): organisms both *exist in* and *evolve in* a "rich sea of information." The idea that we would need explanations framed around what is relevant in the environment for the agent, rather than for its inner workings, can be put in evolutionary terms. The agent finds meaning in its surroundings inasmuch as there are features of the environment the taking advantage of which played a role in the survival and reproduction of its ancestors. Such features or resources are meaningful *for the agent* even when the agent does not effect any activity. This is so because the agent's activity, the actualization of an affordance, is understood in terms of the potential offered by the affordance. (More on the ontological individuation of affordances below.) Such potentiality can be explained by appealing to successful taking-advantage-ofs by the agent's ancestors. When there is a story to be told about the history behind the agent, that story will go a long way in explaining its interaction with the environment. Most agents, if not all, have ancestors.[2]

« 7 » Does this mean that the agent merely resonates or responds to meanings established by evolution? I believe that the target article offers an insightful negative answer, complementary to my insistence on the role of evolution, when they distinguish (§§31–33) between causal and constitutive niche construction. Agents, in their activity, make it the case (constitutively) that some pre-existing properties of the environment are relevant for them, but also make it the case (causally) that some new properties arise in the environment. In the latter case, they may actually contribute to the shaping of evolution and to establishing new informational patterns that could be perceived as relevant or meaningful by future agents.

Two kinds of representationalism

« 8 » Another strong point of the target article is their discussion of the representationalist or internalist consequences that may follow from some enactivist tenets. Here, I will try to contribute with a complementary argument. One can be a representationalist by claiming that cognition is mediated by representations. But one can also be a representationalist in a deeper sense, a sense that predates the appeal to representations in the cognitive sciences or in the philosophy of mind: one can understand that the central, and perhaps sole, role of language is to describe or represent facts. Whether enactivism is representationalist in the first sense is, in my opinion, an open question. However, they seem to be committed to the idea that every meaningful,

2| As an example of the relevance of history for present circumstances, consider Davidson's (1987) Swampman thought experiment: lighting disintegrates him and, simultaneously, by some coincidence, an identical copy of himself appears in the swamp. He goes home and seems to recognize his wife. But he does not recognize her because he never saw her before.

explanatory discourse about organisms is descriptive in nature – it is particularly telling that even our normative evaluations of behaviour (as correct or incorrect, as adaptive or maladaptive, etc.) play, in their view, a descriptive role (see, for instance, Di Paolo 2005 and Barandiaran & Egbert 2013).

« 9 » Biological normativity is, on this take, an actual property of the agent, independent of our explanatory practices. Our explanations of an agent's behaviour in terms of its success or failure to follow a norm will apply if, as a matter of pure fact, the agent follows or not its self-constructed norms. However, this is an overreaction against the temptation to appeal to non-natural entities to explain the behaviour of natural beings. The realization that there is a variety of legitimate things that we do with language (to describe, but also to assess or to give intelligibility), opens up a space for rich forms of naturalism. If language has functions that are not referential, the need to reduce every explanation to a fact-stating one subsides, without reintroducing any kind of spooky entity into our ontology. This is one of the central lessons that can be learned from Wittgenstein's and Ryle's work (see Heras-Escribano, Noble & Pinedo 2015 and Heras-Escribano & Pinedo 2015).

« 10 » To label a field, an event or a phenomenon as "normative" is not just a way of speaking, a projection onto the world of a certain stance that, appearances notwithstanding, does not carve nature at its joints and one could posteriorly abandon without losing understanding or explanatory power. The deepest and longest lasting influence of Descartes is the idea that having a mind is having "a something," a *res*, and that our task is to place it somewhere or other: in my brain, in my body, in my body, plus my hammer and my smartphone, etc. The anti-representationalism that I have sketched in this section goes directly against that, mostly unquestioned, Cartesian idea. Being minded is, in this take, not being understandable without the use of cognitive vocabulary, and this applies to humans as much as to bacteria. The same goes for "being an agent" or "being correct" and agential or normative vocabulary. Having a mind is not like having a liver, and being cruel is not like being tall. To point out such category mistakes, using Ryle's apt phrase, is not to negate that there is mindedness or cruelty in the world, except if one starts out with the representationalist intuition that what makes any thought or sentence "true" is a corresponding fact in the world involving measurable entities (see Frápolli & Villanueva 2012). Ryle's famous "ghost in the machine" criticism of Cartesianism is far from merely being a criticism of the ghost; it is also a criticism of mechanicism, and it should be a welcome companion for both EP and enactivism.

The ontology of affordances

« 11 » In the target article under discussion, the authors rightly insist on the existence of affordances independently of their being detected (§§12f, 43), though, surely, their existence depends on being detect*able*. Agents inhabit a meaningful environment, but its meaningfulness does not spring into being when detected by the agent. There is a close parallel to this idea in contemporary metaphysics. The majority view regarding dispositions is that they are intrinsic properties, i.e., properties whose existence is independent from the existence or inexistence of any contingent entity (Molnar 2003: 39ff; Mumford 1998). The idea that dispositions only exist when they manifest leads to the intolerable paradox of claiming that, for many kinds of dispositions, they would exist and cease to exist at the same time. An explosive substance ceases to be explosive when it explodes. If its explosivity came into being only when exploding, the substance would be explosive and not explosive at that very moment.

« 12 » However, the alternatives can be tricky and may lead to a commitment with the kind of descriptivism regarding language criticized above. Dispositions are individuated either in terms of their potential manifestations or in terms of what have been called their "reciprocal dispositional partners" (Martin 2008). Likewise, for affordances: "An affordance points both ways, to the environment and to the observer" (Gibson 1979: 129, quoted in §19). Although the existence of an affordance does not depend on its being effectively detected by some agent *A* (this has been called the "central platitude" of dispositionalism: see Tugby 2013: 454), its individuation is done in terms of its being detect*able* by some *A*. We may reject relationalism in two ways (both present in §43). One is to claim, in line with the central platitude, that something is a nutrient even when no one is eating it. Another is to claim that something is a nutrient even if no one that exists or has ever existed could eat it. The second claim raises some metaphysical questions: if the individuation of the affordance cannot be done by appealing to the effectivities of any existing agent, where else should we look in order to individuate it as the kind of affordance that it is? There are two options that immediately come to mind: possible agents or types of actualizations. Both options come with a heavy metaphysical baggage, arguably close to Platonism (see Tugby 2013). We have to ask ourselves whether we need to populate our ontology with a potentially infinite number of possibilia or of Platonic universals. Though the problems may not be unsurmountable, I believe that it is worth considering placing the discussion outside the field of ontology, in line with the anti-representationalism presented in §§8f. This, however, I must leave for another occasion.

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