

Enactivism without Autonomy?

what went wrong at the roots of enactivism and how we should recover the autonomous foundations of sensorimotor agency

Xabier E. Barandiaran¹

Abstract. Different varieties of enactivism struggle to fill the empty throne after the long reign of representational cognitivism. And the notion of autonomy is one of the central claims under dispute within the different enactivist research programmes, despite the central role that it played on the early enactivist foundations. It is the very autonomy of enactivism itself what is at stake here, if it doesn't want to be integrated back into a reformed version of representational cognitivism or subsumed under new forms of behaviourism. In this work I will show why autonomy is a necessary component of the enactive programme, I shall clarify some foundational misunderstandings or conceptual obstacles that have made autonomy a difficult notion to assume for some sensorimotor enactive approaches and, finally, I will propose to introduce autonomy back at the roots of enactivism through the notion of habit and sensorimotor agency.

Cognition presupposes the function of an organization for its own conservation and this is a first fundamental analogy with life
JEAN PIAGET

1 INTRODUCTION

Almost as if we were back into the 18-19th century political arena, we are witnessing a maturing revolution to displace computational cognitivism out of its ruling throne within the academic lands of cognitive science, psychology and philosophy of mind. Enactivism stands nowadays as a feasible candidate to power, parliamentary presence (should we avoid representation) or popular rioting flag (choose your favourite political metaphor here). And, as it often happens, talk of “radicalism vs. conservatism” or “revolution vs. reform”, becomes widespread [1]–[5]. The tension between the internal factions, of a formerly “unified” front, starts to rise. This tension should be welcome (the more so, given the relatively non-violent history of uprisings within the philosophical and, more generally, academic *Hobbiton*). It forces us to sharpen a research programme under the increasing pressure to satisfy cognitive-land citizen's demands. And the notion of *autonomy* is one of the central claims of enactivism that is currently under dispute and popular disorientation. But it is the very autonomy of enactivism itself what is at stake here, if we are to resist being integrated back into a reformed version of representational cognitivism or subsumed under new forms of behaviourism.

In this work I will try: a) to show why autonomy is a desirable component for the enactive programme, b) to clarify some

foundational misunderstandings or conceptual obstacles that have made autonomy a difficult notion to assume for some sensorimotor enactive approaches: i. the unclear notion of “operational closure of the nervous system”, ii. the overemphasis on the life-mind continuity thesis (under the “life = cognition” slogan) and iii. the lack of good models of sensorimotor autonomy; and, finally, c) to introduce autonomy back at the roots of enactivism through the notion of habit and sensorimotor agency.

2 AUTONOMY AND ENACTIVISM

Any dictionary reference reveals that the term “to enact” means to act from within and also to establish by law. The very term calls for “autonomy” (from the Greek *auto*=self and *nomos*=law) as a concept that integrates both the emergence or constitution of a subject, an agentive identity that is the locus of action, and the establishment (by this very subject) of its own norms of operation. And yet, some forms of enactivism—particularly the so called “radical enactivism” [6] and the sensorimotor contingency theory [7], [8]—have either forgotten or neglected the notion of autonomy. The, by now classical and often foundational reference for enactive approaches, *The Embodied Mind* [9], was particularly sensitive to this notion of autonomy. Not in vain, one of the “founding fathers” dedicated a whole book to the notion of autonomy [10] and many enactive scholars still sustain a deep connection between life and mind through the notion of autopoiesis [11], i.e. autonomy at the molecular or material scale.

Recent emphasis on the sensorimotor nature of the enactive mind has left autonomy out of focus, centring the debate around a definitive victory over the notion of representation [6] or the clarification of the sensorimotor constitution of experience and the nature of skills and knowledge of sensorimotor contingencies [12]. It is time, however, to radicalise autonomy, or, to put in less revolutionary terms, simply to review how this notion can enrich the enactive programme and to analyse why it was lost somewhere along the way towards some of the contemporary positions (when the very idea was precisely situated at the roots of the original proposal).

It is possible to identify three main obstacles for this loss. First, the notion of “operational closure of the nervous systems” (OCO_{NS} hereafter), as expressed on the early writings, turns out difficult to reconcile with the nowadays more fashionable claim that “minds ain't in the head” and the emphasis on the sensorimotor constitution of experience [7]. Whereas the operational closure of cellular life is easy to pin down, and provides for a naturalized account of life in terms of autopoietic organization, the OCO_{NS} (as an organizational foundation for behavioural

¹ IAS-Research Center for Life, Mind, and Society, Dept. of Philosophy, School of Social Work, UPV/EHU - University of the Basque Country, Spain. Email: xabier.academic@barandiaran.net.

autonomy) leaves enactivism with the following conundrum: on the one hand the operations of the nervous system are “purely” self-contained and self-referential, yet, on the other hand, the “cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided” [9, pp. 173]... How can the operational closure of the NS and the sensorimotor constitution of experience be reconciled?

This tension is particularly apparent on Bittorio, the model used to illustrate operational closure and structural coupling in *The Embodied Mind* [9, pp. 151–157]. And this brings us to the second problem that might have pushed some enactivist factions away from autonomy: the lack of a good model of sensorimotor autonomy (in contrast with the operationally explicit models of basic or material autonomy [13], [14]). Bittorio is a one dimensional cellular automata that appears surrounded by “a milieu of random 0s and 1s” that perturb the system, which in turn selectively compensates the perturbations according to its internal emergent dynamics. “[O]n the basis of its autonomy (closure)” Varela et al. conclude, “[Bittorio] performs an interpretation in the sense that it selects or brings forth a domain of significance out of the background of its *random milieu*” [9, p. 156, italics added]. Simply put, Bittorio has no way of enacting sensorimotor regularities, for a very simple reason: it has no motor capacity to influence its sensory changes through the environment. On the light of this model, and the ambiguity inherent to the relationship between the notion of OCoNS and that of “structural coupling” with a “random milieu”, it is no disdain to ignore the notion of autonomy, but almost a forced move if theoretical consistency is to be preserved: if sensorimotor regularities need be considered constitutive of experience (to the extent of externalism), how could it be reconciled with the OCoNS?

The third reason that explains why some enactivists have distanced themselves from the idea of autonomy concerns the recurrent fall back position to autopoiesis and metabolism to ground cognitive phenomena. What is the specific role played by the NS if any history of structural coupling between an autonomous system (of any kind: metabolic or autopoietic, immune, nervous, etc.) is sufficient to “enact a world”? Is the bacteria moving up a sugar gradient as cognitive as the hunting cheetah? How does metabolism relate to the claim that “cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided” [9, p. 1973]? Why should sensorimotor patterns be relevant at all if any form of life (be it bacterial life, plant life or even human vegetative life!) is to be considered a form of cognition?

3 THE AUTONOMY OF MENTAL LIFE

It is almost ten years now since I opted for an alternative path (albeit implicit and somewhat consistent with the original proposal, with due reforms) in order to rescue a notion of autonomy that is valid and complementary to the sensorimotor nature of our mental lives. One way to identify this path is by highlighting that mental life is unlike other forms of life (particularly biological life) and that the analogy between life and mind needs not imply a continuity thesis (in fact I have long advocated for a “biology ≠ cognition” thesis—see [15] but particularly [16, Ch. 7]). In turn, this approach distinguishes itself from the more traditional notion of OCoNS by assuming that cognitive autonomy is constitutively sensorimotor; i.e. that the neurodynamic patterns that are characteristic of our lived experience depend on a

strong sense of sensorimotor coupling (i.e. not simply as perturbations to an otherwise operationally closed network, but as a network that achieves its closure through body and environment). In other words: that it is the specific form of sensorimotor coordination that body and environment make possible what sustains the neurodynamic patterns that constitute experience (I will clarify this point with a recent simulation model [17]).

But the sensorimotor constitution of neurodynamic patterns is not the only relevant aspect of autonomy that matters to enactivism. What sensorimotor autonomy provides is the satisfaction of the three necessary and sufficient conditions for agency at the scale of sensorimotor coordination dynamics. We can properly talk of agency when: “(a) there is a system as a *distinguishable entity* that is different from its environment [individuality condition], (b) this system is *doing* something by itself in that environment [interactional asymmetry condition], and (c) it does so according to a certain *goal or norm* [normativity condition]” [18, p. 369]. What enactivism hasn't yet been able to make explicit (despite some insightful theoretical approximations [19], [20]) is how exactly can sensorimotor identity or individuality, interactional asymmetry and the origin of cognitive norms be naturalized in terms of sensorimotor-dependent neurodynamic patterns.

It is at this point where the Good Ancient Fashioned notion of *habit* might come to the rescue. Whereas nowadays cognitivism has definitely debunked a notion of habit that was itself a redux version of what behaviourism made acceptable through the filter of operationalist epistemology applied to associationism, an alternative conception of habit can be recovered from a rich and inspiring history that can be traced back from Aristotle's ethics to Piaget through an organicist school of thinking of which enactivism is itself a heir [21]. Beyond the mere stimulus-response probability correlation, this richer conception of habit integrates brain, body and environment into a self-sustaining sensorimotor life-form.

We can re-define habit as “a *self-sustaining pattern of sensorimotor coordination* that is formed when the stability of a particular mode of sensorimotor engagement is dynamically coupled with the stability of the mechanisms generating it” [adapted from 16, p. 281]. This notion of habit, closer to the notion of a spontaneously emerging dissipative structure than to a properly organized biological individuality, provides, nevertheless, with a first analogy with life and a first approximation to a sensorimotor conception of identity and normativity. Through repetition (and the myriad of reinforcing plastic mechanisms that brain and world can provide) a habit can take a life of its own, it is both the cause and the consequence of its own enactment. This form of recursion provides for a mild sense of identity of the habit, a locus of survival and self-generating persistence. And this very same property of habits affords for a naturalized sense of normativity (whose ethical and metaphysical dimensions have been recently analysed elsewhere [22]): the precarious dependence of habitual behaviour on the sensorimotor environment and brain-body structures defines a set of viability conditions that impose certain normative constraints (what, how and when to behave in order to keep the habit “alive”).

But we can go beyond the case of a single habit and, following a suggestion pointed by William James, conceive that sensorimotor autonomy demands the emergence of a “bundle of habits” that is generally tied within the brain (where most of the plastic rubber of habits lies). We can add that a proper sense of autonomous sensorimotor agency, or Mental Life, comes into

existence when the adaptive conservation of this bundle becomes the main principle of sensorimotor regulation (adapted from [16, p. 294])². A sensorimotor agent, as an individual, is an emergent web of habits nested on its behaviour generating mechanisms, and the adaptive preservation of the internal stability or this web becomes the normative axis of its ongoing operations. Biological needs might manifest themselves as endogenously originated and strong perturbations to the stability of this habit-ecology (e.g. the urge to find food or water) but a properly sensorimotor origin of frustration and norms can also be envisioned: e.g. the *failure* of the environment to collaborate on balancing conflicting habits or the difficulty to *appropriately* enact the *right* sensorimotor coordinations on which a tangle of habits depends for its systemic equilibrium due, for instance, to the presence of visual inversion goggles. A sense of normativity emerges here that sets sensorimotor agency apart from biological autonomy while grounding more sophisticated forms of cognitive normativity. This is a notion of autonomy that centres a perspective and co-defines a world that is constitutively sensorimotor.

If we ignore the gap that the notion of autonomy comes to fill within enactivism we are left with a shaky radical research programme where missile seeking devices and bacteria alike (whatever might come to be describe as being “attuned to the ways in which one’s movements will affect the character of input” [23, p. 84]) might be able to reclaim citizenship at cognitive-land without even being cognitively alive. To rise the requirement towards “knowledge” of sensorimotor contingencies won’t solve the problem, since it leaves open precisely the central question that a political programme in cognitive-land needs to define: who is the subject of cognition, who is the bearer or the concerned with knowledge, how to identify the character that brings about this field and which are the principles that set up the norms for that knowledge to be right or wrong, adaptive or maladaptive. And “sensorimotor autonomous agency” is a chapter of the enactivist programme that should not be left without further development if we are to propose a genuine alternative.

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² I explored in detail the evolution, development and neurobiological basis of this form of autonomy at [16, Ch. 8].

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