have affective value within the umwelt of the organism.

« 12 » As Rebekka Hufendiek put it:

> "Being dangerous, indigestible, or offensive are properties that cannot be explained with reference to physics or chemistry alone. To say that something is dangerous for something else introduces a *kind of normativity* into the story that can only be captured adequately within a biological framework. It makes sense to speak of 'dangerousness' in relation to the organism only if the survival of the organism is introduced as a basic value in the first place." (Hufendiek 2016: 6, emphasis added)

« 13 » So, when Heras-Escribano claims that "perception as such is not normative, according to the ecological view, because there is no perceptual error" (§34), I agree in the sense that there is no error in an absolute context-independent sense of good or bad, correct or incorrect. However, there is value in perception based on the abilities of the agent and its learning processes: if I have tried to climb a tree and have hurt myself in doing so, the affordance is changed by the affective value I give to my experience of it. The next time I encounter a tree, the affordance will be different in my umwelt (not in the habitat). In other words, the norms that tell the agent whether it is paying attention and valuating the appropriate aspects of the environment and whether it is engaging adequately with them in the current interaction, are dependent on the trajectory of past interactions.

« 14 » Accordingly, affordances can entail an affective normativity at the biological level: it is *for* the agent's umwelt that a particular affordance has some affective value, because it preserves its organismic form of life. However, it is important to acknowledge that some affordances owe their value to certain organisms to biological criteria and many others to sociocultural ones.

« 15 » Aspects of the environment are thus significant for an agent, as they offer the possibility of maintaining its biological viability and/or sustainability, such as by keeping the agent hydrated or avoiding scratches on the hands when climbing a tree. Agents not only perceive these aspects of the environment as affordances but engage with them when they are affectively relevant to them, i.e., when they feel, bodily, the need to maintain a form of life (biological and/or social) that they value and care about.

« 16 » This takes me to my concluding question: Does reflection on the affective value of abilities in affordances make them intrinsically normative? Q1

References

Baggs E. & Chemero A. (2018) Radical embodiment in two directions. Synthese Online first. https://doi.org/10.1007/s11229-018-02020-9

Chemero A. (2009) Radical embodied cognitive science. MIT Press, Cambridge MA.

Gastelum M. (2020) Scale matters: Temporality in the perception of affordances. Frontiers in Psychology 11: 1188. https://doi.org/10.3389/fpsyg.2020.01188

Gibson J. (1979) The ecological approach to visual perception. Lawrence Erlbaum Associates, Hillsdale NJ.

Heras-Escribano M. (2016) Embracing the environment: Ecological answers for enactive problems. Constructivist Foundations 11(2): 309–312.
► https://constructivist.info/11/2/309

Hufendiek R. (2017) Affordances and the normativity of emotions. Synthese 194: 4455–4476. https://doi.org/10.1007/s11229-016-1144-7

Reed E. S. (1996) Encountering the world: Toward an ecological psychology. Oxford University Press, New York.

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Can Ecological Psychology Account for Human Agency and Meaningful Experience?

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> Abstract • I argue that any approach to affordances that stays close to the *letter of the law* (of traditional Gibsonian ecological psychology) is not able to account for human agency and meaningful experience. I sketch how an approach that follows the *spirit of the law* can account for these phenomena.

Handling Editor • Alexander Riegler

« 1 » In his target article "Précis to *The Philosophy of Affordances*," Manuel Heras-Escribano expresses a worry concerning the "popularization" of the idea of affordances. He points out, in §2, that some usages of this idea are "inaccurate and problematic," since they are at odds with the ecological approach in which the idea originated. In those cases, the concept of affordance is used "as an honorific label for something that is fully understandable in non-ecological terms."

« 2 » As such, we might label Heras-Escribano's position as conservative: he insists that any usage of the concept of affordances stay close to its ecological roots. That is, he suggests we think in line with the *letter of the law* – the law being the Gibsonian theory of affordances or traditional ecological psychology (EP). Any research domain that requires a "broader" concept of affordances is then simply beyond the scope of EP. In contrast, some prefer to investigate affordances in line with the *spirit of the law*. For instance, some researchers may be more sensitive to agential phenomenology. They may want to do justice to the *lived experience* of the agent and therefore revise the affordance-concept (whilst staying close to the spirit of the ecological approach). As a proponent of the "spirit" camp, my worry with the "letter" camp is that they want to have their cake and eat it too. That is, by adhering to the traditional concept of affordances (not allowing for revisions) they should acknowledge the limited scope of

EP and the insufficiency of the traditional Gibsonian concept of affordances for various research domains. However, they seem reluctant to do so.

« 3 » In this commentary, I will clarify this point of contention by turning to the issues of *agency and experience*. In a nutshell, I will argue that a conservative view on affordances that adheres to the letter of the law, such as Heras-Escribano's, cannot account for *human agency* nor for *meaningful experience*, despite claiming that it can.

« 4 » To start with meaningful experience: Heras-Escribano (in §10) suggests that EP provides "a scientific explanation of how we experience our environment." More specifically, EP allows us to understand that the environment is not neutral to the organism but rather *meaningful* (Footnote 9). He adds that EP focuses "on those aspects of the environment that are meaningful (in bodily terms) to agents: that is, which are the elements […] that allow them to perform certain actions" (§10). In contrast, I would argue that (conservative) EP does *not* offer a scientific explanation of how we, *as human beings*, experience our environment.[1] This is the case because we do not merely experience meaningfulness "in bodily terms" (for more elaborate arguments see Ratcliffe & Broome in press, and Dings 2018). Analogously, the elements that allow us to perform certain actions are not restricted to information about the affording object and information about our bodies.

« 5 » To understand why, we need to look more closely at *human agency*. Roughly, there are two characteristics of human agency (as opposed to the agency of most other organisms) that conservative EP fails to accommodate.[2] The first is that it is fundamentally *diachronic*: what we do *now* is often inextricably connected to what we have done in the past and what we plan to do in our future. We make future commitments regarding X, regret how we did X the last time, and both may affect (how I experience) my current engagement with X. Secondly, human agency is thoroughly *reflexive*. In Charles Taylor's (1985) words, we are *self-interpreting animals*: we reflect on what we have done, deliberate on what we should do, and may change our actions accordingly. In terms of affordances, we may reflect on what objects afford and subsequently exert active influence on our field of affordances, to change what an object affords *for us*. (Of course, a major contribution of EP is its acknowledgement that the majority of our actions are carried out *unreflectively*. However, this does not negate the claim that human beings *do* reflect on their actions and action possibilities. Crucially, even if reflective acts make up a minority of our everyday agency, they are typically what human beings find most important – what they care about the most).

« 6 » Crucially, human agency and meaningful experience are interconnected: we need the diachronic and self-interpretative nature of human agency to make sense of meaningful experience. As I have argued in Dings (2018), an affordance can be experienced as soliciting when it is *relevant* to one's concerns (see also Rietveld & Kiverstein 2014), but our concerns are not homogenous. We identify with some concerns, commit ourselves to them, or embed them in a self-narrative. These are typically diachronic concerns, and relevance to such concerns is experienced as meaningful (Dings 2018). Such meaningfulness also entails a broader self-referentiality than is typically assumed: to experience an object as meaningful does not merely entail co-perceiving my bodily self as being able to act on that meaningful object. It also entails co-perceiving my self more broadly, as having particular values, social roles, long-term plans, and so forth. For human beings, these too are elements that allow us to perform certain actions, yet they are neglected by accounts such as Heras-Escribano's.

« 7 » A brief example might help to clarify the point at stake: how does a vegetarian's experience of (and subsequent interaction with) a piece of meat on the barbecue differ from that of a non-vegetarian? An account of affordances that stays close to the *letter of the law*, such as Heras-Escribano's, would have difficulty accounting for that experience, because it only sees meaningfulness in terms of bodily relevance. In that sense, for both individuals the meat would afford eating. However, their experience (and related agency) is probably different. If we think in line with the *spirit of the law,* then we are in a better position to account for meaningful experiences and human agency. On this view, we could highlight that the vegetarian has made diachronic commitments based on personal values, thereby actively shaping how she experiences possibilities for action. Thus, we can acknowledge the role of personal history and the active influence that the agent might have on the inviting nature of the affordance, but stay within the spirit of the law, i.e., remain close to EP's central tenets (see, e.g., Withagen, Araújo & De Poel 2017). As I suggested in Dings (2018), to make sense of human agency, we need to more thoroughly emphasize the embeddedness of the experience of affordances in personal values, self-narratives and future commitments. To say that one co-perceives one's personal values and self-narratives means that if the vegetarian had other personal values, she would experience the meat on the barbecue differently (in terms of *whether* and *how* it solicited action).

1| It clearly goes beyond the scope of this commentary to provide a full exegesis of the idea of "meaningfulness" in James Gibson's work, but a quick look at his published books suggests a shift from a very diverse understanding of meaning to a more narrowed one. In one of his earliest books *The Perception of the Visual World*, Gibson (1950: 197–199) acknowledges that there are many levels or kinds of meaning, including but not limited to affordances, emotional valences, symbols, meanings of events and social meanings. However, in *The Senses Considered as Perceptual Systems*, Gibson (1966: 285) suggests speaking of "affordances" to substitute value and meaning. By affordances he means "simply what things furnish, for good or ill." Even later, in *The Ecological Approach to Visual Perception*, Gibson speaks about the "meaningful world" exclusively in terms of ecological information and affordances, leaving no room for "subjective values" (Gibson 1979: 137). Finally, in a bundle of his selected essays, Gibson conflates the two concepts by saying that "the meaning or value of a thing consists in what it affords" (Reed & Jones 1982: 407). Regardless of what one thinks of this interpretation, it is noteworthy that contemporary psychology of meaning hardly mention Gibson or affordances (see, e.g., the edited volume by Markman, Proulx & Lindberg 2013).

2| Another typical feature of human agency is its social and cultural embeddedness, which (in contrast to diachronicity and reflexivity) is increasingly acknowledged by affordance researchers (e.g., Rietveld & Kiverstein 2014).

« 8 » So, let me conclude by returning to the dilemma that this commentary started out with: should we be thinking in line with the *letter* or the *spirit* of traditional EP? Q1 I have argued that the traditional Gibsonian notion of affordance is limited when it comes to understanding the meaningfulness of experience and typical human agency, because it relies only on a sense of bodily relevance, thereby ignoring the diachronic and holistic nature of human agency and agential phenomenology. Others such as Matthew Ratcliffe and Matthew Broome (in press) have similarly pointed out that the Gibsonian notion is insufficient to account for meaningful experience. However, whereas they suggest we discard this notion altogether, I propose we should work towards a re-conceptualization of affordances. There is a wide variety of ways in which we may experience affordances (Dings 2018) and acknowledging that variety allows us:

- to see how interacting with affordances contributes to our self-understanding (Dings 2019);
- can help us make sense of psychopathology (Dings 2020);
- and sheds light on issues that are pivotal to human agency, such as authenticity and autonomy (as I argue in a paper that I recently submitted for publication).

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References

Dings R. (2018) Understanding phenomenological differences in how affordances solicit action: An exploration. Phenomenology and the Cognitive Sciences 17(4): 681–699.

Dings R. (2019) The dynamic and recursive interplay of embodiment and narrative identity. Philosophical Psychology 32(2): 186–210.

Dings R. (2020) Psychopathology, phenomenology and affordances. Phenomenology & Mind 18: 56–66.

Gibson J. J. (1950) The perception of the visual world. The Riverside Press, Cambridge MA.

Gibson J. J. (1966) The senses considered as perceptual systems. Houghton Mifflin, Boston MA.

Gibson J. J. (1979) The ecological approach to visual perception. Taylor & Francis, New York NY.

Markman K. D., Proulx T. E. & Lindberg M. J. (2013) The psychology of meaning. American Psychological Association, Washington DC.

Ratcliffe M. & Broome M. (in press) Beyond "salience" and "affordance": Understanding anomalous experiences of significant possibilities. In: Archer S. (ed.) Salience. Routledge, London.

Reed E. S. & Jones R. (1982) Reasons for realism: Selected essays of James J. Gibson. Lawrence Erlbaum, Hillsdale NJ.

Rietveld E. & Kiverstein J. (2014) A rich landscape of affordances. Ecological Psychology 26(4): 325–352.

Taylor C. (1985) Philosophical papers. Volume 1: Human agency and language. Cambridge University Press, Cambridge MA.

Withagen R., Araújo D. & De Poel H. J. (2017) Inviting affordances and agency. New Ideas in Psychology 45: 11–18.

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The Emergent and Evolving Nature of Affordances in Mathematical Problem Solving

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> Abstract • I build on Heras-Escribano's ontological characterization to address issues of affordances related to mathematics education, particularly about how it can enable fruitful conceptualizations for understanding mathematical problem-solving processes. This leads me to address the emergent and evolving nature of affordances in mathematical solving processes.

Handling Editor • Alexander Riegler

« 1 » The ideas Manuel Heras-Escribano shares about affordances, in his target article, strongly resonate with my experience and work in mathematics education research, where I am concerned with the study of mathematical problem-solving processes. For this reason, in this commentary I revisit parts of my previous work on affordances in light of Heras-Escribano's ontological characterization (§§12–23). Doing this, my intention is to address how affordances can offer an enriched and fruitful way of illustrating and conceptualizing mathematical problem-solving processes "that allow us to offer scientifically richer explanations" (§3). To do so, I illustrate how affordances can be conceived as emergent and evolving, that is, not fixed-once-and-for-all properties.

The relevance of Gibson's affordances for mathematics education

« 2 » Gibson positioned himself strongly against dualism, i.e., the separation between organism and environment. Arguing for their inseparability, recognizing the co-evolution of animals and their environment, he emphasized the animal–environment reciprocity, as Heras-Escribano points out in §3. The following is how Gibson explained the concept: