



# The lived, living, and behavioral sense of perception

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## Abstract

With Jan Degenaar and Kevin O'Regan's (D&O) critique of (what they call) 'auto-poietic enactivism' as point of departure, this article seeks to revisit, refine, and develop phenomenology's significance for the enactive view. Arguing that D&O's 'sensorimotor theory' fails to do justice to perceptual meaning, the article unfolds by (1) connecting this meaning to the notion of enaction as a meaningful co-definition of perceiver and perceived, (2) recounting phenomenological reasons for conceiving of the perceiving subject as a living body, and (3) showing how the phenomenological perspective does a better job at fulfilling D&O's requirement for grounding notions of mentality in 'outer' criteria than they do. The picture that thus emerges is one of perceptual meaning as an integration of lived, living, and behavioral aspects – a structure of behavior that cannot be captured by appeal to sensorimotor capacities alone but that is adequately illuminated by the enactive notion of adaptive autonomy.

**Keywords** Phenomenology · Enactivism · Perception · Sensorimotor theory · Mind-life continuity

**An enactive-phenomenological response to a sensorimotor critique** ORCID 0000-0002-9340-3591.

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*With Jan Degenaar and Kevin O'Regan's (D&O) critique of (what they call) 'auto-poietic enactivism' as point of departure, this article seeks to revisit, refine, and develop phenomenology's significance for the enactive view. Arguing that D&O's*

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*'sensorimotor theory' fails to do justice to perceptual meaning, the article unfolds by (1) connecting this meaning to the notion of enaction as a meaningful co-definition of perceiver and perceived, (2) recounting phenomenological reasons for conceiving of the perceiving subject as a living body, and (3) showing how the phenomenological perspective does a better job at fulfilling D&O's requirement for grounding notions of mentality in 'outer' criteria than they do. The picture that thus emerges is one of perceptual meaning as an integration of lived, living, and behavioral aspects – a structure of behavior that cannot be captured by appeal to sensorimotor capacities alone but that is adequately illuminated by the enactive notion of adaptive autonomy.*

## 1 Introduction

Phenomenological philosophy has been a central component of the enactive approach to cognitive science from its first formulation in *The Embodied Mind* (Varela et al., 1991) through many of the later contributions to the approach.<sup>1</sup> Despite this, there is a tendency in some parts of the literature to either neglect or misrepresent the significance of phenomenology for the enactive view, with the consequence that debates take off from inadequate premises. One example is Jan Degenaar and Kevin O'Regan's (2017; from now: D&O) arguments for why one should prefer the 'sensorimotor' over the 'autopoietic' enactivist view of perception. For reasons that will become clearer as we proceed, I will in what follows refrain from using these labels for the two views, opting instead to reserve the name 'enactive approach' or 'enactivism' for the latter and to call the position espoused by D&O 'sensorimotor theory' (ST).<sup>2</sup> The main point of conflict between these views, as set up by D&O, is the following: Whereas ST sees perception as constituted solely by exercises of sensorimotor capacities, enactivists hold that perception is constituted by exercises of sensorimotor capacities *and* organizational processes associated with biological identity generation. In this article I use D&O's arguments for the redundant nature of this additional requirement as an occasion to revisit, refine, and further develop key features of enactive phenomenology in ways that have until now been lacking from the enactivist literature.

<sup>1</sup> Notable works include *Mind in Life* (Thompson, 2007a), *Enaction* (Stewart et al. eds., 2010), *Enactivist Interventions* (Gallagher, 2017), *Sensorimotor Life* (Di Paolo et al., 2017), and *Linguistic Bodies* (Di Paolo et al., 2018).

<sup>2</sup> The terms 'autopoietic' and 'sensorimotor' enactivism was coined by Hutto & Myin (2012), who distinguished them from their own 'radical' brand of enactivism. The convention of distinguishing between these three varieties of enactivism was further established in Ward et al.'s (2017) introduction to the *Topoi* special issue where D&O's article was published. However, virtually no 'autopoietic' enactivists accept the label and, representing the view with the strongest connection to Varela et al.'s original enactive proposal, they have also suggested that it is misleading the use the 'enactive' label for the sensorimotor and radical variants (Barandiaran, 2017; Colombetti, 2018; Thompson, 2018). 'Sensorimotor enactivism' is typically thought to be advocated in works such as Hurley (1998), O'Regan and Noë (2001), Noë (2004), and O'Regan (2011). When I speak of ST here, however, I mainly refer to the view espoused by D&O and the parts of these other works that are compatible with this view. This means that Noë, who on more than one occasion (2009; 2012) has advocated a role for biological factors for perception and consciousness that is at odds with D&O's view, should not be seen as a full representative of ST.

At the center of the phenomenological response to D&O that I develop here is a claim that enactivists have levelled against ST-like views of perception on many occasions and in various forms over the years. The claim is succinctly expressed by Ezequiel A. Di Paolo and colleagues, who state that these views fail to do justice to the fact that “perception is *inherently meaningful for an agent*” (2017: 179; my emphasis).<sup>3</sup> In what follows I approach this idea of perceptual meaning in three ways. In Sect. 1 I set up the main differences between ST and enactivism, focusing on the latter’s idea of enaction as a process of meaningful co-definition of agent and environment. In Sect. 2 I revisit some enactive arguments against D&O’s sensorimotor predecessors, showing how they form a phenomenological case for ascribing a constitutive role for the *living* body in lived perceptual experience. Section 3 investigates how this phenomenological approach can handle the demand, stated by D&O, that our account of perception should be based on how perceptual capacities are displayed in behavior. With these steps I aim not only to defend the enactive view against D&O’s critique, but also to contribute to enactivist discourse by clarifying the significance and status of phenomenological analyses, and, ultimately, to uncover perceptual meaning as an integration of lived, living, and behavioral dimensions.

## 2 Setting the stage: enactive and sensorimotor perception

The purpose of this section is to outline some main features of the relation between ST and the enactive approach. I begin by noting their agreement when it comes to the sensorimotor nature of perception, before sketching some key differences in light of the notions of enaction and mind-life continuity, and, lastly, presenting the critique raised by D&O. I conclude the section by stating the need to have a closer look at the phenomenological motivation for the enactive notion of perception.

### 2.1 The consensus

Both enactivists and sensorimotor theorists view perception as embodied and active, constituted by a body’s dynamic handling of sensorimotor patterns; i.e., patterns in the co-variation of movement and sensory flow. One key idea here is to reject what Susan Hurley called “the classical sandwich” model of the mind (1998: 401), according to which action and perception make up two separate components of the mind with cognition stuffed in between as a mediator. The embodied and active view, rather, sees action and perception as essentially integrated: movement and sensory flow are inseparable moments of a continuous cycle of body-environment interactions, which does not require the mediation of anything like representational thought or cognition (Noë, 2004). Here, perception is itself understood as a form of activity, as a perceiver’s explorative exploitation of sensorimotor patterns. Consider, for

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<sup>3</sup> A similar critique has recently been raised by Noë against Hutto and Myin’s ‘radical enactivism’ (2021). He argues that the radical enactivists fail to do justice to perceptual *presence*, which I take to more or less correspond to what I call perceptual *meaning*.

instance, this analysis of what constitutes the “feel” of Porsche driving from the paper that launched the first explicitly sensorimotor approach to perception:

There are characteristic ways in which the vehicle accelerates in response to pressure on the gas pedal. There are definite features of the way the car handles turns, how smoothly one can change gears, and so on. What it is like to drive a Porsche is constituted by all these sensorimotor contingencies and by one’s skillful mastery of them [...]. (O’Regan & Noë, 2001: 961)

Or, to take another example, my perception of a sponge’s softness does not reside *in me*, but in its distinctive ways of yielding to and resisting the push of my fingers (O’Regan, 2011: 108).<sup>4</sup> Perception, in other words, is achieved and constituted not *within* the perceiver(’s head) but at the dynamic intersection between embodied perceivers and their surroundings. Phrased in these general terms, the sensorimotor account of perception represents something like a core consensus between ST and the enactive approach. Upon further scrutiny, however, some significant differences between the two views emerge.

## 2.2 Two notions of enaction

Some of D&O’s sensorimotor predecessors have been accused by enactivists of tending – despite pronounced anti-representationalist ambitions – to be too caught up in a language and a way of thinking with a strong “representational pull” (Di Paolo et al., 2017: 30).<sup>5</sup> Briefly, this has to do with these sensorimotor views understanding the idea of “skillful mastery” from the above quote in terms of a form of “knowledge” (O’Regan and Noë, 2001: 946) on the part of the subject-pole of the perceptual relation. The implication, if this interpretation is correct, is that perception is not essentially interactional and non-representational after all but is rather accomplished squarely on the side of the perceiver, through the application of stored or represented knowledge of sensorimotor patterns. In contrast, enactivism advocates a *world-involving* notion of mastery, according to which mastery is “an emergent property of a whole embodied agent in interaction with the environment” (Di Paolo et al., 2017: 36). Here, perceiver and surroundings are taken to be primordially integrated rather than distinct. Thus, one does not require a one-sided contribution of the former to make sense of it accessing the latter; rather, mastery is seen as a feature of the relation itself.<sup>6</sup>

While it seems that D&O manage to steer clear of the representational pull, the idea of world-involvement nonetheless marks a difference between their position and the enactive view. This difference can be illuminated by noting that there are cur-

<sup>4</sup> O’Regan credits Myin (2003) for coming up with the example. For a detailed treatment of the sensorimotor contingencies involved in squeezing a sponge, see Di Paolo et al., (2017: 58 ff.).

<sup>5</sup> Hutto & Myin (2012) also accuse ‘sensorimotor enactivism’ of remaining too representationalist.

<sup>6</sup> Not all instances of what is typically thought of as sensorimotor approaches to perception are equally vulnerable to the accusation of representationalism. Noë (2009), for instance, explicitly endorses a ‘world-involving’ notion of perception, though he elsewhere – in O’Regan and Noë (2001) and occasionally in Noë (2004) – seems more susceptible to the ‘representational pull’.

rently two different notions of *enaction* at play in the literature. First, there is the *broad* sense, which seems to be the most predominant. Here, to say that perception (or cognition more generally) is enactive simply means that it is *active* or somehow action-based.<sup>7</sup> This is the sense assumed in cases where the label ‘sensorimotor *enactivism*’ is used. Next, there is the *narrow* notion of ‘enaction’. This is the notion that was introduced with the original enactive approach in *The Embodied Mind*, where it was meant to emphasize the idea that “cognition is not the representation of a pregiven world by a pregiven mind but is rather *the enactment of a world and a mind*” (Varela et al., 1991: 9; my emphasis). Thus, while sharing the broad notion’s emphasis on activity, ‘enaction’ here signifies the more radical idea of a process of “co-definition” (Varela, 2011: 614) or “mutual shaping” (Di Paolo, 2018: 88) of agent and environment. The main difference between the two notions of enaction is the following: On the narrow notion, the world-involving nature of perception is understood in a way that is also suited to explain the nature and emergence of the *perceiver* and how the world manifests a meaningful domain *for* the perceiver. The broad notion alone, however, contains no such resources – it simply presupposes the existence of perceiver and perceivable world and theorizes that their relation is accomplished through action. As we’ll see in the discussions to follow (particularly in Sects. 2 and 3), this difference underlies much of the conflict between D&O and the enactive view.

### 2.3 Mind-life continuity and adaptive autonomy

We gain a better understanding of the narrow notion of enaction through the enactive *mind-life continuity thesis*. As we’ll see shortly, this thesis is the main target of D&O’s critique. In a much-cited formulation, the thesis states that “life and mind share a set of basic organizational properties, and the organizational properties distinctive of mind are an enriched version of those fundamental to life. Mind is life-like and life is mind-like” (Thompson, 2007a: 128). A distinctive trait of enactivists’ understanding of this thesis, which contrasts with similar theses espoused by others, is that it refers not only to a continuity of function, organization, or behavior, but also involves a continuity in subjective and experiential – i.e., *phenomenological* – features of mentality (ibid.: 129). In other words, the thesis posits that there is a deep connection between phenomenological and biological structures, so that some phenomenological concepts apply – at least to some extent – to the whole range of living beings from humans to the simplest organisms, and some biological concepts likewise can be used to make sense of aspects of human phenomenology as emergent, natural phenomena.<sup>8</sup> As such, the mind-life continuity thesis is the centerpiece in enactivism’s project of naturalizing the mind.

<sup>7</sup> When the editors of *The Oxford Handbook of 4E Cognition* state that a cognitive process as enacted if it is “partially constituted by” or “partially dependent upon the ability or disposition to act” (Newen et al., 2018: 6), they are defining the broad notion of enaction.

<sup>8</sup> Enactivists draw inspiration from Hans Jonas’ (1966) existential biology when arguing that even the simplest organisms instantiate forms of teleology and agency (Weber & Varela, 2002; Thompson, 2007a; Di Paolo 2009). This “Jonasian turn” in enactivism is not uncontroversial (Villalobos & Ward, 2016; Kee, 2018), but it is beyond the scope of this article to discuss it here. Hverven & Netland (2021) for a response to some of the criticism, and a clarification of Jonas’ philosophy in the enactivist context.

From the phenomenological side, which we'll return to in Sect. 2, the core idea is that lived experience is the presentation of a world of *meaning* to an embodied subject, and that this meaning is constituted by structures of subject-world *correlation* – i.e., structures of interdependence and co-specification between subject and world (Merleau-Ponty, 2012: 454).<sup>9</sup> To be clear, ‘meaning’ does in this case not mean representational content, but rather a deeper and broader dimension of significance or value, correlated to the perceiver’s pragmatic and existential projects, that is inherent in how the perceived world manifests as present for perceivers. From the biological side, the enactivists appeal to the notion of *adaptive autonomy* in order to give a naturalistic account of the meaningful subject-world (or agent-environment) co-specification characteristic of lived experience (Di Paolo, 2005; Paolo, 2018; Thompson, 2007a).

‘Autonomy’ in this context refers to a specific form of self-individuation displayed by some systems. The notion has roots in Humberto Maturana and Francisco Varela’s (1980) proposal to define life in terms of the organizational property of *autopoiesis*. An autopoietic system, on this theory, is a system that is.

organized (defined as a unity) as a network of processes of production (transformation and destruction) of components which: (i) through their interactions and transformations continuously regenerate and realize the network of processes (relations) that produced them; and (ii) constitute it [the system] as a concrete unity in space in which they (the components) exist by specifying the topological domain of its realization as such a network. (ibid.:78–79)

Thus construed, autopoiesis is a form of organization that belongs to the physico-chemical domain, involving the generation of a “semipermeable boundary” (Thompson, 2007a: 101) that distinguishes the system as a material individual relative to its surroundings. The paradigmatic example is the living cell. Through metabolic exchanges of matter and energy with its surroundings, the cell produces itself as a network of mutually enabling processes distinguished from its surroundings by the semipermeable cell membrane. We here see an affinity to the idea of subject-world co-specification: The autopoietic system, we can say, carves out or specifies a section of the world relevant for its existence (e.g., what kind of material that is let through the membrane), while this section in turn contributes to specifying the system as an individual by being a necessary component in its process of self-generation.

While being historically rooted in Maturana and Varela’s autopoietic theory, the contemporary enactive view differs from it in various – and significant – ways (Di Paolo & Thompson, 2014; Di Paolo, 2018). First of all, the notion of autonomy that is at the center of the enactive approach stems from Varela’s (1979) generalization of the concept of autopoiesis to self-individuating forms of organization in domains other than the sort of material self-production displayed by single cells. Autopoiesis, on this view, is only one particular – basic, physico-chemical – *kind* of autonomy (Thompson, 2007a: 44). This is one reason why it is misleading to use the name

<sup>9</sup> Hence, in contrast to how it is often used, ‘correlation’ does here not mean a relationship between two independent events, but rather a relation of mutual dependence.

‘autopoietic enactivism’ for this brand of enactive theory (Thompson, 2018). An autonomous system, as enactivists define it, does not necessarily involve the production of a semipermeable material boundary, but it must be *operationally closed* and *precarious* (Di Paolo & Thompson, 2014). A system is operationally closed if it consists of a network of mutually enabling processes (which is not to say that it depends *only* on its own processes). As such, the notion of operational closure captures, in more general terms, the core pattern of autopoietic organization as defined by Maturana and Varela. That autonomous systems are precarious means that the processes they consist of are such that they cannot persist without the enabling relations of the operationally closed network. Hence, considered in isolation, each process tends toward a breakdown that is avoided only as long as the network is maintained. The enactive notion of autonomy, then, refers to operationally closed systems that are constantly working to maintain themselves in the face of their constituent’s – and hence their own – tendencies to decay. This work consists in negotiating a “primordial tension” between two opposite tendencies that are equally indispensable for the project of self-individuation: the tendency toward self-enclosure, distinguishing the system as an individual relative to its environment, and the tendency toward openness, allowing exchanges with the environment required for sustaining the processes of self-production (Di Paolo et al., 2017: 134). Both of these tendencies must be kept in check in order for the autonomous system to persist as such: both total closure and total openness, the respective goals of each of the tendencies considered in isolation, are fatal for self-individuation.

Thus conceived, autonomous systems are characterized by a form of purposiveness – aiming at self-preservation through counteracting the destructive tendencies of their precarious nature – and as such also by a normativity that distinguishes between conditions that are good and bad relative to this purpose. Enactivists use the notion of *adaptivity* to make sense of how norms pertaining to autonomous systems’ existence can become manifest *for* the systems themselves, establishing them as agents entertaining a meaningful perspective on their domain of interactions. Briefly put, adaptivity is the capacity of some autonomous systems to regulate their activities and relations in response to tendencies registered as approaching or receding from the boundary of their viability, so as to preserve their continued existence (Di Paolo, 2005; Paolo, 2018).<sup>10</sup> Adaptivity, in other words, is the capacity by which autonomous systems are able to continually resolve the primordial tension of self-individuation (Di Paolo et al., 2017: 134). The notion of autonomy by itself, without adaptivity, only entails an “all-or-nothing” form of normativity (Di Paolo, 2005: 436) where things are equally ‘good’ for the system as long as it persists, regardless of whether it is thriving in a safe and healthy environment or is sliding toward a cliff from which it will fall to its inevitable death, and ‘bad’ first when the system is actually destroyed. *Adaptive* autonomous systems, on the other hand, are responsive to possible futures

<sup>10</sup> This is a simplified rendering. The full, operational definition states that adaptivity is “a system’s capacity, in some circumstances, to regulate its states and its relation to the environment with the result that, if the states are sufficiently close to the boundary of viability: 1. Tendencies are distinguished and acted upon depending on whether the states will approach or recede from the boundary and, as a consequence, 2. Tendencies of the first kind are moved closer to or transformed into tendencies of the second, and so future states are prevented from reaching the boundary with an outward velocity” (Di Paolo, 2005: 438).

evaluated in light of *graded* norms distinguishing not only ‘good’ (alive) and ‘bad’ (dead), but conditions that are ‘better’, ‘neutral’, and ‘worse’ for the systems’ viability. For instance, given the appropriate sensorimotor capacities, such systems will recognize the slide toward a cliff as a tendency in the wrong direction and actively work against it. As such, adaptive autonomous systems are agents operating in a domain that is present *for them* as significant (in simple terms, as approachable or repulsive) relative to norms pertaining to their own existence as autonomous agents. In enactivist terms, adaptive autonomous systems’ behavior relative to the graded norms of their viability is a process of *sense-making* – the simultaneous, interdependent realization of an agent and its meaningful environment.

With the concept of adaptive autonomy, the co-definitional logic implied by the original definition of autopoiesis has thus evolved to a form that seems better suited to capture the phenomenological idea of co-definition as involving the constitution of meaning and subjectivity. Here it is important to remember that autonomy is a more general term than autopoiesis, applicable to instances of self-individuation in a wider range of domains. On the enactive view, the meaning and subjectivity characteristic of human perception emerges through processes of self-individuation that involves not only the organic, but also *sensorimotor* and *intersubjective* dimensions (Di Paolo et al., 2017: 5). First, human perceivers are *sensorimotor agents*, characterized by a form of adaptive autonomy that organizes sensorimotor schemes in an operationally closed network. As such, our sense-making does not unfold solely in relation to the norms determined by the project of upholding our metabolic existence, but also to norms relevant for our sensorimotor identity. In Di Paolo et al.’s words, “[a] sensorimotor subject’s activities become meaningful not only in virtue of their contribution to biological survival, but also in virtue of their contribution to the stability and coherence of a sensorimotor repertoire” (2017: 39). So, for instance, the activity of lighting up a cigarette – which is clearly not aimed at biological survival – involves a range of sensorimotor schemes (putting the cigarette between one’s lips, finding and igniting the lighter, etc.) that must be done in the right order and in the right way for the activity to be successful, achieving one’s sensorimotor identity as cigarette smoker (ibid.: 147). Second, we are intersubjective and *linguistic* agents (Di Paolo et al., 2018), having our identities and our world shaped by activities of participatory sense-making (De Jaegher & Di Paolo, 2007) with other human subjects, adding dimensions of meaning to our existence that, for instance, makes the activity of cigarette smoking expressive of a culturally situated *human* identity (symbolizing e.g. weakness of the will or a rebellious nature).

Hence, although adaptive autonomy is a biological concept in the sense that it is paradigmatically exemplified by the organizational pattern by which living organisms maintain their existence as such, enactivists employ it to describe forms of organization over and above the level of organic self-production, and it is only by doing so that they purport to be able to account for the features of human perception. This point is crucial for our purposes, since it, as we’ll see shortly, means that parts of D&O’s critique is based on a misunderstanding.



## 2.4 D&O's critique

It is the biological side of enactive theory that is the main target of D&O's critique. As they see it, ("autopoietic") enactivists are committed to the claim that "there is a *necessary and constitutive* relation between conscious experience and autopoietic processes or associated background capacities" (2017: 397; orig. emphasis). ST, on the other hand, holds that "perceptual consciousness can be understood without further appeal to factors outside the domain of perceptual interactions and their behavioral expressions" (ibid.). D&O's objection, in other words, is that "autopoietic processes or associated background capacities" are external to the domain of perceptual interactions and hence not part of what constitutes perception. At best, they claim, such processes or capacities might be *instrumentally* necessary for perception, i.e., they might be necessary for *enabling* a system to engage in perceptual interactions, though they play no part *in* the interactions themselves (ibid.: 399). For instance, they grant that *some* form of autonomy probably is necessary for a system to qualify as a perceiver, though they suggest that a "deflationary" form of autonomy, according to which a system is autonomous if its behavior is "underdetermined by its present environment," might suffice (ibid.). Regardless of the role autonomy might play as an enabling condition for perception, however, "this does not imply that conscious perception is *constituted* by anything outside the domain of recognizably perceptual capacities" (ibid.; orig. emphasis). And to be clear, D&O's notion of perceptual capacities has a purely sensorimotor sense: they are sensing capacities exercised by perceivers, where sensing capacities are understood as capacities for "master[ing] the current sensorimotor dependencies linking possible actions and resulting changes in sensory stimulation" (ibid.: 394). Since such capacities on their view "can be displayed even by simple artifacts, such as missile guidance systems" (ibid.), they are clearly not unique to the biological domain.

How can the enactivists respond to this? Let's begin by noting an imprecision in D&O's articulation of the enactive commitment above; namely, that *autopoiesis* is assumed to be constitutive of conscious experience. The same misrepresentation is at play also at a later point, when they argue that "[w]hen we learn to use the concept of conscious perceptual experience, we do not appear to make use of knowledge of metabolism" (ibid.: 405; I look closer at this objection in Sect. 3). The assumption here is that the mind-life continuity thesis commits the enactivists to the idea that the bio-chemical, cellular processes of self-generation are constitutive of all mental phenomena. However, what the thesis states is that the same organizational properties (adaptive autonomy) apply to both minds and living organisms. This entails that perception constitutively depends on *some* instantiation of adaptive autonomy, but not that it constitutively depends on adaptive autonomy as instantiated at the autopoietic or metabolic level. Indeed, we have already seen that human perception, on the enactive view, emerges through adaptive autonomy instantiated in a space encompassing not only the organic, but also sensorimotor and intersubjective dimensions. These dimensions are interweaved in a variety of complex ways, making it impossible to give a simple, general answer to the question of how they are related (Di Paolo et al., 2017: 173). Our sensorimotor agency, for instance, is enabled and constrained by our organic identity, but it is also underdetermined by and might even be in ten-

sion with it (as the example of cigarette smoking shows), and features of our organic identity are in turn shaped by possibilities opened by our sensorimotor agency.<sup>11</sup> Enactivists do however not seem to think that organic forms of self-individuation are *constitutively* necessary for perception in the way assumed by D&O. In fact, the question of whether autopoiesis is even *instrumentally* necessary for adaptive autonomous agency, and hence for mental phenomena, is left open by central enactivists (Di Paolo, 2009; Di Paolo et al., 2017; Thompson, 2018).

While this makes less of a straw man of the enactive position, it does not clear away D&O's main concern. Even if perception on the enactive view is not necessarily constitutively dependent on *autopoiesis*, it is still constitutively dependent on adaptive autonomy, and adaptive autonomy is 'outside' the domain of perceptual capacities as defined by D&O. The enactivists can reply to this by pointing out that, on their view, this separation of the perceiving agent's organization from its (exercise of) perceptual capacities is not tenable. To say that perception is constitutively characterized by adaptive autonomy means that perception *is* a process by which the interdependent system of perceiver-perceived is enacted; perceivers emerge as such *through* the ways they interact with their environment, and hence there is no perceptual agent prior to or apart from the exercise of perceptual capacities. A consequence of this is that although perceivers and missile guidance systems display capacities that are similar in their sensorimotor character, the capacities are ultimately different in nature. *Perceptual* capacities are capacities that serve to uphold a dynamic and precarious perceiver-identity through a continuous flow of sensorimotor patterns that are meaningful *for* the perceiver, whereas the missile guidance system's capacities are capacities for exploiting specific sensorimotor patterns in order to track moving objects, implemented in a static-identity, non-autonomous (i.e., heteronomous) system pre-defined by human designers.

Here we arrive at our main topic. For, as it stands, this retort against D&O *presupposes* the enactive notion of perception as meaningful co-definition, when what is really needed is a *defense* of that notion. In the next section, we'll look at some of the phenomenological reasons for accepting the enactive view of perception.

### 3 The lived and living sense of perception

Without explicitly recognizing them as such, D&O do consider three phenomenological reasons for preferring the enactive over their sensorimotor view of perception. These are the objections, levelled against sensorimotor views by enactivists on earlier occasions, that they lack resources for doing justice to the roles of (1) pre-reflective bodily self-awareness, (2) affectivity, and (3) unified subjectivity in perception. By revisiting these objections below, my intention is to refine them in a way that makes them better suited to respond to D&O's critique and that clarifies a central aspect of phenomenology's significance for enactivism. I do this by emphasizing the essential

<sup>11</sup> As Di Paolo et al. note, "practically all animal life" is "organizationally dependent" on the sensorimotor level in the sense that it relies on sources of nutrition that can only be accessed by mobile, sensorimotor agents (ibid.: 174).

interconnection of 1–3 as moments in the phenomenological idea of subject-world interdependence or correlation, with the aim of showing how perceptual meaning as phenomenologically uncovered is grounded in the perceiver's nature as a *living* body.<sup>12</sup>

### 3.1 Pre-reflective bodily self-awareness

In *Mind in Life*, Evan Thompson argues that the sensorimotor approach needs to be supplemented with the enactive theory of adaptive autonomy and “a phenomenological account of bodily self-consciousness” (2007a: 258). Regarding the latter, Thompson takes issue with Myin and O'Regan's (2002) sensorimotor account of subjectivity, claiming that it fails to account for what is arguably the essence of subjectivity, namely, “the first-personal quality of experience as such” (2007a: 262). To do this, it is not sufficient to account only for what it is for an object to be *accessible* to a subject, as Thompson claims Myin and O'Regan do. One also needs to recognize the role of pre-reflective bodily self-awareness in constituting the object as phenomenally manifest *for me*.

Take, for instance, the experience of a cup. The cup in front of me is accessible to me as an object that affords certain activities. It affords drinking as its culturally determined use-value, but it also presents the possibility of a range of other manipulative and explorative movements. Not least, the cup requires certain patterns of perceptual activity, like visually or tactilely tracing its contours, to remain perceptually present at all. The notion of pre-reflective bodily self-awareness denotes the fact that this access to the cup has a *sense* that touches or refers back to me as a bodily subject, without it being the case that I consciously attend to or reflect on my bodily self. When I touch the cup, my experience involves a feeling of pressure from the cup touching my fingers, and when I trace its contours with my hand, the tactile sensation is integrated with my sense of movement, forming a pattern of activity and feeling that constitutes the cup as manifest *for me*.

This is a key aspect of the idea of perceiver-perceived co-definition. With the notion of pre-reflective bodily self-awareness, we see how perceptual objects are defined by the ways they ‘touch’ perceivers in response to the perceivers’ activities, and we get the other pole of the correlational structure by recognizing that the perceivers in turn, *qua* embodied subjects, are defined as such through their *being touched* in the way that they are: the tactile and kinesthetic patterns that trace the contours of the cup as perceptual object for me simultaneously outline my ‘contours’ as cup-perceiver, specifying my phenomenological perceiver-identity.<sup>13</sup>

D&O do not engage substantially with the idea of pre-reflective bodily self-awareness. In fact, they reject the idea without any real consideration, stating simply that “there seems no reason to suppose that in general conscious experience of the body is

<sup>12</sup> See Stapleton & Froese (2016) for more on the relation between phenomenology and biology in enactivism.

<sup>13</sup> See Gapenne (2010) for a review of several studies supporting the idea of a kinesthetic co-constitution of perceiving subject and perceptual objects. Di Paolo et al., (2017) offer a detailed dynamical systems framework for making sense of this kind of idea.

required for conscious experience of the world” (2017: 400). Two things can be said in response to this. First, their rendering of the idea in terms of “conscious experience of the body” does not make it clear that the experience in question is the *pre-reflective* sense of being a bodily subject, a *lived body*, and not an experience *of* the body as object. Secondly, the fact that they find *no reason* for the idea that the lived body is constitutive of perceptual experience reveals a failure to engage with enactivism’s phenomenological dimension, and hence a neglect of a key feature of the enactive view. In order to reject the idea of the lived body, D&O would have to either propose an alternative phenomenological account or deny that phenomenological accounts should be granted this sort of authority in cognitive science. D&O does not take an explicit stance on this question, though in Sect. 3 we’ll see that they seem to implicitly embrace the latter alternative.

### 3.2 Affectivity

Enactivists have also accused sensorimotor views of lacking the conceptual resources to make sense of the affective dimension of perception. Shaun Gallagher, for instance, argues that “[s]chemata of sensorimotor contingencies give an agent the *how* of perception, a tacit knowledge of potential sensorimotor engagements, without giving it *why*, which depends on latent valences that push or pull for attention in one direction or another” (2017: 151, orig. emphasis). The perceived world is never presented as a completely neutral set of motor possibilities. It appears as a field of *senses* that, basically construed, fall on an attractive-repulsive continuum, but which typically also have a thicker meaning connected to one’s current projects and the intersubjective lifeworld one inhabits. Consider, for instance, the experience of playing football: the ball rolling towards me certainly presents me with certain motor possibilities, but these possibilities are far from neutral – they have a value determined by the context of the game and my present situation in it, manifested perceptually as, e.g., opportunities for scoring a goal (Merleau-Ponty, 1963: 168). Likewise, the cup in front of me sometimes appears as an opportunity for a refreshing sip of coffee, and other times as an annoyance that hinders me from placing my papers where I want them. In general, affectivity denotes the fact that perceptual sense must be understood as this kind of orientation of the perceptual field, presenting solicitations for behavior defined against the background of the perceiver’s multifaceted existential context.

Affectivity, as Giovanna Colombetti puts it, is “a broad capacity to be affected or ‘touched’ by something” (2018: 574). I kick the ball because that *strikes me* as the thing to do in that situation. Importantly, affectivity thus conceived is not a faculty external to perception or a type of experience that only occasionally occurs. Rather, perception – *qua* sense-making – is necessarily and intrinsically affective (Colombetti, 2013: 18 ff.). To perceive is to be presented with a meaningful world, which entails being affected by that world in an existential way.

We can see this clearer by noting the relation between affectivity and pre-reflective bodily self-awareness: These are not, as my treating them under separate subheadings might suggest, two distinct phenomena. On the contrary, pre-reflective bodily self-awareness *is* a primordial experiential manifestation of being affected – it is the experience of being touched through one’s bodily dealings with the world. And ‘being

touched' in this case is not simply to feel discrete sensations of, say, tactile pressure, but already to be presented with a meaningful situation loaded with motivational forces for my activities. The patterns of perceptual activity that, through the corresponding modulations of my bodily self-awareness, keep the cup perceptually present, trace a *sense* that appears against the background of my present situation (e.g., as craving coffee) and, ultimately, my overall *form of life* (as, among other things, a type of being capable of drinking that is also part of a cup-using culture). In this way, the 'touch' in question is an *existential* touch, and pre-reflective bodily self-awareness – affectivity – can be construed more broadly as *a sense of existence*.

This gives more substance to the idea of agent-world co-definition. With the notion of affectivity we see, first, how the perceived world is specified relative to the perceiver's projects and mode of existence; my perceived world is organized by forces of valence that are of existential significance to me. Secondly, perceivers are in turn defined and situated through the ways we are affected by the world; my mode of existence is specified by the way the world shows up as meaningful to me. My identity as perceiver is not first given by me as an isolated subject and then projected as a layer of significance on my surroundings; it is realized, maintained and modulated – *enacted* – through my affective interactions with the world.

The charge against ST, then, is that it is unable to do justice to perception's affective dimension. D&O respond to this in two steps. First, they note that sensorimotor contingencies can be defined on levels of abstraction that counts for instance *knowing how to make a friend smile* as a sensorimotor skill (2017: 402). Next, admitting that this still does not provide us with the affective 'why' of perception, they suggest that an appeal to "action tendencies" might solve the problem:

[W]hen I am inclined to comfort a friend when she's sad, or when I tend to try to make her laugh when she's cheerful, these behavioral tendencies may be part of the affective aspects of my experience. To the extent that this is the case, affective aspects of the experience lie within the domain of perceptual [i.e. sensorimotor] attunement and its expressions. (ibid.)

What is it about my perception of my friend's mood that makes me want to comfort her? On this view, it is my *inclination* to respond in that way to that mood in that person. But this does not solve the problem. Saying that I *tend* to comfort my friend when she is sad does not explain how my perception of her *motivates* that tendency, and it is this motivational force of perception that we are trying to understand. Once again, reflections on the phenomenology of perception seem absent from D&O's reasoning. When I perceive my sad friend, her behavior is expressive of a *sense* that affects me as a person that cares for my friend. I could not be *inclined* to comfort my friend if my perception of her didn't motivate me in some way in the first place.

D&O might respond that the motivational factor appealed to here can be attributed to *emotions* (e.g., empathy), which on their view – together with "experiences of thought" and "feelings like hunger and pain" – belong outside the domain of perception (2017: 393n1). This 'purified' view of perception does however not hold up against the scientific and phenomenological evidence. For one, we know that there is significant "anatomical and functional overlap" as well as reciprocal and circular

interactions between the systems subserving perception and emotion at the neural level (Lewis, 2005: 178; Duncan & Barrett 2007). There is also strong evidence to suggest that a form of basic or core affectivity underpins consciousness and cognition as such (Barrett & Bliss-Moreau, 2009; Colombetti, 2013; Damasio, 1999), and numerous studies have shown how differences in emotional states are correlated with perceiving things differently.<sup>14</sup> From the phenomenological perspective, moreover, it is not clear what would be left of perception if stripped of the affective and emotional dimension. We have already seen how the affectivity of pre-reflective bodily self-awareness grounds the subjectivity of perceptual experience – what would perception be if it did not involve the presentation of a scene *for* a perceiver? Further, the figure-ground structure of perception – where some things always stand out as more salient than others against a less determinate background – is also deeply connected to affectivity and emotion. Indeed, the figure-ground structure of perception reflects the fact that perception is never completely neutral, but is organized according to interests, concerns, and the general affective embeddedness of the perceiver – it always has a *sense*. Hence, in the examples we have considered above, the affective and emotional dimension manifests *in* the way figure and ground are organized in the perceptual field – the ball stands out as kick-able in the grassy field, my sad friend captures my concerned attention and makes other things recede into the background – and can as such not be conceived as external to perception.

### 3.3 The living and temporal unity of subjectivity

The last objection to ST that I'm going to consider in this section is that of unified subjectivity. The main idea here is that perception presupposes a *perceiver*, a subject of perceptual experience and agent of perceptual activity. By labelling exercises of sensorimotor capacities the sole constitutive condition of perception, the claim goes, ST *presupposes* a perceiver-system capable of exercising said capacities, without providing an account of what it is that characterizes perceivers as such (Thompson, 2007a; Di Paolo et al., 2017). We already touched on this issue in Sect. 1. We saw there that D&O acknowledge that some sort of autonomy might be necessary for a system to qualify as a perceiver, but still argue that it is nonetheless only exercises of sensorimotor capacities that are *constitutively* necessary for perception, whereas, on the other hand, the notion of enaction as co-specification means that perception *is* an adaptive autonomous system's generation of itself as a perceiver. I'll now indicate how the reflections from the previous subsections provide a phenomenological conception of this perceiver as a living body. But first some background. Phenomenologists tend to distinguish between the *lived* and the *living* body as two aspects of embodiment, where the former denotes the body considered as a *subject* of experience and the latter the body as an *experienceable*, physical structure (Husserl, 1970; Heinämaa, 2018; Wehrle, 2020). This “double sense” of embodiment (Varela et al., 1991: xvi) is central for the enactive idea of mutual illumination between phenomenology and objective science and their naturalization of the mind by way of the

<sup>14</sup> For instance, mood influences the perception of steepness (Riener et al., 2011), and depression influences the perception of contrast (Salmela et al., 2021). See also Gallagher (2017: 151ff).

notions of embodied subjectivity and biological naturalism (Hanna & Thompson, 2003; Thompson, 2007a: 237; Fuchs 2020). My remarks below offer a way to make sense of these ideas by sketching how the lived body is integrated with the living body, and the extent to which the living body in this context is a *biological* body.

The phenomenon of pre-reflective bodily self-awareness reveals the *embodied* nature of the perceiver. Of course, ST also holds that perception is embodied in the sense of being constituted by bodily activity. Here, however, we're talking about embodiment in a deeper sense, which also involves the fundamental *passivity* that comes with being a vulnerable, material presence that is, as Merleau-Ponty says, "caught in the fabric of the world" (1964a: 163). In short, lived perception essentially involves being revealed pre-reflectively to oneself as a *living* body: I am not a pure subject but a bodily existence that is exposed to the contingencies of the world, and it is, among other things, the process of this constantly being proven to me through being touched by the world that constitutes my unity or identity as an embodied perceiver.

Further, affectivity signals a perceiver that *cares* for her own existence through being sensitive and responsive to her bodily contingency and vulnerability. For one's living body to be pre-reflectively part of one's experience is to be aware that one's existence as a living body is at stake in one's dealings with the world, and this is what constitutes the world's meaningful presence in the first place. In this way, affectivity lays at the ground of our *temporal* unity as perceivers – the coherence of our experiences as *our* experiences through time. According to Husserl's (1991) phenomenology of time-consciousness, which has a central place in enactive theory (Thompson, 2007a: ch. 11; Varela 1999), the temporality of experience is constituted by a dynamic interweaving of three interdependent moments: primal impression (the 'now'), retention (of the immediate past), and protention (anticipation of the immediate future). In this picture, affectivity is what underlies the future-oriented drive of experience (Thompson, 2007a: ch. 12; Varela & Depraz 2005). As affectively laden, the perceptual field is constituted as a field of possible futures that *matter for* the perceiver because they are possible future presents *of* the perceiver, presents that inevitably involve being 'touched' and modified by the perceived in various ways. Further, retention must on this view be understood as the persistence in the presence of prior affections, possible futures turned actual past, informing our future-directed attitude. Without affectivity, one's surroundings will not manifest as projections of one's future selves, and one's present state will not be defined (for oneself) as a modification of a past self, and there will thus be no temporally coherent experience.

It is not difficult to see the affinities between these phenomenological analyses and the enactive notion of adaptive autonomy. An adaptive autonomous system, remember, is a precarious system that upholds itself as an individual through interactions with its surroundings, instantiating a perspective on its surroundings as significant for its future states. This fits well with the idea of the living and temporal unity of the perceiving subject. In Thompson's words, the "immanent purposiveness of life is recapitulated in the temporality and intentionality of consciousness" (2007a: 362).<sup>15</sup>

<sup>15</sup> The enactivists are here following Jonas (1966: 86), who interpret the "biological time" of metabolism along the lines of the phenomenological analysis of temporality,

Of course, the phenomenological reflections above do not warrant us to conclude that the biochemical process of metabolism is constitutively necessary for perception. But, as we saw in Sect. 1, this is not what the enactive mind-life continuity thesis entails anyway. The analyses do however suggest that the subject of perception is biological in the sense of displaying the *general* logic of life – adaptive autonomy.

## 4 The behavioral sense of perception

The upshot of the previous section is that the phenomenology of perception favors the enactive over D&O's view of perception. In this section, I aim to clarify the methodological role of phenomenology as a way to delineate the nature of mental phenomena in light of a challenge implicit in D&O's argument. As I remarked above, in order to counter enactivists' reliance on phenomenology, sensorimotor theorists must either argue that their phenomenological analyses are inaccurate or deny that phenomenology has this kind of authority over theories in cognitive science. Though D&O do not explicitly engage in any discussions about phenomenology, they make it very clear what they consider to be the appropriate way to ground our notions of mentality; namely, to look at how mental phenomena are displayed in *behavior*. This can seem to be at odds with the phenomenological approach, insofar as phenomenology often is understood to deal merely with the first-personal character of experience. Below I'll argue that this worry is misplaced by demonstrating how the phenomenology of perception must, in a sense, be understood as a reflection of perceptual behavior, and further, that it is actually ST that fails to capture perception's behavioral manifestation.

### 4.1 The significance of perceptual behavior

According to D&O, if we want to know what perception is, we should look at how perception is exhibited in perceptual behavior. "An 'inner process'," as Wittgenstein says, "stands in need of outward criteria" (2009, § 580; quoted by D&O, 2017: 398). Following this line of thought, the relevant question for determining which factors are constitutive of perception, according to D&O, is "[w]hich interactions of a system are relevant for the sensible ascription of perceptual consciousness?" (2017: 397). Needless to say, D&O find that only interactions that can be explained purely in terms of exercises of sensorimotor capacities are relevant. As they see it, the enactive view of perception as constituted of biological organizational processes posits *more* factors as constitutive of perception than what is displayed in perceptual behavior, and is hence guilty of assuming a notion of perception that is misaligned with the contexts and practices from which 'perception' gets its meaning in the first place. This is the background for D&O's objection, quoted in Sect. 1, that "[w]hen we learn to use the concept of conscious perceptual experience, we do not appear to make use of knowledge of metabolism" (2017: 405). Even though the invocation of metabolism, as we saw there, misrepresents the enactive view, the general question underlying the objection is still legitimate: how can the enactive approach – in particular, the



phenomenological component we saw at play in the previous section – deal with the demand for “outward criteria”?

Let’s first have a look at a key premise of D&O’s objection, in order to seek out some reasons for why we should want to ground our notions of mentality in behavior. Is it really the case that the nature of perception can be determined by looking at the basis from which we learn the concept of perception? A worry with this idea is that it seems to conflate the semantics and metaphysics of perception. For instance, I might learn the concept ‘Venus’ by being made aware of an object with a distinct position and brightness in the night sky, but this does not mean that I thus gain full access to Venus’ *nature* (e.g., that it is a planet of such-and-such a mass orbiting the sun at such-and-such a speed). Venus’ distinctive appearance in the night sky does not by itself provide me with the necessary and sufficient conditions for being Venus. Likewise, one could argue that even if we learn the concept ‘perception’ from observing perceptual behavior, and this behavior seems to be constituted solely by exercises of sensorimotor capacities, this does not by itself warrant the conclusion that perception *is* nothing but exercises of sensorimotor capacities.

In D&O’s defense, however, perception is a very different kind of ‘object’ than Venus. In the case of Venus, it is possible to look behind its night sky appearance and discover its real properties, but can we do the same thing with perception? That is, can we make sense of there being a ‘real’ perception behind perceptual behavior? One way to respond positively to this question is to advocate a form of reductionism, for instance the idea that perception *really is* nothing but such-and-such a neural event. Another alternative is to locate the essence of perception in the *subjective* domain, claiming that it is accessible only by introspection. In both cases, however, it can be argued that we *lose sight of* rather than determine the nature of the phenomenon we originally, on the basis of perceptual behavior, designate with the word ‘perception’. In the reductionist case, one makes perception unrecognizable by determining it as an internal, subpersonal process rather than as an embodied system’s skillful interaction with its surroundings. And in the subjectivist case, perception is taken away from the public domain altogether, seemingly making each individual the authority on what ‘perception’ denotes in their own case, thus eliminating the possibility of an objective theory of perception altogether. Hence it seems that, if we want perception to remain recognizable and to be discernable in the shared, observable world, the best alternative is to base one’s metaphysics of perception on the phenomenon from which we learn the concept of perception in the first place, i.e., perceptual behavior.

## 4.2 Mutual illumination

Accepting this line of reasoning, my claim is that phenomenology dodges the charge of subjectivism and introspectionism and offers a view of perceptual behavior as *not* constituted solely of sensorimotor capacities. That it is necessary for phenomenology to have a response to such charges is evident not only from the criticism springing from usual anti-phenomenological suspects such as Dennett (2001), but also from the fact that phenomenologically informed enactivists occasionally lend themselves to subjectivist interpretations. One example that seems to directly contradict the emphasis on behavior advocated by D&O is the claim, quoted affirmatively by Thompson

(2007b: 166), that “[d]iscussions [in cognitive science] are laden with terms that we understand *first and foremost by reference to our own internal states*: consciousness, attention, dreaming [etc.]” (Jack & Roepstorff, 2002: 333; my emphasis). Similarly, we find Varela (1996: 334) agreeing with John Searle in that “the ontology of the mental is an irreducibly first-person ontology” (1992: 95), which can be read as implying that it is introspection, not the observation of others’ behavior, that gives the most genuine access to the mind.

While the presence of these and similar remarks in the enactivist literature signals the need for a clarification of phenomenology’s status, it is not the case that the enactive enterprise actually is committed to a view of the mind as a purely subjective phenomenon that can be accessed only through introspection. On the contrary, as we have seen, the enactive notion of the mind as *embodied* means that it should be understood as neither purely subjective nor purely objective, but rather as a bodily structure of existence that integrates both the lived and the living body (Varela et al., 1991: xvi; Thompson, 2007a: 248; Fuchs 2020). This, further, means that although phenomenological analyses of experience on this view are indispensable for understanding the mind, they are not *sufficient*, and they do not represent the only ‘genuine’ access to mental phenomena. Hence, enactivists advocate the need for a “mutual illumination” (Varela et al., 1991: 15) between phenomenology and the sciences of life and mind.<sup>16</sup> For this to make proper sense, however, we need an understanding of phenomenology that accommodates the demand for outward criteria.

### 4.3 Beyond first-person phenomenology

If ‘introspection’ simply means to reflect on the first-personal character of experience, then introspection is undoubtedly a central part of the phenomenological project.<sup>17</sup> Phenomenological ‘introspection’ is however of a quite distinct nature. Part of this has to do with the idea of subject-world correlation that we’ve already encountered. That is, the phenomenologist’s main domain is not subjects’ mental states considered in isolation, but rather the ways in which subjects are intentionally *directed* towards the world. Hence, *correlational analysis* is a central piece of phenomenological methodology. With this approach, phenomenologists do not seek to uncover arbitrary traits of their own individual experiences, or to give the most fine-grained description possible of the qualitative ‘feel’ of various experiences. Rather, as Dan Zahavi observes, phenomenology is interested in “*invariant structures of experience*” (2017: 15; my emphasis). The focus on invariant structures means that the phenomenologist aims to produce analyses with a validity that reaches beyond her own internal states. In articulating a phenomenology of perception, for instance, I do not merely give a description of what it is like *for me* to perceive; I aim to uncover structures that are

<sup>16</sup> In *Linguistic Bodies* (Di Paolo et al., 2018) the authors appeal to the phenomenological perspective as part of a *dialectical* approach to the mind. I see the notion of dialectics developed there as a much-needed contribution to enactive methodology, which develops and gives more substance to the idea of mutual illumination.

<sup>17</sup> A lot has been said to defend phenomenology against charges of subjectivism and introspectionism, and this is not the place to recount it all. For a couple of convincing attempts at more systematic clarifications of this issue, see Zahavi (2017) and Belt (2020).

constitutively necessary for the appearance of the perceived human world as such. This is the intended significance of the phenomenological analyses in Sect. 2: they presume to identify and describe some of the structures without which the world could not appear perceptually at all.

How can this be linked to the demand for outward criteria and the significance of perceptual behavior? Are not these invariant structures still first personal and as such not ‘outward’ in the required sense? To reply to this, we must consider the inherently *intersubjective* significance of lived experience. Another way to put the point about invariant structures is to say that these structures do not simply belong to how *I* individually perceive, but rather to how *one* – i.e., everyone who shares the human lifeworld – discloses the perceived world. Sure, the structures are described as they manifest ‘subjectively’, but what is thus described is something shared by all perceiving subjects insofar as we inhabit the same lifeworld. As such, phenomenology does not let it be up to each individual subject to decide their own truths about experience. *Qua* intersubjectively shared, claims about the structures of lived experience are subject to critique and revisions by a community of phenomenological researchers.

There are at least two ways in which we can talk of outward criteria in this context. First, the intersubjective invariants of lived experience are manifested *outwardly* in the structures of the lifeworld that we share. We inevitably perceive the world as a *shared* world, perceivable by other perspectives than our own and as potentially relevant for others’ existential projects (Husserl, 1970: 108). Following this thought, the evidence for the role of affectivity in perception is not in my internal states, but *in the things I perceive*. It is, to return to the example from Sect. 2, *the cup itself*, as a phenomenon of the lifeworld, that shows me the role of affectivity in perception. Secondly, the ability to perceive the world as intersubjectively constituted in this way is enabled and facilitated by encounters with *other* subjects. It is the outwardly manifest behavior of other perceivers, tracing the meaningful physiognomy of our shared surroundings, that first initiates me into the human lifeworld. By empathically taking up the gestures of others, I incorporate an intersubjective mode of being, and in that way lay the basis for the perspective on my own lived experience that enables me to conceptualize myself as a subject among others and to search for the invariant structures we share (Zahavi, 1996). “[K]nowledge of our own mind,” as Hans Jonas says, “is a function of acquaintance with other minds” (1980: 246). This amounts to a phenomenological rejection of the above-quoted claim that we understand notions of mentality “first and foremost by reference to our own internal states.” I understand the notion of perception not primarily because I have a privileged first-personal access to what it is to perceive, but because perception is an intersubjective, publicly available phenomenon, visible in others’ behavior. Even when I’m investigating the first-personal character of perception, I must understand perception as this kind of relation to the world that I also see others entertaining, and which have such-and-such outward, behavioral signs.

#### 4.4 The structure of perceptual behavior

So, what are these outward signs of perception? In Sect. 2 we saw that perception is characterized by an affectively constituted meaning that is not capturable by the

resources at ST's disposal. A possible defense at that point was to claim that this dimension of meaning does not seem constitutively necessary for perception if we – as we should – ground our notion of perception in perceptual behavior. If D&O are right, perceptual behavior is constituted solely of a system's display of capacities for handling sensorimotor contingencies. If we actually look at how the capacity for perception is exhibited in the behavior of others, however, it seems to involve a specific, meaningful *way* of handling sensorimotor contingencies that still cannot be appropriately accounted for by the notion of sensorimotor capacities alone. “[B]odily persons,” as Sara Heinämaa observes, “are individuated by their subjective modes of responding to what is given in experience [...] As subjective expressions, our bodies [...] are distinguished by their unique ways of moving, gesturing and acting in respect to what is given in their intentional environment” (2018: 539). Perceptual behavior, in other words, is behavior that *expresses subjectivity* in a distinctive way. When I experience others as perceivers, it is because their behavior displays not only the capacity for mastering sensorimotor contingencies, but for doing so in an affectively constituted way, responding to their surroundings as something that is significant *for them*. In short, perceptual behavior is revealed as such by displaying an intrinsic relation of meaning between perceiver and perceived. It is this meaningful subject-world co-definition that organizes and integrates subjectivity as a unified *structure of behavior* (Merleau-Ponty, 1963) as it is revealed both introspectively and in the experience of other perceivers. In this way, the phenomenological defense of the enactive notion of perception takes the form of establishing meaningful co-specification as essential to perception not only from the perspective of ‘what it is like’ to perceive, but also from the perspective of *what perceivers are like*.

We are now in position to better understand the enactive idea of a mutual illumination between phenomenology and other scientific perspectives on the mind. For, where we already in Sect. 2 uncovered the perceiving subject as a vulnerable, material presence in the world, we have now seen that our very access to subjectivity is mediated by the worldly, behavioral presence of others. As such, our self-reflections – phenomenological and otherwise – are really reflections on forms of behavior, accessible introspectively but necessarily also bearing an outward significance. Hence, the subject matter of phenomenology spills into the world outside philosophers’ acts of self-reflection and welcomes – if not *demand*s – mutually illuminating exchanges with other approaches. In Merleau-Ponty’s words, “if the transcendental is intersubjectivity, how can the borders of the transcendental and the empirical help become indistinct? For along with the other person, all the other person sees of me – all my facticity – is reintegrated into subjectivity, or at least posited as an indispensable element of its definition” (Merleau-Ponty, 1964b: 107). The theory of adaptive autonomy is enactivists’ proposal for a framework that can facilitate and make sense of the circulation of phenomenological and empirical perspectives required to illuminate the nature of the mind: It captures the meaning-constitutive logic underlying both ‘internal’ and ‘external’ manifestations of subjectivity, and it does so in a way that

can be given a mathematical articulation with the resources of dynamical systems theory<sup>18</sup> and as such be implemented in a range of scientific approaches to the mind.

D&O's notion of the outward criteria for perception is here discovered to be too abstract, mistaking a necessary *part* of perceptual behavior – exercises of sensorimotor capacities – for the full phenomenon. Thus, their objection that the enactive account of perception is misaligned with the contexts in which we learn the notion of perception is deflected back to their own view: to say that perception is constituted solely of exercises of sensorimotor capacities is to fail to do justice to the structure of perceptual behavior, which from the perspectives we have entertained is revealed as expressive of an affectively lived and living bodily subjectivity. Rather than being redundant, the enactive notion of adaptive autonomy here seems adequate for illuminating what is going on: the dynamic generation and maintenance of a meaningful co-definitional system of perceiver and perceived.

In this way, we have seen how phenomenology escapes the charge of subjectivism, incorporates the significance of perceptual behavior, and leads to a rejection of D&O's idea of how perception is behaviorally displayed.

#### 4.5 A last resort?

Before concluding, we need to address an objection that has probably struck some readers. Phenomenological considerations, I've argued, suggest that exercises of sensorimotor capacities are not sufficient for constituting perception, but is this really what has been shown? One possibility that seemingly remains open, is to claim that I've only provided support for the idea that adaptive autonomy is constitutive of *human*, perhaps *biological*, perception, but not that it is constitutively *necessary* for perception *as such*. D&O indicate that they could take this route by claiming that even if it were the case that autonomy is "*implied in perception itself*" in the case of living organisms, this would "not imply that [it] is *necessary* for experience" (2017: 400, orig. emphases). This, however, seems to only further detach their notion of perception from contexts of actual perceptual behavior. Given that every actual case of perception up until this point in the earth's history has been displayed in the behavior of living organisms (which D&O does not dispute), and perception in these cases *is* a living body's enaction of an existential context (which I've argued), how can the claim that autonomy is not necessary for perception be justified? Whatever one means by 'perception' here, it seems to be disengaged from the contexts that provide this term with a meaning in the first place.

But, the objection continues, isn't it at least conceivable that there could be a non-biological system that behaves exactly like a perceiver, and which it therefore would be reasonable to say that displays perceptual capacities? This kind of thought experiment plays an important role in D&O's dialectic (2017: 404). The first thing to say here is that it is not sufficient for a system to *mimic* perceptual behavior for it to actually display the full sense of perception. In Di Paolo's words, "[t]he movement

<sup>18</sup> Providing resources for making mathematical sense of self-organizing emergent systems characterized by circular part-whole forms of causality (Kelso, 1995; Juarrero, 1999), dynamical systems theory plays an essential role in enactivists' articulation of the theory of adaptive autonomy (Di Paolo et al., 2017).

of meaningful action can be convincingly emulated in an artificial system but this is not the same as the system acting meaningfully” (2005: 443). In short, a system acting a certain way because it is designed to imitate the perceptual behavior of a living organism is not the same as acting that way because one’s existence is at stake in how one interacts with the environment. *If* an artificial system’s behavior consistently displayed the structure of perception over a prolonged stretch of time, we would certainly need very good reasons to refrain from ascribing perception to it. This, however, is not a scenario that would support ST over the enactive view, for in such a case the system in question would also fulfill the behavioral criteria for adaptive autonomy.

## 5 Conclusion

If the enactive view of the mind wants to retain a viable position in cognitive science, it needs to continue to return to, refine, and develop its phenomenological arguments. In this article I’ve tried to contribute to this task. First, by emphasizing the significance of the notion of enaction as co-definition and how it binds together the phenomenological and biological dimensions of the enactive view. Then, by revisiting some of the ways the phenomenological perspective motivates the idea that lived perception is constituted by the living body. Lastly, by outlining a phenomenological response to the demand for outward, behavioral criteria for our notions of mentality. Central here is the idea of the mind as a *structure of behavior*. This structure can be accessed and studied from a variety of perspectives, facilitating the enactive idea of mutual illumination, but what integrates and unifies them all is the meaningful direction of the behavior – a direction that cannot be accounted for by appeal to sensorimotor capacities alone.

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## References

- Barandiaran, X. E. (2017). Autonomy and Enactivism: Towards a Theory of Sensorimotor Autonomous Agency. *Topoi*, 36(3), 409–430
- Barrett, L. F., & Bliss-Moreau, E. (2009). Affect as a Psychological Primitive. *Advances in Experimental Social Psychology*, 41, 167–218
- Belt, J. (2020). Phenomenological Skepticism Reconsidered: A Husserlian Answer to Dennett's Challenge. *Frontiers in Psychology*, 11
- Colombetti, G. (2013). *The Feeling Body: Affective Science Meets the Enactive Mind*. Cambridge: MIT Press
- Colombetti, G. (2018). Enacting Affectivity. In A. Newen, De L. Bruin, & S. Gallagher (Eds.), *The Oxford Handbook of 4E Cognition* (pp. 571–587). Oxford: Oxford University Press
- Damasio, A. R. (1999). *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*. New York: Harcourt Brace
- De Jaegher, H., & Di Paolo, E. (2007). Participatory Sense-Making: An Enactive Approach to Social Cognition. *Phenomenology and Cognitive Science*, 6, 485–507
- Degenaar, J., & O'Regan, J. K. (2017). Sensorimotor Theory and Enactivism. *Topoi*, 36, 393–407
- Dennett, D. C. (2001). The fantasy of first-person science. In S. Wuppuluri, & F. Doria (Eds.), *The Map and the Territory: Exploring the Foundations of Science, Thought and Reality* (pp. 455–473). Cham: Springer
- Di Paolo, E. A. (2005). Autoopoiesis, Adaptivity, Teleology, Agency. *Phenomenology and the Cognitive Sciences*, 4, 429–452
- Di Paolo, E. A. (2009). Extended Life. *Topoi*, 28(9)
- Di Paolo, E. A. (2018). The Enactive Conception of Life. In A. Newen, De L. Bruin, & S. Gallagher (Eds.), *The Oxford Handbook of 4E Cognition* (pp. 71–94). Oxford: Oxford University Press
- Di Paolo, E. A., Buhrmann, T., & Barandiaran, X. E. (2017). *Sensorimotor Life*. Oxford: Oxford University Press
- Di Paolo, E. A., Cuffari, E. C., & De Jaegher, H. (2018). *Linguistic Bodies: The continuity between life and language*. Cambridge: MIT Press
- Di Paolo, E., & Thompson, E. (2014). The enactive approach. In L. Shapiro (Ed.), *The Routledge handbook of embodied cognition* (pp. 68–78). Oxfordshire: Routledge/Taylor & Francis Group
- Duncan, S., & Barrett, L. F. (2007). Affect is a form of cognition: A neurobiological analysis. *Cognition and Emotion*, 21(6), 1184–1211
- Fuchs, T. (2020). The Circularity of the Embodied Mind. *Frontiers in Psychology*, 11
- Gallagher, S. (2017). *Enactivist Interventions: Rethinking the Mind*. Oxford: Oxford University Press
- Gapenne, O. (2010). Kinesthesia and the Construction of Perceptual Objects. In J. Stewart, O. Gapenne, & E. A. Di Paolo (Eds.), *Enaction: Toward a New Paradigm for Cognitive Science* (pp. 183–218). Cambridge: The MIT Press
- Hanna, R., & Thompson, E. (2003). The mind-body-body problem. *Theoria et Historia Scientiarum: International Journal for Interdisciplinary Studies*, 7, 24–44
- Heinämaa, S. (2018). Embodiment and Bodily Becoming. In D. Zahavi (Ed.), *The Oxford Handbook of the History of Phenomenology* (pp. 533–557). Oxford: Oxford University Press
- Hurley, S. L. (1998). *Consciousness in Action*. Cambridge: Harvard University Press
- Husserl, E. (1970). *The Crisis of the European Sciences and Transcendental Phenomenology*. (D. Carr, Trans.) Evanston: Northwestern University Press
- Husserl, E. (1991). *On the phenomenology of the consciousness of internal time (1893 – 197)*. (J. B. Brough, Trans.) London: Kluwer academic publishers
- Hutto, D. D., & Myin, E. (2012). *Radicalizing Enactivism: Basic Minds without Content*. Cambridge: The MIT Press
- Hverven, S., & Netland, T. (2021). Projection or encounter? Investigating Hans Jonas' case for natural teleology. *Phenomenology and the Cognitive Sciences*
- Jack, A., & Roepstorff, A. (2002). Introspection and cognitive brain mapping: from stimulus-response to script-report. *Trends in Cognitive Sciences*, 6, 333–339
- Jonas, H. (1966). *The Phenomenon of Life*. Evanston: Northwestern University Press
- Jonas, H. (1980). Change and permanence: On the possibility of understanding history. *Philosophical essays* (pp. 237–260). Atropos Press

- Juarrero, A. (1999). *Dynamics in Action: Intentional Behavior as a Complex System*. Cambridge: The MIT Press
- Kee, H. (2018). Phenomenology and naturalism in autopoietic and radical enactivism: exploring sense-making and continuity from the top down. *Synthese*, pp.2323–2343
- Kelso, S. (1995). *Dynamic Patterns: The Self-Organization of Brain and Behavior*. Cambridge: The MIT Press
- Lewis, M. D. (2005). Bridging emotion theory and neurobiology through dynamic systems modeling. *Behavioral and brain sciences*, 28, 169–245
- Maturana, H. R., & Varela, F. J. (1980). *Autopoiesis and Cognition: The Realization of the Living*. Boston: D. Reidel
- Merleau-Ponty, M. (1963). *The Structure of Behavior*. Pittsburgh: Duquesne University Press
- Merleau-Ponty, M. (1964a). Eye and Mind. *The Primacy of Perception* (pp. 159–190). Evanston: Northwestern University Press
- Merleau-Ponty, M. (1964b). The Philosopher and Sociology. In *Signs* (R. C. McCleary, Trans., pp. 98–113). Evanston: Northwestern University Press
- Merleau-Ponty, M. (2012). *Phenomenology of Perception*. New York: Routledge
- Myin, E. (2003). An account of color without a subject? *Behavioral and Brain Sciences*, 26, 42–43
- Myin, E., & O'Regan, K. J. (2002). Perceptual consciousness, access to modality, and skill theories: a way to naturalize phenomenology? *Journal of Consciousness Studies*, 9, 27–46
- Newen, A., De Bruin, L., & Gallagher, S. (2018). 4E Cognition: Historical Roots, Key Concepts, and Central Issues. In A. Newen, De L. Bruin, & S. Gallagher (Eds.), *The Oxford Handbook of 4E Cognition* (pp. 3–15). Oxford: Oxford University Press
- Noë, A. (2004). *Action in Perception*. Cambridge: MIT Press
- Noë, A. (2009). *Out of our Heads: Why you are not your brain and other lessons from the biology of consciousness*. New York: Hill & Want
- Noë, A. (2012). *Varieties of Presence*. Cambridge: Harvard University Press
- Noë, A. (2021). The enactive approach: a briefer statement, with some remarks on “radical enactivism”. *Phenomenology and the Cognitive Sciences*, 20, 957–970
- O'Regan, J. K. (2011). *Why red doesn't sound like a bell: understanding the feel of consciousness*. Oxford: Oxford University Press
- O'Regan, J. K., & Noë, A. (2001). A sensorimotor account of vision and visual consciousness. *Behavioral and Brain Sciences*, 24, 883–917
- Riener, C., Stefanucci, J., Proffitt, D., & Clore, G. (2011). An effect of mood on the perception of geographical slant. *Cognition and Emotion*, 25(1), 174–182
- Salmela, V., Lumikukka, S., Söderholm, J., Roope, H., Lahti, J., Ekelund, J., & Isometsä, E. (2021). Reduced visual contrast suppression during major depressive episodes. *Journal of Psychiatry and Neuroscience*, 46(2), E222–E231
- Searle, J. (1992). *The Rediscovery of the Mind*. Cambridge: The MIT Press
- Stapleton, M., & Froese, T. (2016). The enactive philosophy of embodiment: From biological foundations of agency to the phenomenology of subjectivity. In M. García-Valdecasas, J. I. Murillo, & N. F. Barrett (Eds.), *Biology and subjectivity: Philosophical contributions to non-reductive neuroscience* (pp. 113–129). Cham: Springer
- Stewart, J., Gapenne, O., & Di Paolo, E. A. (Eds.). (2010). *Enaction: Toward a New Paradigm for Cognitive Science*. Cambridge: The MIT Press
- Thompson, E. (2007a). *Mind in Life: Biology, Phenomenology, and the Sciences of Mind*. Cambridge: Harvard University Press
- Thompson, E. (2007b). Look again: Phenomenology and mental imagery. *Phenomenology and the Cognitive Sciences*, 6, 137–170
- Thompson, E. (2018, January 11). Review: Evolving Enactivism: Basic Minds Meet Content. *Notre Dame Philosophical Reviews*. Retrieved November 20, 2021, from <http://ndpr.nd.edu/reviews/evolving-enactivism-basic-minds-meet-content/>
- Varela, F. J. (1979). *Principles of Biological Autonomy*. New York: Elsevier North Holland, Inc
- Varela, F. J. (1996). Neurophenomenology: A methodological remedy for the hard problem. *Journal of Consciousness Studies*, 4, 330–349
- Varela, F. J. (1999). The Specious Present: A Neurophenomenology of Time Consciousness. In J. Petitot, F. J. Varela, & B. R. M. Pachoud (Eds.), *Naturalizing Phenomenology* (pp. 266–314). Stanford: Stanford University Press



- Varela, F. J. (2011). Preface to the second edition of “De Máquinas y Seres Vivos - Autopoiesis: La organización de lo vivo”. *Systems Research and Behavioral Science*, 28(6), 601–617
- Varela, F. J., & Depraz, N. (2005). At the Source of Time: Valence and the constitutional dynamics of affect. *Journal of Consciousness Studies*, 12(8–10), 61–81
- Varela, F. J., Thompson, E., & Rosch, E. (1991). *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge: MIT Press
- Villalobos, M., & Ward, D. (2016). Lived experience and cognitive science: Reappraising enactivism’s Jonasian turn. *Constructivist Foundations*, 11, 204–233
- Ward, D., Silverman, D., & Villalobos, M. (2017). Introduction: The Varieties of Enactivism. *Topoi*, 36, 365–375
- Weber, A., & Varela, F. J. (2002). Life after Kant: Natural purposes and the autopoietic foundations of biological individuality. *Phenomenology and the Cognitive Sciences*, pp. 97–125
- Wehrle, M. (2020). Being a body and having a body. The twofold temporality of embodied intentionality. *Phenomenology and the Cognitive Sciences*, 19, 499–521
- Wittgenstein, L. (2009). *Philosophical Investigations* (4. ed.). (G. Anscombe, P. Hacker, & J. Schulte, Trans.) Oxford: Blackwell Publishing Ltd
- Zahavi, D. (1996). Husserl’s Intersubjective Transformation of Transcendental Philosophy. *Journal of the British Society for Phenomenology*, 27(7), 228–245
- Zahavi, D. (2017). *Husserl’s Legacy*. Oxford: Oxford University Press

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