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Lived experience and the naturalization of bodily experience: An ecological proposal

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Abstract

In this paper we defend the idea that ecological psychology is in a good position for making sense of bodily experience by naturalizing some of the most important features of Husserlian lived experience, such as kinesthetics or proprioception. Some postcognitivist researchers have suggested that the notion of lived experience, originated in Husserl's phenomenological project, is fundamental to make sense of the concept of bodily experience. Recently, it has been suggested that, when considering Husserl's notion of lived experience, ecological psychology lacks the conceptual resources to make sense of this notion, for it is focused on goal-directed tasks. In contrast, enactivism is allegedly in better shape to make sense of the concept due to its direct roots in the phenomenological tradition. After contextualizing the debate, in this paper we claim that all the relevant aspects attributed to the Husserlian notion of lived experience can be accounted for within the scientific framework of ecological psychology. We conclude that there are enough materials to start defining an embodied and situated naturalization of the notion of bodily experience from an ecological perspective.

Keywords

ecological psychology, embodiment, enactivism, experience, naturalization, phenomenology

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Experience in postcognitivist approaches is bodily experience

Postcognitivism is a naturalistic approach to cognition that has been gaining argumentative traction within the cognitive sciences over the last few years (see Chemero, 2009; Lobo, 2024; Newen et al., 2018; Raja, 2024). Also known as radical embodied cognitive science, postcognitivism rejects the idea that cognition purely consists in computational processes based on the manipulation of inner representations in the brain as traditional cognitivism proposes (Thagard, 2005). Instead, postcognitivism or radical embodiment claims that cognition is *embodied*, *situated*, and not necessarily *representational*.[1] In this sense, cognition is not understood as information-processing within the brain or the nervous system, but it is conceived as the set of bodily skillful abilities of the organism. Instead of looking inside our brains, radical embodied philosophers and cognitive scientists pay attention to what organisms can do with their bodies in their environment. Thus, whereas the foundation of the concept of cognition in traditional neuro-centered cognitivism is the notion of mental representation, in radical embodiment it is the idea of experience understood from an embodied and situated approach; that is, paying attention to what the body does and which are the skills and capacities that organisms possess. Experience, in this view, is *bodily* experience.

Postcognitivism conceptualizes bodily experience as emerging from the history of interactions between organisms and their environment; bodily experience is the product of the active and skillful abilities of the organism that allow it to explore and navigate the environment in an efficient way (Heras-Escribano, 2019; Hutto & Myin, 2017). The idea is that organisms establish action–perception loops (under the idea that acting is for perceiving and perceiving is for acting) that expand through space and time, creating a history of mutual interactions between organisms and their environment (Di Paolo, 2018; Myin, 2016; Richardson et al., 2008). The resulting outcome of this history of interactions is experience, and it is *bodily experience* exactly because it is based on the abilities of the organism for exploring and dealing with its environment through the body (Segundo-Ortin et al., 2019).

The idea of offering an approach to bodily experience from a naturalistic, embodied, and situated perspective is still an open debate (Petitmengin, 2017; Thompson, 2005). Traditionally, the two main approaches that have characterized experience and perceptual learning from an embodied, situated, and nonrepresentational perspective have been ecological psychology and the Enactive Theory (Lobo, 2019). Enaction claimed it has found in the phenomenological tradition a number of resources to make sense of bodily experience (Gallagher & Zahavi, 2012; Thompson, 2007; Varela et al., 1991; also see Newen et al., 2018).

In this context of dispute, some authors proposed that the notion of *lived experience* (*Erlebnis*) in Husserl's phenomenological project is fundamental to make sense of the concept of bodily experience in postcognitivist terms (Gallagher, 2017; Käufer & Chemero, 2021; Rump, 2018). *Erlebnis* refers to the stream of conscious experience as it is directly given to us, before any scientific or theoretical interpretation. This includes perceptions, but also emotions, thoughts, and acts of consciousness in their immediate, first-person embodied givenness.[2] Considering this, either enaction or ecological

psychology would need to include the notion of lived experience in their views to make full sense of bodily experience in naturalistic terms.

In this line, some authors have suggested that, when considering Husserl's notion of lived experience, ecological psychology lacks the conceptual resources to incorporate the notion in its pretended naturalistic terms, for ecological psychology only focuses on a very reduced subset of actions; namely, goal-directed tasks (Glotzbach & Heft 1982; Popova & Rączaszek-Leonardi, 2020). In contrast, it has been claimed that enactivism is better able to make sense of the concept of embodiment through the notion of lived experience due to its direct roots in the phenomenological tradition, and therefore conceptual compatibility with the tradition (Di Paolo & Thompson, 2024; Gallagher, 2012).

This paper opposes this pessimistic evaluation. We propose that all the relevant aspects attributed to the Husserlian notion of lived experience in the perceptual aspect (kinesthetics, proprioception, etc.) can be explained by the scientific framework of ecological psychology. We conclude, therefore, that an embodied and situated naturalization of the notion of bodily experience is, in principle, possible to be achieved from an ecological perspective.

Contextualizing postcognitivism: Ecological psychology and enactivism

Ecological psychology is an approach that advanced the main ideas of embodiment and situatedness (as well as nonrepresentationalism and anticomputationalism) in the 1960s, decades before their official irruption in the cognitive sciences debate during the 1990s with 4E cognition (Heras-Escribano, 2019; Heras-Escribano & Andrada, 2022). Ecological psychology placed action–perception processes, perceptual learning, and development at the core of its research program from the very beginning, and it has been gathering *in vivo* experimental evidence from perception–action and perceptual learning processes in animals and humans for more than 50 years (Turvey, 2019). For this reason, authors like Reed claim that

> [t]he ecological approach to psychology, with its roots in Darwinian ideas and which achieved maturity in the work of James Gibson and Eleanor Gibson, offers the promise of a natural science of meaningful behavior and experience—a scientific approach to real, living, psychological processes. (Turvey, 1996, p. 28)

Thus, in ecological psychology, perception is direct in the sense that we use the available information of the environment to guide our action, and no information-processing, computing, or any other kind of mental gymnastics is involved. This explanation of direct perception as information detection led ecological psychologists to propose several experimental research lines on perceptual learning (see E. J. Gibson & Pick, 2000), one of the most promising being the direct learning research program. This research line has shown that perceptual learning can be represented as a change in which the novices become experts at doing a particular task because they stop using less-specific informational variables and they start using ecological, specific informational variables to perform the task (Jacobs & Michaels, 2007). Several perceptual learning tasks have been

analyzed from this perspective, such as cart-pole-balancing, ball-punching, and so forth. This framework allows us to understand bodily experience as a history of interactions between organisms and the available information in their environments, because organisms explore their environments and use ecological information to guide their actions and continue exploring and making their way in the world. This can help us to build a naturalistic, nonrepresentational, embodied, and situated approach to experience.

Enactivism is an embodied and situated approach to cognition that aims to naturalize the mind in a nonreductive way. Rather than a single corpus, the label enactivism refers to a constellation of approaches that do not necessarily share the same commitments and goals; except for one—namely, the idea that action is lawfully connected to sensations or what has been called *sensorimotor laws* (Di Paolo et al., 2017; Thompson, 2007; Varela et al., 1991). The irruption of enaction in the cognitive sciences is promoted by the publication of *The Embodied Mind* authored by Varela et al. (1991). The authors' main proposal combines ideas coming from phenomenology, Buddhism, and the biophysical approach to the definition of the living and emphasizing the notions of autopoiesis and sensorimotor contingencies.

Three branches of enactivism can be distinguished in the literature: (a) traditional enactivism, (b) sensorimotor enactivism, and (c) radical enactivism. Traditional enactivism, or autopoietic enactivism, refers to Varela et al.'s (1991) original ideas. This branch aims at rebuilding the definition of cognition not relying on the concepts of representation and computational processes but, rather, based on the fundamental role of sensorimotor contingencies in the shaping of the mind. The concept of sensorimotor contingencies refers to the lawful connection between sensations and movement, and enactivists claim that the mastery of these contingencies leads to skillful behavior. Thus, this first branch claims that the enactive approach consists of two main claims, namely, that (a) "perception consists in perceptually guided action" and (b) that "cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided" (p. 173).

In combining the autopoietic theory of biological agents with sensorimotor contingencies, traditional enactivism emphasizes the importance of agency as the key level of explanation for cognition. Then, we can differentiate between cognitive and biological agency, but both are connected inasmuch as sensorimotor contingencies contribute to the self-stability of the system. Thus, cognitive agency is defined as the repertoire of skillful abilities based on the mastery of sensorimotor contingencies and, for this reason, the concept of *agency* is key within this view for it is the level of analysis of cognition. Enactivists define agency as an autonomous or self-individuated organism capable of normative interactional asymmetry with its surroundings (Barandiaran et al., 2009).

The abilities that every organism develops shape the very organism as an agent, as long as these abilities allow it to interact with the world in active terms, and those interactions acquire their normative character because they contribute to their autonomy or self-individuation. Now, the second branch, sensorimotor enactivism, endorses the idea of the mastery of sensorimotor contingencies without necessarily endorsing the biological basis (Nöe, 2004; O'Regan, 2011); and the third branch, radical enactivism, is a research program focused on "sanitizing" the remainders of traditional cognitivism and representationalism within the embodied–situated cognitive sciences in order to clarify

an innovative way of understanding (basic) cognition from a nonrepresentational approach (Hutto & Myin, 2013, 2017). In the rest of the paper, we will focus on autopoietic enactivism, so we will refer to it simply as enaction, enactivism, or the enactive approach.

Important to our discussion is the fact that enactivism is born tightly connected to the phenomenological tradition as both approaches acknowledge the importance of agency for explaining cognition and take the agent as the main focus of description and analysis. These two approaches also emphasize the importance of sensory experience as tied to action from the first-person perspective (Käufer & Chemero, 2015). In their foundational work, Varela et al. (1991) state the connection between enactivism and phenomenology in the following manner: "What we are offering in this book is thus a new lineage of descent from the fundamental intuition of double embodiment first articulated by Merleau-Ponty" (p. xiii).

Nevertheless, the development of traditional enactivism throughout the years led to a reconsideration of Husserlian phenomenology. First of all, Thompson's (2007) book *Mind in Life*, which was meant to be a sequel to *The Embodied Mind* (Varela et al., 1991; see also Thompson, 2007, p. xi), offered a reappraisal of the way enactivism should understand Husserl's phenomenological approach. As he claimed:

> Our earlier interpretation of Husserl [in *The Embodied Mind*] was mistaken. Husserlian phenomenology has far more resources than we realized for productive cross-fertilization with both the sciences of mind . . . and Buddhist thought . . . . In particular, I now believe (i) that Husserl was not a methodological solipsist; (ii) that he was greatly concerned with the intersubjective and embodied aspects of experience; (iii) that his theory of intentionality was not a representational theory; and (iv) that his theory of the life world was not reductionistic and representationalist. (Thompson, 2007, p. 413)

After a careful reinterpretation of Husserl's work based on the analysis of his untranslated manuscripts, Thompson realized that embodiment and intersubjectivity were more important for Husserl than what Dreyfus was able to admit, and this is why Husserlian phenomenology played a more decisive role for the enactive project in *Mind in Life* (Thompson, 2007).

Enactivism, ecological psychology, and the notion of lived experience

Whereas ecological psychology shares with enaction the idea that perception is strongly tied to action—and some other commitments against representationalism and cognitivism—the former rejects the idea that perception should start with sensations (something that is shared by cognitivism and enactivism). Ecological psychology claims that perception starts with what is called ecological or specific information, which is not information in the Shannon–Weaver sense (Shannon, 1949), but a way of understanding the term that is not linked to information-processing. This information is specific as it correlates 1:1 with the aspects of the environment, which means that the detection of ecological information is the direct perception of the affordances of the environment (Michaels &

Carello, 1981; Turvey, 2019). Taking the starting point of ecological psychology into consideration, it seems plausible to suggest that, at least in principle, a comprehensive analysis of bodily experience could be naturalized in ecological terms through experimental methods and models.

The tensions as well and the overlaps between ecological psychology and enactivists are well-known in the specialized literature. Regarding the tensions, there is an enactivist *motto* that is always present, but mentioned in different terms: enactivism has more to do with accounting for the phenomenology, or general feeling or perspective of an organism in the world, whereas ecological psychology merely analyses the activities of that particular organism from a scientific standpoint, paying no attention to this general "way of feeling" or being in the world. This has been repeated in many ways, for example as the "tacking back and forth between phenomenology as we live it in all its textured banality (also, glorious complexity), and the methodical search and testing of generalities, is precisely what an enactive science aims for" (McGann, 2016, p. 313), or when Stapleton (2016) claimed that "[t]he enactivist project seeks to give a deeper explanation of perception-action coupling . . . in terms of grounding this agency in something intrinsic . . . to the system rather than relying on attributing it from an external (heteronomous) perspective" (p. 325).

Regarding bodily experience in particular, this view of an ecological naturalization is denied in the literature under the idea that ecological psychology "focuses on merely a subset of projects and intentional acts in which we can be engaged, i.e., those connected to a goal-directed activity in the environment" (Popova & Rączaszek-Leonardi, 2020, p. 5).[3] This is totally in line with McGann's and Stapleton's above-mentioned ideas: ecological psychology would fail when explaining experience only based on goal-directed behavior, for this kind of behavior should be framed under a richer and more general understanding of bodily experience; if not, these authors say, the body would be simply treated as an object of study, not as a lived unity of experience of a particular agent (see also McKinney et al., 2022; Read & Szokolszky, 2020). In this line, Sheets-Johnstone (1999) claimed that James Gibson "transforms the phenomenon of movement into a phenomenon enmeshed in the global phenomenon of 'perceptual affordances'" (p. 235). Sheets-Johnstone claimed that ecological psychology focuses more on the functioning of the five senses than on a complete account of bodily experience as an integrated phenomenon, which would be a full-blown system different from the other ones: "movement is something both more and other than instrumental, and . . . kinesthesis may afford something both more and other than information" (p. 238). Hence, movement in the ecological approach is understood as fragmented, "a kinetic episode that we, as adults, partition off from the global phenomenon of animation," and completely devoid of the "ongoingness of primal *kinetic liveliness* [emphasis added]" (p. 212). Sheets-Johnstone on the one side, and Popova and Rączaszek-Leonardi (2020) on the other, claim this because, according to these authors, focusing on real in vivo experimentation with goal-directed tasks, as ecological psychology does, treats the body as an object rather than as something more organic and dynamic. This difference between the body as an object (*Körper*) and the body as a subject (*Leib*) is key because the former analyses body phenomena as "objective characteristics" and the latter analyzes body phenomena as having "an effect on the way I experience the world" (Gallagher, 2012, p. 95).

Starting from this point, enactivists have claimed that the Husserlian notion of *lived experience* and *lived body* can play a fundamental role in providing a more general sense of the body that can lead to a complete account of bodily experience. For example, Popova and Rączaszek-Leonardi (2020) suggest that:

> The indications of one's bodily presence [as depicted in ecological psychology] are not the felt bodily experiences but rather "persistent features in the field of view," such as occluding edges . . . This, however, also *refers to the body as an object* [emphasis added]; its movements, specified by the optical flow, are considered in terms of coupling to the processes in the world, *but the body as experiencing, lived one*, [emphasis added] the proprioceptive or kinaesthetic information of felt body motion (which does not have to be specified by optical flow) *does not seem to be a discernible element of experience* [emphasis added] and, for example, cannot be coupled to the experienced visual flow. *This Gibsonian understanding of the body, in other words, is not equivalent to the felt, bodily presence that dominates the Husserlian notion of lived experience* [emphasis added]. (p. 6)

Popova and Rączaszek-Leonardi's (2020) idea is that the Husserlian concept of *lived experience* can serve as a general framework for understanding bodily experience within enactivism. They claim that, despite the fact that enactivism starts with the idea that our way of being in the world is primarily practical, the problem with this is that bodily experience cannot be understood solely in terms of practical goals but, as Sheets-Johnstone (1999, p. 212) claimed, should also be understood as an "ongoingness of primal kinetic liveliness." This will be the case for an attribution of agency in a particular case (a goal-directed task), but a prior level is necessary: this necessary level implies a more basic sense of agency and experience defined as a "bodily-given sense of agency" that includes both the *kinesthetic* experience of movement and a *sense* of control of one's own actions (Gallagher, 2012; Sheets-Johnstone, 1999). This is offered with the Husserlian idea of the lived body, which is "originally given in the awareness that I can move, although this awareness often remains implicit" (Popova & Rączaszek-Leonardi, 2020, p. 6). Thus, the most basic dimension of agency is the one that implies the awareness of our own bodies perceived as our own, with the movements they can perform and a sense of control at the same time (Gallagher, 2012; Sheets-Johnstone, 1999). All of this is included in the dimension of lived experience (summarized with the formula "I can move"), which works as a wider, more fundamental dimension of intelligibility from which we can then attribute agency and experience to particular bodies in particular goal-directed tasks (Husserl, 1989). In this sense, all kinds of goal-directed behaviors acquire their meaning as such only when they are understood from that dimension of lived experience.

According to the authors, the Husserlian notion of lived experience provides the rudiments for the way in which every movement and action of an organism should be understood. These authors invoke Husserl's commentators to clarify the idea of lived experience as including kinesthetics:

> Husserl is not referring to the physiological movements of the body (the physical range of movements of which the body is capable) but rather our first-person experiential sense of the

> moving of our eyes, tilting and turning the head, looking up or down and so on, especially in so far as these movements are *freely* undertaken. (Moran & Cohen, 2012, p. 181)

This is exactly the main idea of Sheets-Johnstone's (1999) criticism of Gibson and positive proposal of a kinesthetic approach to movement, whereas Popova and Rączaszek-Leonardi (2020) take the Husserlian concept of lived experience as the key aspect for articulating their proposal for explaining bodily experience. Gallagher (2012) and Gallagher and Zahavi (2008) heavily rely on these ideas to make sense of the body in phenomenological terms. In the Husserlian view, lived experience is *Erlebnis*, namely:

> the conscious state as personally lived through and experienced in the first person that includes all kinds of *cogitationes* [which are all kinds of mental states, such as sensations, feelings, beliefs, desires, etc.] that can be identified in the stream of consciousness. (Moran & Cohen, 2012, p. 195)

On this view, the lived body is the body as an organism (*Leib*), not the body as a piece of physical nature, which it is ultimately referred to as *Körper* by Husserl. The lived body is experienced as one's own, including the sense of control and the aforementioned "I can." In Husserl's phenomenology, the lived body is the center of sensations and actions, and it implies a first-person perspective, a living embodied *egoity* (*leibliche Ichlichkeit*). The concept of the lived body implies the idea that "I am always present to myself within my own sphere of experience" (Moran & Cohen, 2012, pp. 194–195) so it is the center of every sensation and the origin of every action: it structures sensations and triggers actions. As we can see, the notion of lived experience provides a general framework of self-ownership from which one can make sense of everything that happens to oneself, that egoity setting a sphere or scenario from which it is possible to make sense of all happenings from a first-person perspective. In this sense, particular bodily movements are not analyzed in isolation but are understood taking this egoity as a background in which such movements become pieces of a continuous stream of first-personal experiences.

Coming back to the problem, according to Sheets-Johnstone (1999) and to Popova and Rączaszek-Leonardi (2020), ecological psychology cannot account for the main aspects of lived experience as it is presented in Husserlian phenomenology. In ecological psychology, the concept of body:

> refers to the body as an object; its movements, specified by the optical flow, are considered in terms of coupling to the processes in the world, but the body as experiencing, lived one, the proprioceptive or kinaesthetic information of felt body motion (which does not have to be specified by optical flow) does not seem to be a discernible element of experience. (Popova & Rączaszek-Leonardi, 2020, p. 348)

Lacking all ingredients of the lived experience dimension, the ecological explanation only relies on the functional description of goal-directed actions. Their own depiction of the ecological approach invites the authors to conclude that the "Gibsonian understanding of the body, in other words, is not equivalent to the felt, bodily presence that dominates the Husserlian notion of lived experience" (p. 348).

The contrast with ecological psychology is fundamental according to these authors: ecological psychology lacks this lived experience dimension, so the goal-directed behaviors they analyze cannot be contextualized within a wider range of actions that include the awareness of the subjects' own bodies, the movements they can perform, and the sense of control. According to ecological psychology, the constant interaction with environmental aspects such as specific information cannot offer a suitable framework, as it cannot explain the aspects that lived experience provides (awareness, control, kinaesthetic information of self-body motion, and a perception of oneself as an agent that can do things by itself). For this reason, the Husserlian dimension of lived experience should be postulated as key for explaining bodily experience, according to the authors.

Steps towards an ecological naturalization of bodily experience

In this section, we shall oppose the pessimistic evaluation of ecological psychology when it comes to the possibility of explaining bodily experience in postcognitivist terms. We claim that ecological psychology's understanding of the body and perception–action satisfies most (if not all) aspects of the Husserlian notion of lived experience regarding its perceptual dimension (the ideas of kinesthetics, proprioception, etc.). Note that we are not claiming that Husserlian lived experience is already contained in ecological psychology's view on perception, or that lived experience is identical to perception–action processes as depicted in ecological psychology: what we state is that the alleged features of lived experience that authors such as Popova and Rączaszek-Leonardi (2020) claim that are exclusive of Husserlian phenomenology and are not present in ecological psychology are in fact describable in ecological terms.[4] We think that ecological psychology is a good candidate for such a naturalization task because: (a) it is an evidence-based approach with a vast corpus of experimental results, (b) it offers a theoretical and conceptual corpus with new ideas and concepts for redefining cognition in embodied and situated terms (such as the concept of affordance); (c) it does not simply apply mainstream methodologies (conceived from a cognitivist standpoint) as it develops its own resources, such as models and metrics, to delve into the details that other scientific methods have overlooked. So, in this section we explore the requirements for offering a naturalization of bodily experience from a postcognitivist approach through the lens of ecological psychology.

Ecological psychology, ecological information, and the body as Leib

Ecological psychology seems to overcome the traditional dichotomy between a reductive, third-person scientific account and a phenomenological first-person account of experience: it is well-equipped to naturalize bodily experience from a first-person perspective.[5] This means that ecological psychology can offer a scientific explanation of many of the features attributed to the lived experience of the agent, starting from the idea of understanding the body not as a *Körper* or object but as a *Leib*, as an animate body or organism. The aspects that have been typically applied to the notion of lived experience

and that allegedly are hard to be captured by a scientific account of perception and action have been largely analyzed in ecological psychology. This is because scientific approaches to the study of experiential and cognitive phenomena are traditionally third person, while ecological psychology developed a whole scientific and conceptual framework based on the organism–environment coalition that analyzes experience from a first-person perspective. This includes all aspects attributed to the concept of lived experience, such as awareness, control, and so forth. Perception is "a keeping-in-touch with the world, an experiencing of things rather than a having of experiences," as J. J. Gibson (1979/2015, p. 228) wrote. In this sense, all task-oriented experiments ran by ecological psychologists should be analyzed in light of the key aspects of lived experience: awareness, control, first-person perspective, the proprioceptive or kinaesthetic information of felt body motion. Once we fully understand how all these aspects are present in the ecological approach, they become discernible elements of experience that can be accounted for experimentally (this is, scientifically, in a naturalized way). As J. J. Gibson himself claimed when he described how we visually perceive:

> Information exists in a normal ambient array, therefore, to specify the nearness of the parts of the self to the point of observation—first the head, then the body, the limbs, and the extremities. *The experience of a central self in the head and a peripheral self in the body is not therefore a mysterious intuition or a philosophical abstraction but has a basis in optical information* [emphasis added]. (J. J. Gibson, 1979/2015, p. 107)

J. J. Gibson started to develop a scientific way of understanding vision in particular and perception in general from a first-person perspective. In this research program, the role of the body and motion are essential aspects to be considered. In this context, it is odd to observe claims such as the following: In the ecological approach, "the body as experiencing, lived one, the proprioceptive or kinaesthetic information of felt body motion (which does not have to be specified by optical flow) does not seem to be a discernible element of experience" (Popova & Rączaszek-Leonardi, 2020, p. 348). Quite on the contrary, ecological psychology includes proprioceptive and kinaesthetic information of felt body motion from a first-person perspective from the very beginning of the approach. Historically, J. J. Gibson reformulated the dominant passive view of the senses by including the role of action in them, and categorized them as perceptual systems, including also proprioceptive information. J. J. Gibson (1966, 1979/2015) rejected subpersonal (reductive, mechanistic) and passive explanations to perception–action and started from the active, animate organism for making sense of experience. This means that he had to reformulate the senses as perceptual systems at an organismal level and in an active way (including not only the nervous system but also different postures, orientations, movements, etc.). This new definition of the senses as perceptual systems rejected the traditional division of the five sensory modalities as passive receptors of stimuli and opened up to new ways of understanding perception.

The concept of perceptual systems includes not only the nervous pathways leading up to perceptual experiences but also exploratory strategies, orientations, postures, and so forth (for example, the basic orienting system, the auditory system, the haptic system, the visual system, etc.). All these systems included bodily equipment and movement. For

example, the basic orienting system is the result of how the vestibular apparatus interlocks with different organs and perceptual systems as well as how the body has to overcome the force of gravity to keep a posture that allows the organism to navigate the environment through locomotion (J. J. Gibson, 1966). According to this idea, subjects enjoy exploratory orientations towards informational sources: the organism exercises the auditory system, thanks to different postures and orientations, and performs exploratory orientations towards the sources of sound (the same goes for the exploratory orientations towards sources of light through the visual system). Locomotion is the result of putting the orienting system into action. In this sense, perceptual systems are a compound of nervous pathways with different bodily aspects of the organism, and are also engaged with environmental aspects such as forces, fluxes, or energy arrays. This way of understanding perception as based on the active information pickup of the whole organism through different orientations depending on informational sources was clearly innovative at the time, as was the idea of ecological or perceptual information.

J. J. Gibson also showed how all activity and perception of the organism was structured at an organismal level to perceive the affordances of the environment by considering proprioceptive and kinaesthetic information. The ecological program for working on different perceptual systems was carried out in the following years. For example, Stoffregen and Bardy (2001) offer a systematized criticism against the traditional classification of the five senses and a vindication of the Gibsonian account of perceptual systems. They also developed J. J. Gibson's original ideas: they postulate the existence of a global array of information, which are higher order relations between different energy arrays. In this sense, while J. J. Gibson himself and several ecological psychologists claimed that there are different energy arrays, Stoffregen and Bardy (2001) claim that we do not encounter individual energy arrays per se but we are also in contact with these other relations established among different energy arrays. This shows the fruitfulness and explanatory richness of the ecological framework, as well as the idea that ecological psychology is a dynamic, ongoing approach that evolves through time and that is constantly polishing itself both conceptually and empirically.

One of the main problems with the pessimistic evaluation of ecological psychology in the debate has to do with the inaccurate depictions of ecological psychology that the defenders of this type of assessments defend. Take the following case. Popova and Rączaszek-Leonardi (2020) claim that, in the ecological approach, "the body":

> [r]efers to the body as an object; its movements, specified by the optical flow, are considered in terms of coupling to the processes in the world, but the body as experiencing, lived one, the proprioceptive or kinaesthetic information of felt body motion (which does not have to be specified by optical flow) does not seem to be a discernible element of experience. (p. 348)

This quotation does not present an accurate description of ecological psychology, as J. J. Gibson included as central kinesthetics, proprioception, and self-body motion, as well as some other aspects of lived experience (first-person perspective, control, embodiment, etc.). There is a clear conflict between how J. J. Gibson's account is depicted by Popova and Rączaszek-Leonardi and how J. J. Gibson originally explained his ecological approach. First, he claimed that "[t]he optical flow of the ambient array is almost

never perceived as motion; it is simply experienced as kinesthesis, that is, egolocomotion" (J. J. Gibson, 1979/2015, p. 115). In this simple quotation we have three key elements that are allegedly missed from the ecological approach: the first-person perspective, kinesthetics, and body motion, which proves that vision is not purely exteroceptive within the ecological approach. This is because, contrary to what we can read from Popova and Rączaszek-Leonardi, kinaesthetics and proprioception play a central role in the ecological account of perception.

An ecological understanding of key aspects of lived experience: Kinesthetics and proprioception

Let us start with kinaesthetics. J. J. Gibson defines vision as a kinaesthetic process of the whole body, as it registers different kinds of movement of the body, relating for example muscular and visual kinesthesis. In this sense, the criticism raised by Popova and Rączaszek-Leonardi by which in the ecological approach to perception there is no felt motion involved and that it merely pertains to coupling with external information is inaccurate. This quotation illustrates how central kinaesthesis is in the ecological approach to visual perception:

> I suggested that vision is kinesthetic in that it registers movements of the body just as much as does the muscle-joint-skin system and the inner ear system. Vision picks up both movements of the whole body relative to the ground and movement of a member of the body relative to the whole. Visual kinesthesis goes along with muscular kinesthesis. The doctrine that vision is exteroceptive, that it obtains "external" information only, is simply false. Vision obtains information about both the environment and the self. In fact, all the senses do so when they are considered as perceptual systems. (J. J. Gibson, 1979/2015, p. 175)

The way in which the organism or agent visually experiences its own body along with the environment is a key aspect within the ecological approach. In fact, J. J. Gibson emphasizes the dimensions and constitution of the body as much as the role of the environment and the role of action in visual perception. It is because of our bodily constitution, our action, and the information available in the environment that we perceive the way we do. Here we can see how J. J. Gibson combined all these aspects for his kinesthetic approach to vision from a first-person perspective:

> An observer perceives the position of here relative to the environment and also [their] body as being here. [Their] limbs protrude into the field of view, and even [their] nose is a sort of protuberance into the field. . . . Since the occupied point of observation is normally a moving position, not a stationary one, the animal sees its body moving relative to the ground. It sees that part of the environment toward which it is moving; it sees the movements of its feet, relative to its body and also over the ground. When it looks around during locomotion, it sees the turning of its head. These are all cases of visual kinesthesis. (J. J. Gibson, 1979/2015, pp. 197–198)

As we can see, J. J. Gibson advanced key notions of situatedness and embodiment even before the terms were coined by emphasizing the centrality of body dimensions, body motions, and first-person perspective on his account of visual perception. But the

Gibsonian account does not merely apply to vision, as we have seen previously. J. J. Gibson (1966) stressed the multifaceted view of the sense of touch (which was until then mostly conceived as passive cutaneous sensitivity in the field of psychology) to include kinaesthetics, leading to haptics and to the birth of the discipline known as dynamic touch, one of the key research areas in ecological psychology (Turvey, 1996). Recently, some ecological psychologists proposed that dynamic touch satisfies most of the key requirements of the enactive approach (Travieso et al., 2020). It is surprising for ecologically oriented researchers that Popova and Rączaszek-Leonardi (2020) use this quotation to illustrate the aspects that are allegedly lacking in the ecological framework and how they are key in the Husserlian approach:

> Husserl is not referring to the physiological movements of the body (the physical range of movements of which the body is capable) but rather our first-person experiential sense of the moving of our eyes, tilting and turning the head, looking up or down and so on, especially in so far as these movements are *freely* undertaken. (Moran & Cohen, 2012, p. 181)

This quotation is surprising because ecological psychology focuses on the first-person perspective and the appeal to physiology is only understood as part of an integrated explanation of the behavior of organisms. This account precisely studies the first-person freely undertaken activity that leads to perceiving the environment in order to keep acting, just what Sheets-Johnstone (1999) demands. In fact, J. J. Gibson (1979/2015) aimed to analyze how we perceive according to this exploratory, freely undertaken movement. Thus, he proposed to include kinesthesis in perception, which inevitably leads to the inclusion of proprioception along with action in the way we perceive (J. J. Gibson, 1979/2015). In this sense, J. J. Gibson offered a unitary, integrated framework for explaining experience that included free action and proprioception, and all this serves to make sense of the so-called lived experience in naturalistic terms. Hence, we conclude that Sheets-Johnstone's (1999) accusations against the Gibsonian view on movement, leading her to propose an "ongoingness of primal kinetic *liveliness* [emphasis added]" (p. 212), are unfounded, because this is what Gibson precisely offered. Take, for example, the following quotation:

> Information about the self accompanies information about the environment, and the two are inseparable. Egoreception accompanies exteroception, like the other side of a coin. Perception has two poles, the subjective and the objective, and information is available to specify both. One perceives the environment and coperceives oneself. (J. J. Gibson, 1979/2015, p. 116)

The idea that "one perceives the environment and coperceives oneself" at the same time implies the centrality of kinaesthetics, proprioception, and awareness of oneself in the explanation of experience within ecological psychology. It shows how kinaesthetics is tightly related to proprioception and exoreception in a similar way as when Popova and Rączaszek-Leonardi (2020) define lived experience as "the proprioceptive or kinaesthetic information of felt body motion" (p. 348). This perspective is applied to the kinds of movements described before in the quotation by Moran and Cohen (2012) that are part of the exploratory strategies for perceiving, and all of this is scientifically explained from a first-person perspective in the ecological approach. For this reason, the ecological

approach includes this implicit awareness of one's body and of its motility expressed with the "I can" that defines the Husserlian concept of lived experience, but in a naturalistic, scientific way.

An ecological understanding of key aspects of lived experience: Awareness

Another key aspect of lived experience along with kinesthetics and proprioception is awareness. J. J. Gibson emphasized awareness in his view, and it remains as central as the rest of the aspects that were mentioned before and that all together conform lived experience. Other authors, such as Reed (1996), also emphasized this view when developing ecological psychology and applying it to the life sciences. According to the ecological approach, perception is awareness: the kind of awareness that is first-personal, bodily, and active. The bodily experience includes the picking up of ecological information as well as the awareness of the organism's own body and the world:

> The visual world is the outcome of the picking up of invariant information in an ambient optic array by an exploring visual system, and the awareness of the observer's own body in the world is a part of the experience. The awareness of "out there" and of "here" are complementary. (J. J. Gibson, 1979/2015, p. 197)

Awareness of the organism's own body and the environment leads to the control of bodily action, another essential ingredient of lived experience. Ecological psychology also includes the sense of control of the agent's own action, which is exerted in the active engagement with the environment. Control for an ecological approach is not understood as something that has to do with motor programs, commands from the nervous systems, and so on. No reductive, brain-centered, or mechanistic explanation is involved here: control is explained in the engagement of organism and environment. There is plenty of empirical evidence and conceptual analysis on the study of control within the ecological approach (J. J. Gibson, 1979/2015; Lee, 2009; Lee & Aronson, 1974; Lee & Reddish, 1981; Turvey, 1992). The prospective control of action is analyzed in the ecological approach from the engagement of the organism with environmental factors, but without losing the first-person perspective and awareness mentioned before. J. J. Gibson (1979/2015, p. 213) claimed that "the theory of affordances implies that to see things is to see how to get among them and what to do or not to do with them," and that implies that awareness and the "I can" from which every particular action is made sense. Prospective control is essential to psychology, and it was considered as a "hallmark of behavior" for the cofounder of ecological psychology, E. J. Gibson (1994).

An ecological understanding of key aspects of lived experience: Lived bodiliness

This ecological way of understanding experience as active, first-personal, embodied, and situated is quite similar to the concept of lived bodiliness in Husserlian phenomenology: "Lived bodiliness is Husserl's term for the first-person human experience of being embodied in a way that one experiences oneself as 'governing' or 'holding' sway in a body with feelings of willful self-movement" (Moran & Cohen, 2012, p. 193). This way

of understanding bodily experience, as including live bodiliness and lived experience, is nevertheless achieved in purely naturalistic terms within the ecological approach, as we have seen.

The relation between phenomenology and ecological psychology is quite complex, as they have ideas and perspectives in common but seem to diverge in key commitments. Ecological psychology accepts the criticism against the reductive and mechanistic approach to psychology proposed by Husserlian phenomenology, but it also rejected phenomenology as a "methodology of interpretation" fully detached from nature and science. However, as we can see, there are similarities in the notions of lived experience and lived bodiliness between phenomenology and ecological psychology. The difference is that, at that time (before the development of neurophenomenology and phenomenological cognitive science), ecological psychology aimed to explain first-person bodily experience from a naturalistic perspective: the body in ecological psychology is not an object, not a *Körper*, but a naturalized *Leib*. As Reed (1996) claimed:

> Ecological psychology thus accepts the critique of causal psychological explanations begun by Brentano and the act psychologists and carried forward by some of the phenomenologists. But ecological psychology emphatically rejects the assumption, also basic to that tradition, that agency cannot be understood scientifically and can be rationalized only by the methodologies of interpretation. Ecological psychology rejects the causal reductionism of other scientific psychologies but without rejecting their emphasis on experiment and empirical explanation. The goal of ecological psychology is to explain agency scientifically, not to explain it away or to simply offer a discourse about it. (p. 19)

Since ecological psychologists have primarily focused on perceptual systems, a fully fledged account of agency remains underdeveloped. This paper examines bodily experience as a key component of agency, though agency also encompasses aspects such as language and social normativity. We conclude that, under the light of what we have seen, it is only a matter of time before the postcognitivist community benefits from a systematic ecological account of agency.

In sum, Popova and Rączaszek-Leonardi (2020) claimed that "the body as experiencing, lived one, the proprioceptive or kinaesthetic information of felt body motion (which does not have to be specified by optical flow) does not seem to be a discernible element of experience" (p. 348) in the ecological approach. After carefully analyzing the evidence from the ecological literature and showing that it includes all aspects that were allegedly neglected (awareness, control, proprioception, kinaesthetics, etc.), we can conclude that the ecological approach includes all these aspects, and it is in a suitable position to naturalize bodily experience from an embodied and situated approach.

The promise of an ecological naturalization of lived experience

We have said before that ecological psychology is a naturalistic, embodied, situated, nonrepresentational approach to perception and experience from a first-person perspective with its own scientific research framework for gathering experimental evidence. In this sense, ecological psychology built not only a new ontology and epistemology of mind (including direct perception, affordances, ecological information, direct learning, etc.) but also a new science for the mind with its own models and metrics.

Ecological psychology analyzes cognition starting from the organism as interacting with its environment. Thus, the main unit of analysis is the organism–environment system, and the psychological processes to be analyzed is the action–perception loop that emerges from the history of interactions between the organism and the environment. The loop is established thanks to affordances and ecological information: if perception is information detection, then we directly perceive the affordances of the environment through active exploration, which allows us to keep exploring the environment: perception is tied to action and is for action. But none of this would be useful without a methodological framework to operationalize this, a framework that includes models and metrics. For example, Warren's (1984) study on the affordance of climbability developed a kind of metrics that is applied to every agent in order to explain the perception of the possibility to climb a step. Warren concluded that an agent perceives as climbable a step that is less than 0.88 times the height of their leg. Instead of using neutral metrics such as centimeters or inches, Warren used an agent-related or body-scaled metric, something that applies to every agent and is useful then to apply to every human being from a first-person perspective. Also, Warren and collaborators developed some other models for steering and locomotion (Fajen & Warren, 2003) and passing-through apertures (Warren & Whang, 1987), also making use of agent-related metrics. Some other authors developed their own models within the ecological approach as well.

The combination of a new epistemology and ontology with a methodological framework with its own models and metrics sets the foundation for establishing an experimental framework for naturalizing bodily experience in the future. If we consider that the key aspects of lived experience mentioned in this section can be operationalized experimentally in ecological terms, we have enough resources within the ecological framework for analyzing bodily experience through the aforementioned perspective of direct learning. In this view, bodily experience can be accounted for in naturalistic terms through the different curves in perceptual learning that lead to the establishment of different bodily abilities, including all aspects covered in the ecological approach (control, awareness, proprioception, etc.).

Concluding remarks

In this paper, we have demonstrated that ecological psychology can account for key elements traditionally associated with Husserlian lived experience, including awareness, proprioception, kinesthetics, and a first-person perspective on bodily action. Our analysis highlights that ecological psychology not only acknowledges these aspects but also offers a naturalistic framework for their study, opening the possibility of integrating them into experimental designs and empirical research. By providing a systematic account of these dimensions, ecological psychology presents itself as a promising approach for understanding lived experience scientifically without relying on transcendental phenomenology.

Contrary to certain interpretations, we have shown that ecological psychology does not reduce the body to a mere object of study (*Körper*). Instead, it considers the body as a lived, active entity (*Leib*), continuously engaged in meaningful interactions with its environment. This perspective aligns with the Husserlian notion of lived experience while maintaining the advantage of a naturalistic, empirically testable framework. As a

result, ecological psychology provides a scientifically grounded alternative for exploring bodily experience, bridging phenomenological insights with contemporary cognitive science.

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Notes

1. Postcognitivism should not be confused with the so-called 4E cognition view (acronym for embodied, embedded, enactive, and extended; see Newen et al., 2018), although they seem to share a number of philosophical commitments. Take the following case: Two prominent expressions of the 4E approach are the *enactive approach* and the *extended mind approach*. The latter, proposed by Clark and Chalmers (1998), argues that parts of the body and environment can constitute mental states by fulfilling functional roles typically associated with the brain. This perspective, known as active externalism, emphasizes the role of active processes in shaping mental states. However, despite rejecting a brain-centered notion of the mind, it retains core aspects of traditional cognitivism, such as functionalism, representationalism, and computationalism. Categorized as weakly embodied and situated by Newen et al. (2018), this approach holds that mental states depend on causal structures rather than specific material bases. Thus, bodily and environmental contributions are seen as replaceable and not essential for shaping mental states. Contrasting, the *enactive approach* rejects functionalism, computationalism, and representationalism, offering a new view of cognition as based on sensorimotor regularities (the scientific, lawful connections between action and sensory inputs). With this, the enactive approach emphasizes the concept of agency from a strong embodied view (Gallagher, 2017). As a result, 4E cognition is a label that includes approaches that make use of either information processing or evidence-based sensorimotor contingencies to make sense of what cognition is from an active and nonneurocentric perspective (Clark, 2000; Stewart et al., 2010). In this sense, enactivism and the extended mind approach share their emphasis on embodiment and situatedness, but they are not on the same page regarding representationalism and cognitivism so the 4E label might not be always informative. In what follows, we will include enactivism within the postcognitivism approach, since it rejects representationalism, computationalism, and functionalism.

2. It is important to note that, unlike later thinkers like Heidegger or Merleau-Ponty, Husserl initially treats *Erlebnis* as something that can be bracketed and analyzed in its pure, intentional structure. However, in his later work (e.g., *Crisis of the European Sciences*), Husserl (1970) begins to incorporate a more historical and intersubjective understanding of experience, particularly in relation to the *Lifeworld* (*Lebenswelt*).
3. In their paper, Popova and Rączaszek-Leonardi (2020) try to establish a deep integration between enaction and ecological psychology, and to do that they start by pointing out the differences. Among the differences that they underline, they introduce this divergence between different ways of understanding action and bodily experience in enaction and in ecological psychology. They link enaction to phenomenology and claim that bodily experience is much more integrated in the organism via the notion of lived experience, something that ecological psychology lacks because it is an experimental approach with no appeal to a phenomenological framework. We are making extensive use of their point to illustrate our positive story of how ecological psychology can explain bodily experience which is, we think, by naturalizing in ecological terms some of the key aspects that Popova and Rączaszek-Leonardi claim are exclusive of Husserlian lived experience. We acknowledge that the general project of the authors in their original paper (an attempt to make compatible the frameworks of enaction and ecological psychology) exceeds the point that we want to make in this publication. We are thankful to an anonymous reviewer for inviting us to make this point explicit.
4. For an author who defends a stronger connection between Husserlian phenomenology and ecological psychology, see Werner (2016).
5. It is important to say that ecological psychology is not the only approach whose project is to naturalize experience from a first-person perspective. Along with enactivism, phenomenological cognitive science (Gallagher & Zahavi, 2008; Käufer & Chemero, 2015) and neurophenomenology (Varela, 1996) are examples of this research program within the phenomenological tradition.

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