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The risk of trivializing affordances: mental and cognitive affordances examined

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ABSTRACT

In the last years, we have attended to different attempts to extend the notion of affordance to include mental or cognitive actions. In short, the idea is that our capacity to perform some cognitive functions such as counting, imagining, mathematical reasoning, and so on, is preceded by our awareness of cognitive or mental affordances. In this paper, we analyze two of these attempts, Mental Affordance Hypothesis, and cognitive horizons, and conclude that they fail to deliver their promise. Our argument is two-fold. First, we show that both proposals lack an explanation for how these affordances can be perceived or experienced by the individuals. Second, we argue, focusing on the examples provided by the authors, that the introduction of cognitive affordances is not justified on explanatory grounds. In other words, neither of these proposals offers a compelling justification for thinking that performing said "mental acts" requires the perception of mental or cognitive affordances. Hence, the existence of mental or cognitive affordances remains both scientifically mysterious and explanatorily unjustified.

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1. Introduction

The concept of affordance stems from the functionalist approach to psychology defended, among others, by William James and John Dewey (Heft, 2001; Heras-Escribano, 2019; Lobo et al., 2018, Heras-Escribano et al., 2022). In essence, early functionalists stressed the mutuality or reciprocity of organism and environment, rejected the mind-body dualism, and defended that cognitive processes, like any other biological process, had a function in adapting a species to its environment.[1] Echoing this trend, the notion of affordance captures the idea that acting appropriately in an environmental setting requires perceiving "what [the environment] *offers*

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to the animal, what it *provides* or *furnishes*, either good or ill" (Gibson, 1979 [2015], p. 119, emphasis original).

As conceived by J. J. Gibson, the affordances are the opportunities for bodily action a situation offers to an animal. These affordances are not "objective" properties of the world, nor are they subjectively imposed by the observer. Instead, they imply a complementarity of perceiver and environment:

> An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer. (Gibson, 1979 [2015], p. 121)

For instance, whether an object is graspable depends on whether the object's size bears an appropriate relation to the perceiver's hands. It follows from this idea that an object that is graspable for a human being will not be so for a cat, as the cat does not have opposable thumbs. Similarly, a step is climbable for an individual if there is an appropriate relationship between the step's height and the length of her legs. Affordances exist because of complementary relations between an individual's body and some property of the environment. However, for an affordance to guide the individual's actions it must be perceived. The perception of an affordance requires that the individual "detects" or pays attention to the information that is specific to the affordance.

Since its inception in the ecological literature, the idea of affordance has caught the attention of different thinkers in different fields of study, such as philosophy, robotics, design, architecture, art, or sports science, and the interest of 4E cognitive scientists and philosophers in affordances has been increasing over time. Moreover, some authors have claimed that affordances offer great promise for scaling up the perception-action processes to what has been defined as "higher" cognitive processes, like reasoning, language, or abstract thinking. Echoing this view, many authors propose expanding affordances to other areas beyond perception and bodily action, including, for instance, the existence of mental (McClelland, 2020) or cognitive affordances (Jorba, 2020), affective affordances (Krueger & Colombetti, 2018), speech affordances (Ayala, 2016; Almagro Holgado, 2019), or musical affordances (Krueger, 2014). In this paper, we will focus on analyzing the expansion of affordances to mental (McClelland, 2020) and cognitive (Jorba, 2020) actions.

In section 2, we examine the Mental Affordance Hypothesis (MAH) proposed by McClelland (2020). The Mental Affordance Hypothesis (MAH) is the view that we perceive mental affordances in the same way as we perceive bodily affordances. It is claimed that the perception of such mental affordances makes it possible that we entertain particular mental

actions, such as imagining, counting, or attending. We argue that this hypothesis does not hold. We do so by focusing on one of the necessary conditions proposed for it: The *PERCEPTUAL REQUIREMENT*. We analyze this requirement by offering two different interpretations of it. According to the ecological interpretation, we perceive mental affordances directly by detecting information that specifies them. According to the non-ecological interpretation, mental affordances are perceptually inferred from ambiguous sensory cues. As we will show, McClelland's argument does not meet the requirement for any possible interpretation, as he does not explain how mental affordances can be perceived, either directly or indirectly. Moreover, we argue that McClelland does not offer a compelling justification for thinking that performing said "mental acts" requires the perception of mental affordances. In section 3, we turn to Jorba's notion of cognitive affordances (Jorba, 2020). Jorba introduces cognitive affordances in the context of Husserlian intentional horizons, and her proposal differs from McClelland's in that it does not imply that cognitive affordances are perceived. We nonetheless diagnose similar issues in her view and thus conclude that it does not hold either. Our analysis of these proposals ends with the same conclusion: the introduction of mental and cognitive affordances is both scientifically mysterious and explanatorily unjustified.

To wrap up the paper, section 4 reflects on the importance of affordances for perceptual and psychological science and the risks of trivializing them. Our main claim is that without a proper account of (i) how mental affordances are perceived (or else experienced), and (ii) how the perception of mental affordances helps explain our ability to count, imagine, or engage in mathematical reasoning, the postulation of mental affordances is unjustified. Crucially, affordances are not mere opportunities to do something, but opportunities that are specified by some perceptual information that the observer can detect and use. If we want to avoid diluting the concept of affordance, giving up its explanatory power, we must be careful of using it in its technical, scientific sense. The current attempts to defend the idea of mental or cognitive affordances miss this key point and contribute to trivializing the notion.

2. The mental affordance hypothesis

Traditionally, affordances have been studied in relation to motor behavior. McClelland (2020), however, proposes to extend the notion to the study of what he calls "mental actions" as opposed to "bodily actions." As he puts it:

> An object or scenario x affords the mental act of Φ-*ing* to a subject S if and only if x presents an opportunity for S to perform a mental act of Φ-*ing*. *MAH is the*

> *hypothesis that we are sensitive to mental affordances in the same way as we are sensitive to bodily affordances.* (p. 412, emphasis added)

In elaborating his Mental Affordance Hypothesis (MAH), McClelland proposes three candidates for mental affordances: attending, counting objects, and imagining possible scenarios. Let's briefly examine each one.

To begin with, consider a situation where, while you are working on a paper, the dishwasher starts beeping because the program has finished. You identify the alarm sound and know it is not something you need to deal with at this precise moment, but you find the sound distracting. Still, you manage to keep your focal attention directed to your writing. Of course, this does not mean that you don't hear the sound anymore, but you attend to it only peripherally while focusing on the document that is open on your computer. For McClelland, the beeping sound can be conceived of as affording the mental act of focally attending to it. The beeping sound, he claims, is perceived as "attendable": "we are sensitive to at least one kind of mental affordance, viz. affordances to attend" (p. 417). For him, the mental act of controlling our focal attention is possible because we perceive the objects and events of our surroundings as affording attention.

Now, think of what happens if you are traversing a series of stepping stones across a river and the distribution of stones changes at some point, making it difficult for you to decide which stone to step on next. In such a situation, McClelland argues, you will pause and rehearse in your imagination different possible routes. According to him, the key is that both the physical and imaginary walking are to be described in terms of affordance perception: "The situation you find yourself for the easy stones each afford certain bodily acts. In contrast, the situation you find yourself in when you reach the tricky stretch affords the *mental* act of rehearsing your leap in imagination. This tricky situation presents you with an opportunity to exercise a certain mental capacity" (p. 418). So, according to McClelland, the fact that there is not an obvious or "easy" stone where you can step changes your perception of the situation: You no longer perceive the possibility of stepping on a particular stone, but, instead, the possibility of mentally rehearsing different routes.

To finish up, McClelland asks us to consider "counting affordances" (p. 419–421). Imagine a jar full of marbles. McClelland hypothesizes that counting the marbles is possible because we perceive the possibility of counting them. Moreover, he argues that if this hypothesis is plausible, we should consider the possibility that we are sensitive to other, more abstract, arithmetical operations too.

Importantly, McClelland is clear that:

> MAH is true if and only if there are affordances to perform a mental act Φ such that:
>
> *PERCEPTUAL REQUIREMENT*: *S* perceives *x* as mentally affording Φ-*ing*, and;
>
> *POTENTIATION REQUIREMENT*: *S* perceiving *x* as mentally affording Φ-*ing* potentiates *S* Φ-*ing*. (p. 412)

Here we will focus on the *PERCEPTUAL REQUIREMENT* (*PeR*). Our aim is to show that McClelland's argument for MAH does not meet this requirement. This is so for two reasons: First, unlike what happens with bodily affordances, there is no explanation for how mental affordances can be perceived. Second, there is no reason to think that our capacity to perform "mental acts" requires the existence and perception of mental affordances. Crucially, since both requirements are taken to be individually necessary and jointly sufficient for MAH, showing that the *PeR* does not hold is enough to problematize MAH.

The first condition to analyze the *PeR* is to clarify what McClelland means when he says that "we are sensitive to mental affordances in the same way as we are sensitive to bodily affordances" (p. 412). In what follows, we offer two alternatives to make sense of this requirement. The first option is based on the ecological theory of perception (the theoretical framework where the notion of affordance originated) and implies that affordances are perceived directly (i.e., without mediating inferences). The second option is non-ecological and appeals to the notions of mental representation and inference to explain our sensitivity to affordances. We argue that McClelland fails to meet the *PeR* because he offers no explanation for how mental affordances can be perceived, neither in the ecological nor in the cognitivist paradigm. Hence, we conclude that MAH is ungrounded.

2.1. The ecological reading of MAH

As we saw previously, the notion of affordance was first coined as part of the ecological theory of perception (Gibson, 1966; 1979 [2015]). The concept tries to explain how animals can behave adaptively by perceiving what they can do in the environment. For instance, an agent intending to cross a river must be sure that the stone she is planning to step on affords support, otherwise she may fall into the water. In so far as the agent can, perhaps with the adequate training, perceive whether a stone affords support, she can control her bodily actions on the basis of her perception.

In essence, this is the core idea behind the notion of affordance. The important question, however, is *how* affordances are perceived, and we think that it is there where the real innovation of ecological psychology comes (Raja, 2019; Segundo-Ortin et al., 2019; Warren, 2021). The truly revolutionary idea that Gibson's ecological psychology introduced was that

affordances are perceived directly – namely, that we can explain how an agent can be aware of these possibilities for action without assuming that she engages in any sort of inference, and without invoking mediating entities such as mental representations.

To make sense of this possibility, Gibson introduced the idea of perceptual information. Crucially, whereas psychologists traditionally assumed that perceptual activity started with ambiguous stimuli (i.e., retinal images), Gibsonians hold that perception begins with the detection of information available in the ambient energy array. An example of such perceptual information is the ambient optic array that emerges as the light bounces off the surfaces of the objects that furnish a room. This bouncing light gives rise to a heterogeneous pattern of light in the room. The key point is that since this ambient optic array is lawfully created by the layout of the objects, the properties of the former univocally relate to the latter. This univocal relation, sometimes referred to as "specification" or "specificity," implies that the properties of the ambient array provide non-ambiguous information about the objects and their affordances. Hence, direct or non-mediated perception of the environment is possible: We don't need to perform any extra inferential process to disambiguate perceptual information because this information is non-ambiguous in the first place.[2] We can be aware of the objects' affordances by focusing our attention on specific aspects of the ambient optic array.

Consequently, the major part of the empirical work in ecological psychology is dedicated to identifying and describing the informational variables that make possible the direct perception of affordances.[3] Hence, if we aim to make sense of the *PeR* from the point of view of ecological psychology, we must ask whether there is perceptual information for the direct perception of mental affordances.

To answer this question, we propose to examine the examples provided by McClelland. Let us begin with imagination. Recall that, for McClelland, the change in the affordances we perceive is motivated by a change in the surroundings, viz., the distribution of the stones gets more irregular, forcing us to stretch our leaps. In this scenario, he claims, we no longer perceive the possibility of stepping on a particular stone, but the possibility of imagining possible routes. The problem with this proposal is that he does not explain how this latter perception is possible. When we pay attention to the detail of his hypothesis, we find no account for the information that makes the perception of this mental affordance possible.

Consider the situation again. If you stand on a stone and look around, the information you detect (in this case, the distance to the next stone in relation to the amplitude of your stride) specifies a bodily affordance (where a particular stone affords *step-on-ability* or not) but not a mental affordance. To repeat: for a mental affordance to exist and be perceived,

there must be information that we can detect. However, because McClelland does not offer a description of this information that makes the perception of the imagining affordance possible, we must conclude that the *PeR*, understood ecologically, is not met in this case. The lack of an account for the information that makes the perception of this mental affordance possible renders MAH unacceptably mysterious.

Further still, we do not find adequate reasons for thinking that the perception of mental affordances is needed to explain imagination (see van Dijk & Rietveld, 2020). Even though we agree that we may respond to a situation where it is unclear what stone offers a better chance to step on by mentally rehearsing different routes, it does not follow that the act of mentally rehearsing possible actions should be preceded by the perception of an affordance to imagine these actions. Rather, we claim that it is the opposite: it is because we do not perceive a clear bodily affordance while we are acting that we may stop and imagine alternative options, using our perception of different bodily affordances (in this case, the perception of different stones that afford stepping on them) for that end. In other words, it is because we perceive the possibility of stepping on different rocks that we can imagine how it would be to step on them, but nothing of this requires that we perceive the possibility of imagining such routes as well. Postulating the existence of yet another affordance (the affordance of imagining) is not needed to explain the situation.[4]

The same reasoning holds for counting and attending. What we perceive when we see a jar of marbles is a collection of detached objects. As detached objects, they afford to be grasped, and they can be separated from the others. Now, this bodily affordance is helpful if we want to count them – it is useful to separate the objects so we can perceive all of them individually – but, as in the previous case, what we are doing is using a bodily affordance to carry out the activity of counting, not perceiving a separate mental affordance. Similarly, the dishwasher's alarm indicates that it has finished and that I should take the plates off. Of course, I can decide whether to stop working for a moment and go to the kitchen to take care of it or ignore the alarm, but this does not imply or require that I perceive the beeping noise as *attendable*.

In sum, we have reached two conclusions in this section. First, we have shown that McClelland fails to meet the *PeR* because he does not explain how mental affordances are perceived in an ecologically appropriate way. Second, we have shown that the hypothesis that there are mental affordances is unnecessary, as we can make sense of the cognitive functions that McClelland targets without them. We conclude that the MAH is both scientifically ungrounded and explanatorily misplaced from the point of view of ecological psychology. While we have reasons to think that bodily affordances exist and can be perceived – thanks to the existence of perceptual information that informs, in a non-ambiguous way, about a functional

complementarity between a perceiver's bodily feature and a property of the environment – we have no reasons to think the same about mental affordances. Moreover, as we have shown, the assumption that there are mental affordances is not needed to explain how subjects entertain the kind of cognitive functions McClelland talks about.

2.2. A representational take of MAH

In the previous section, we have shown that the MAH does not hold if we analyze it from the point of view of ecological psychology. There is an alternative possibility, nonetheless. McClelland suggests this alternative view when he claims that

> we should understand affordance perception in a way that is consistent with: a representational view of affordance perception (Siegel 2014); affordance perception requiring internal processes that disambiguate ambiguous sensory inputs (Christensen and Bicknell 2019); and ordinary perceptual awareness being characterised not just by affordances but by objects and qualities (Nanay 2010). (p. 406)

Insofar as McClelland thinks that affordance perception needs to be understood in representational and inferential terms, his proposal is not ecological. Thus, the question becomes: Does MAH fare better if we understand perception this way?

As before, we want to pay close attention to the examples McClelland uses to build his argument. According to him, if the arrangement of the rocks changes, we no longer perceive the possibility of stepping on a particular rock but start imagining possible routes. This act of imagination, according to him, is preceded by the indirect perception of an affordance for carrying out such imagination. Yet, again, we see no explanation for how this is possible. McClelland hypothesizes that mental actions are preceded by the perception of mental affordances, just as bodily actions are preceded by the perception of bodily affordances, but he does not explain how this perceptual inference works. Crucially, there is not *one* single unified explanation of how we perceive affordances indirectly in the literature, but different proposals, and McClelland offers neither an original account nor an argument for one of the already existing views. Hence, we hold that the *PeR* is not met either for the case of non-ecological perception, for we are not explained how mental affordances are perceptually inferred and represented.

But why do we need MAH in the first place? What do we gain, explanatorily speaking, from assuming that the perception of mental affordances precedes mental actions? We think that this question is pertinent, for it shows that MAH is not justified even if we adopt a representational approach to cognition. It is plausible that if the situation becomes too

complicated for the agent to infer the possibility of stepping on a particular stone perceptually, she will stop and mentally rehearse different options. To be clear, we agree that the impossibility of perceiving an explicit bodily affordance for stepping on the following stone quite possibly motivates the agent to rehearse viable routes mentally. Yet nothing in this story requires that we introduce another perceptual process to explain her capacity to imagine. As we see it, to the problem of explaining imagination itself, McClelland is adding another problem: the problem of explaining how we perceptually infer the possibility of imagining. However, we think this problem can be avoided once we notice that we don't gain anything from assuming that, to imagine something, we first have to perceive the possibility of imagining such a thing. Thus, it is not only that McClelland's hypothesis does not help us advance in our understanding of imagination; rather, his proposal comes at the heavy price of having to explain how agents infer the possibility of imagining something before they can imagine it.

To conclude this section, we hold that MAH is not necessarily vindicated if we adopt an approach to perception as indirect and representation-based. Besides, we believe that this hypothesis introduces unnecessary explanatory loans, as it forces us to account for how agents infer the opportunity to attend, imagine, or count before they can perform such actions.

2.3. Examining the empirical evidence in favor of MAH

The reader can argue that, even if it is unclear what explanatory benefit we gain from postulating MAH, we should take this hypothesis seriously if the empirical evidence supports it. We focus on this potential objection now.

It is fair to say that since MAH is a recent proposal, it is understandable that there is no empirical evidence concerning the perception of mental affordances yet. Nonetheless, McClelland relies on two sources of data to defend it. On the one hand, he claims that "[a] key motivation [to accept MAH] comes from reflection on our phenomenology" (p. 407). Interestingly, whereas McClelland deliberately chooses not to elaborate on the phenomenology of counting (p. 420), he offers some insights into the cases of attending and imagining. For instance, he claims, citing Noë (2005), that while we attend to a salient person in a football crowd, we still experience the other people as being "available." The same occurs when we focus on our work and decide to ignore the beeping sound from the dishwasher. Besides, he believes that the fact that we sometimes struggle to keep our attention away from the beeping sound shows that our act of attending to it is preceded by our perception of it as something we can attend. Similarly, for the case of imagination, McClelland claims that the fact that we do not deliberately initiate the act of mentally

rehearsing possible routes but rather allow this mental action to unfold indicates that this activity is preceded by the perception of a mental affordance for imagining.

We find these arguments wanting. Firstly, even if we concede that we experience objects that we are not currently focusing on as being there (as being "available" or "present"), this is not the same as saying that we perceive them as affording attention. In fact, since the same phenomenological reflection is compatible with us perceiving a person in the background as *greet-able*, or as *hug-able*, nothing in this example leads us to describe the situation in terms of mental affordances. Secondly, it simply does not follow from the fact that we are sometimes inclined to perform certain acts, or even from the fact that we may struggle not to perform them, that the perception of an affordance precedes our actions. Rather, it might be that we sometimes act guided by impulses instead of perceived affordances. For instance, an alcoholic may feel the need to drink alcohol and then go to the kitchen and open all cupboards looking for something that affords drinking (a beer can or a wine bottle). This situation is consistent with the well-known fact that we sometimes act in order to perceive affordances, and not because we have perceived them already (see E. J. Gibson & Pick, 2000). Another example of this is when we turn and wield a rod to know if we can throw it (Withagen & van Wermeskerken, 2009).

Together with these phenomenological considerations, McClelland considers some additional "indirect empirical evidence" (p. 416) in favor of MAH. For instance, he refers to the empirical data showing significant overlapping in the brain areas that are active both when we perform a particular action and when we imagine ourselves performing the same action (see, e.g., Jeannerod, 1995). Similarly, he elaborates on the phenomenon of utilizing behavior, and compares it with compulsive counting behavior, as described by Brazzelli and Spinnler (1998). Reflecting on a particular case presented by them, McClelland argues that "the fact that she performs the act of counting on certain stimuli indicates that she perceives those stimuli as offering an opportunity to count" (p. 420).

As before, we find this evidence inconclusive. That some brain areas fire both when we act and when we imagine ourselves acting is interesting, and it may indicate that the connection between perception, cognition, and action is more robust than is usually presupposed (see Engel et al., 2013). However, it does nothing to prove that our imagination is preceded by the perception of an affordance for imagining. Moreover, as argued before, it does not follow from the fact that some patients feel the compulsion to count in the presence of certain stimuli that their behavior is preceded by the perception of an affordance for counting.

3. Affordances and cognitive horizons

As we mentioned in the introduction, MAH is part of a more general trend in the philosophical literature that attempts to show that there are more affordances than those related to bodily actions. Another example of this trend is Jorba's (2020) introduction of "cognitive affordances" in the context of Husserl's phenomenology. Let us see the specific details of the proposal.

A key concept in Husserl's phenomenology is "intentional horizon." Intentional horizons are discussed concerning perception, and they refer to the potentialities included in our perceptual experience of objects. To understand this notion, think of what you experience when you see a book in your bookcase while you are sitting at your desk. According to Husserl, even though only one part of the book (say, its spine) is strictly visible, you nonetheless experience the whole book.[5] This is because our experience of the book contains the possible visions or "visual profiles" that we could get if we moved around it or took it for examination. As Jorba explains it: "the constitution of objects in experience presents a conditional structure: if I move in such and such way, then this and that will appear" (Jorba, 2020, p. 849). This conditional structure in our consciousness is what Husserl calls "horizon", and it is determined by the possible ways in which I can see the object. There are limits to what can be part of a horizon, though. To begin with, the set of possible experiences in the horizon is constrained by the nature of the object itself. Second, my visual horizon of the book is constrained by the context of the perception – I am in my office instead of the beach, and the book is in my bookcase. Third, the background beliefs and assumptions involved in perceiving the object. And, finally, the practical interests I may have at this moment.

Insofar as visual horizons include possible ways in which we can act, affordances are interpreted as being part of the horizons themselves: "Perceptual affordances can be seen as part of the intentional horizon of perception, specifically, as the structure that leads to action in virtue of making certain possibilities available" (p. 859). The book and the context in which the book is embedded afford different ways in which I can act to access other visual profiles.

Even though the notion of horizon is usually discussed in relation to perception, Jorba defends its application to thinking and coins the notion of "cognitive horizon" to that end. According to her, our experience of a thought is constituted, first, by the different modes in which this thought can be presented, and, second, by the set of possible thoughts and mental episodes that can be associated with or inferred from that thought. All these possibilities constitute the cognitive horizon of a thought, in very much the same way it happens with the case of visually perceived objects. The extension of the notion of horizon to thought is

accompanied by an extension of the concept of affordance to include cognitive affordances:

> The experience of thinking consists, at least partially, in "seeing" what you can do with your thoughts and how to continue in your thought from what you have already thought. Chains of conscious thinking normally involve various thoughts, some of which can lead to actions, be they physical or mental [...]. The common structure underlying these two cases is the following: x affords φ-ing, where x is a cognitive element and φ is a certain mental action. (p. 860)

Jorba uses calculation and mathematical reasoning as her primary examples. Given the thought that I should arrive at the station at 8 am to be at my office on time, this thought affords me to calculate the time at which I must leave home. Similarly, a mathematical problem affords different strategies to solve it. Thus, so the story goes, both cognitive elements – the thought about the time I must be at the station, and the mathematical problem I have been given – afford different mental actions, and they are experienced as different cognitive horizons. Jorba (p. 862) says that a similar phenomenon occurs with mind-wandering, where an idea affords the mental act of reflecting upon it.

Despite the obvious parallelism between the proposals of Jorba and McClelland, there is a subtle difference. According to Jorba, whereas the individual must experience cognitive affordances, they need not be perceived. As she puts it: "[a]lthough cognitive affordances might require some perceptual input to exist, we can characterize them without reference to any perceptual element. The cases of cognitive affordances presented here are not strictly *perceived* affordances, but they are *experienced* affordances" (p. 863).

We nonetheless doubt that this move serves to avoid the problems that MAH runs into. On the one hand, the idea that cognitive affordances must be experienced, even if they need not be perceived, still raises the worry of how this experience takes place. In virtue of what do we experience the possibility of reflecting upon an idea? On the other hand, it is not clear to us what explanatory benefits we gain by assuming that calculating the time at which I need to leave home to be at the station on time is preceded by the experience of an affordance for such calculation. In sum, we agree with Jorba that Husserlian visual horizons find a powerful ally in the notion of affordance as described by ecological psychology, but we doubt that an extension of horizons into the cognitive realm is benefited from introducing the notion of cognitive affordance. A more convincing case for this latter move is required.

4. Concluding remarks

In this paper, we have focused on two recent attempts to extend the notion of affordance to include mental or cognitive actions. In both cases, our conclusion is the same: we have neither a proper explanation of how mental or cognitive affordances are perceived (or otherwise experienced), nor a proper justification for thinking that performing "mental acts" requires the perception of said affordances.

We want to conclude this commentary by briefly elaborating on the notion of affordance and the perceptual science behind it. Affordances are one of the most intuitive objects of perception: doors are *pushable*, chairs are *sit-on-able*, floors are *walkable*, and so on. It seems that, in our everyday life, we are surrounded by affordances. Yet, if this object of perception is so pervasive and intuitive, how come it was not used in perceptual science until the second half of the 20th Century? We believe that this is because we needed the proper scientific framework to make sense of it, and this framework is ecological psychology. Until James and Eleanor Gibson developed the ecological approach, affordances were neither a scientific object of study nor a perceptual object defined as such in the philosophical and scientific literature.

Traditionally, affordances are defined as opportunities for bodily action. However, it is important to know the exact sense in which the term "opportunity" is defined here. This definition comes from how ecological psychology explains perception: The light reverberates in the environment's surfaces, forming a pattern that specifies (or correlates 1:1 with) them, and this pattern provides non-ambiguous information for the direct perception of the environment's affordances. Crucially, the information, the affordances, and the laws that relate them can all be described scientifically, as the empirical studies in ecological psychology show. Well-known examples of this are the visual information about time-to-contact, specified by the rate of an object's expansion in the observer's visual field, the information about depth and the relative position of objects specified by visual parallax, or the information about the relative height of terrestrial objects, specified by the ratio at which the horizon intersects them. All these are examples of perceptual variables that lawfully correspond to properties of the world and that allow for the perception of action possibilities. If we want to keep affordances suitable for the scientific study of perception, we must be careful how we use them. We hold that when affordances are defined as opportunities for action, the notion of opportunity should be understood in this technical sense as related to the availability of perceptual information, and not in the everyday, unscientific sense of opportunity. However, none of this is found in

the proposals reviewed here. Instead, they seem to be motivated by the everyday sense of the word "opportunity" rather than by the technical sense that is used for defining affordances in the empirical literature. By doing so, we run the risk of diluting the notion of affordance, giving up its explanatory power and its scientific credentials.

This raises further doubts regarding the overall project of introducing mental and cognitive affordances. Consider the following claim by McClelland:

> [M]y aim in this paper has been not just to make a preliminary case in favor of MAH but to motivate a wider mental affordance research program. The preliminary case I offer should be enough to motivate the direct empirical investigation of our sensitivity to mental affordances. In some cases, the relevant data may already exist but stand in need of reconceptualization. (p. 421)

However, we do not think this is a promising research program, at least in the terms it has been introduced. We summarize our reasons to think this in the following. First of all, since McClelland offers no ideas about how we perceive mental affordances in the first place, no testable hypothesis can follow from MAH. Moreover, the case for the reconceptualization of empirical data seems ineffective, for it is not clear in what sense introducing the notion of "mental affordance" improves our understanding of the current empirical evidence about imagination, counting, and attending. We cannot find how that notion helps us understand the empirical evidence in a more precise, sophisticated, or fine-grained manner. As such, we must conclude that MAH, as its author has presented it, offers neither conceptual nor methodological innovations to the scientific literature. And the same applies to Jorba's cognitive affordances: neither we know how cognitive affordances are experienced, nor is it clear in what sense cognitive affordances are needed to explain mathematical problem-solving, calculating, or mind-wandering.

Of course, this does not mean that expanding the use of affordances beyond perception and bodily action is unattainable. We do not want to block this possibility on *a priori* grounds. Our position is more modest: if we want to make the notion of affordance suitable to be applied to the cognitive realm, we must find a way to make it scientifically respectable and explanatorily useful. Redescribing the world in terms of affordances does not do for a scientific account of reasoning, imagining, and the like, and, by doing so, we run the risk of trivializing the notion of affordance altogether.

Notes

1. It is important to differentiate between functionalism in psychology and functionalism in philosophy. In psychology, functionalism refers to the view of cognition that reacts against structuralism and that, inspired by Darwin's evolutionary theory, is based on the reciprocity of organism and environment. In philosophy, functionalism refers to the theory by which a mental state, event, or process is not defined by its content or material structure, but by the causal or functional role it plays of the system in which it is part.
2. It is non-ambiguous because there is a 1:1 correspondence between the surfaces of the environment and the structure of the light.
3. The empirical research in ecological psychology starts by assuming that perceivers can modulate their behavior on the basis of perceived affordances, and tries to elucidate what information is being used for achieving particular perceptual-motor tasks. A classic example of this is the research on visually-guided locomotion (Fajen, 2021). These studies show that animals, both human and non-human, control their movement with respect to the objects of the environment (steering, braking, stopping, etc.) by relying on an optical informational variable called tau or time-to-contact. Crucially, since time-to-contact is directly available in the optic flow that is produced as the agent approaches the object, it does not need to be inferred or computed internally by the agent (For other examples of ecological research see Turvey, 2019; Warren, 2021).
4. This idea resembles Rucińska's (2017) and Gallagher's (2017) accounts of pretend play. According to them, individuals engage in pretend play by perceiving and taking advantage of bodily affordances in their environment (e.g., grabbing a banana and putting it next to their ear as if it was a phone). This example shows how bodily affordances can be used to carry out other cognitive tasks without the need of postulating other higher-order cognitive affordances (affordance for pretending, in this case). We extend this line of thought to claim that in some instances, imagination involves the perception of bodily affordances too.
5. This problem has been analyzed as the problem of perceptual presence in the philosophy of perception by Noë (2004, 2012).

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References

Almagro Holgado, M. (2019). Affordances and Social Injustice. *Ciencia Cognitiva*, *13*(2), 38–40.

Ayala, S. (2016). Speech affordances: A structural take on how much we can do with our words: Speech capacity: A structural approach. *European Journal of Philosophy*, *24*(4), 879–891. https://doi.org/10.1111/ejop.12186

Brazzelli, M., & Spinnler, H. (1998). An example of lack of frontal inhibition: The "utilization behaviour". *European Journal of Neurology*, *5*(4), 357–353. https://doi.org/10.1046/j.1468-1331.1998.540347.x

Christensen, W., & Bicknell, K. (2019). Affordances and the Anticipatory Control of Action. In L. C. Massimiliano (Ed.), *The Handbook of Embodied Cognition and Sport Psychology* (pp. 601–622). Boston, MA: MIT Press.

Engel, A. K., Maye, A., Kurthen, M., & König, P. (2013). Where's the action? The pragmatic turn in cognitive science. *Trends in Cognitive Sciences*, *17*(5), 202–209. https://doi.org/10.1016/j.tics.2013.03.006

Fajen, B. R. (2021). *Visual control of locomotion*. Cambridge University Press. https://doi.org/10.1017/9781108870474

Gallagher, S. (2017). *Enactivist interventions: Rethinking the mind*. Oxford University Press.

Gibson, J. J. (1966). *The senses considered as perceptual systems*. Greenwood Press.

Gibson, J. J. (1979 [2015]). *The ecological approach to visual perception*. Psychology Press.

Gibson, E. J., & Pick, A. D. (2000). *An ecological approach to perceptual learning and development*. Oxford University Press.

Heft, H. (2001). *Ecological psychology in context: James Gibson, Roger Barker, and the legacy of William James's radical empiricism*. Psychology Press.

Heras-Escribano, M. (2019). *The philosophy of affordances*. Palgrave. https://doi.org/10.1007/978-3-319-98830-6

Heras-Escribano, M., & y Lobo, L. (2022). Los orígenes teóricos de la affordances y la psicología ecológica: Una introducción histórica. In M. Heras-Escribano, L. Lobo, & J. Vega (Eds.), *Affordances y Ciencia Cognitiva: Introducción, teoría y aplicaciones*. Madrid: Tecnos.

Jeannerod, M. (1995). Mental imagery in the motor context. *Neuropsychologia*, *33*(11), 1419–1432. https://doi.org/10.1016/0028-3932(95)00073-c

Jorba, M. (2020). Husserlian horizons, cognitive affordances and motivating reasons for action. *Phenomenology and the Cognitive Sciences*, *19*(5), 847–868. https://doi.org/10.1007/s11097-019-09648-z

Krueger, J. (2014). Affordances and the musically extended mind. *Frontiers in Psychology*, *4*. https://doi.org/10.3389/fpsyg.2013.01003

Krueger, J., & Colombetti, G. (2018). Affective affordances and psychopathology. *Discipline Filosofiche*, *2*(18), 221–247.

Lobo, L., Heras-Escribano, M., & Travieso, D. (2018). The history and philosophy of ecological psychology. *Frontiers in Psychology*, *9*, 2228. https://doi.org/10.3389/fpsyg.2018.02228

McClelland, T. (2020). The mental affordance hypothesis. *Mind*, *129*(514), 401–427. https://doi.org/10.1093/mind/fzz036

Nanay, B. (2010). Action Oriented Perception. *European Journal of Philosophy*, *20*(3), 430–446.

Noë, A. (2004). *Action in Perception*. MIT Press.

Noë, A. (2005). Real presence. *Philosophical Topics*, *33*(1), 235–264. https://doi.org/10.5840/philtopics20053319

Noë, A. (2012). *Varieties of Presence*. Harvard University Press.

Raja, V. (2019). J. J. Gibson's most radical idea: The development of a new law-based psychology. *Theory & Psychology*, *29*(6), 789–806. https://doi.org/10.1177/0959354319855929

Rucińska, Z. (2017). The role of affordances in pretend play. In C. Durt, T. Fuchs, & C. Tewes (Eds.), *Embodiment, enaction, and culture: Investigating the constitution of the shared world*. MIT Press. https://doi.org/10.7551/mitpress/9780262035552.003.0015

Segundo-Ortin, M., Heras-Escribano, M., & Raja, V. (2019). Ecological psychology is radical enough: A reply to radical enactivists. *Philosophical Psychology*, *32*(7), 1001–1023. https://doi.org/10.1080/09515089.2019.1668238

Siegel, S. (2014). Affordances and the contents of perception. In B. Brogaard (Ed.), *Does perception have content?* (pp. 39–76). Oxford: OUP.

Turvey, M. T. (2019). *Lectures on perception: An ecological perspective*. Routledge. https://doi.org/10.4324/9780429443879

van Dijk, L., & Rietveld, E. (2020). Situated imagination. *Phenomenology and the Cognitive Sciences*. https://doi.org/10.1007/s11097-020-09701-2

Warren, W. H. (2021). Information is where you find it: Perception as an ecologically well-posed problem. *I-Perception*, *12*(2), 20416695211000370. https://doi.org/10.1177/20416695211000366

Withagen, R., & van Wermeskerken, M. (2009). Individual differences in learning to perceive length by dynamic touch: Evidence for variation in perceptual learning capacities. *Perception & Psychophysics*, *71*(1), 64–75. https://doi.org/10.3758/APP.71.1.64