Topoi (2026) 45:441–451
https://doi.org/10.1007/s11245-025-10254-9

Scaling-Up Behavior Settings: An Ecological Approach to Cognitive Institutions

Moritz Bammel[1] · **Guilherme Sanches de Oliveira**[2]

Received: 31 January 2025 / Accepted: 7 August 2025 / Published online: 22 August 2025

Abstract
Barker's notion of "behavior settings" has been fruitfully used in Gibsonian ecological psychology to highlight the importance of place and to account for how perception–action of affordances is socio-culturally co-constituted. The goal of this paper is to investigate the potential relation between "behavior settings" and the seemingly-related notion of "cognitive institutions" that has more recently been introduced and used in a different context, in the philosophical literature on extended cognition. Focusing on "behavior settings" and "cognitive institutions" as analytical tools we show that, despite their similarities, the two are ultimately different from each other, but that despite these differences, the two are compatible and can work together. Based on this, we offer a proposal for how "cognitive institutions" can be incorporated into the conceptual framework of Gibsonian ecological psychology, enabling a more comprehensive analysis of how cognitive practices are socio-culturally co-constituted at various spatio-temporal scales. Finally, we conclude that this synthesis contributes to the ongoing critical turn in ecological psychology, supporting the analysis of how cognitive practices are shaped by cognitive institutions for better or worse.

Keywords Cognitive institutions · Behavior settings · Ecological psychology · Socially extensive cognition · Mind-shaping · Political philosophy of mind

1 Introduction

Gibsonian ecological psychologists have found explanatory value in Barker's (1968) notion of *behavior settings* and have fruitfully employed it as part of their conceptual toolkit for more than 20 years (Heft 2001, 2018; McGann et al. 2024). Behavior settings point to the fact that behavior does not happen in a vacuum, but necessarily somewhere, in some context, in some situation or other, and this is central to studying behavior and cognition at the ecological scale. In particular, depending on whether we participate in a work meeting, go grocery shopping, or hang out at a pub with friends, our perception–action of affordances is intimately tied to these specific socio-material arrangements—the behavior settings—that shape how we behave and cognize. Consequently, behavior settings have been conceptualized as ecological structures of a higher order (relative to affordances) that influence which affordances an agent perceives and actualizes (Heft 2001).

In this paper, we aim to further expand ecological psychology's conceptual framework by offering an ecological interpretation of Shaun Gallagher's notion of *cognitive institutions* (Gallagher 2013; Gallagher and Crisafi 2009; Slaby and Gallagher 2015), which, we propose, can help capturing yet another level of ecological structures, above and beyond affordances and behavior settings. To see why the notion of cognitive institutions may be of relevance to ecological psychologists, consider J. J. Gibson's widely discussed mailbox example: "[T]he real postbox (the only one) affords letter-mailing *to a letter-writing human in a community with a postal system*" (Gibson 1979/2015, p. 130; emphasis added). As this example illustrates, perceiving the mailbox as an opportunity to send a letter to another person is contingent on being a member of a community with particular cultural practices involving literacy and collectively established ways

✉ Moritz Bammel
moritz.bammel@leuphana.de

Guilherme Sanches de Oliveira
gui.cogsci@gmail.com

[1] Institute of Sustainability Psychology, Leuphana University Lueneburg, Lüneburg, Germany

[2] Department of Philosophy, University of Murcia, Murcia, Spain

of transmitting messages in writing over (long) distances. However, ecological psychologists have been struggling with how to make sense of the "postal system" in terms of ecological structures. The postal system is neither adequately characterized as an affordance, because it cannot be directly perceived in its entirety, nor does it qualify as a behavior setting, because the postal system, unlike a post office, refers to a set of spatio-temporally widely distributed collective practices that are not confined to a particular place or situation (see Heft 2020, pp. 820–823). As we shall argue, the postal system is better conceived as a cognitive institution, as the latter notion captures precisely those spatio-temporally widely distributed cognitive practices that enable a person living "in a community with a postal system" to perceive a metal container on the sidewalk as an opportunity to send a letter to another person.

Interestingly, a passing remark by Heft indicates that he seems to have anticipated the need for an institutional layer on top of behavior settings already, even though he did not develop this view in detail:

> "As behavior settings of a particular type increase in number, institutional structures are often intentionally established to regulate their collective operation. Such institutions operate at a yet higher-level of structure, adding another level of possibilities and constraints for the individual human actions that are nested within them." (Heft 2013, p. 165)

Taking this observation seriously, in this paper we aim to drive Heft's project forward by spelling out the relation, potential continuities and tensions between 'behavior settings' and 'cognitive institutions' understood in ecological terms.[1] In our view, behavior settings and cognitive institutions are complementary notions that account for the socio-cultural co-constitution of cognitive practices at different spatio-temporal scales. We propose that cognitive institutions can be incorporated into ecological psychology's existing theoretical framework by conceiving of them as yet *higher* higher-order ecological structures, relative to behavior settings. On the ecological account we shall develop, cognitive institutions emerge from collective cognitive practices taking place across a multitude of behavior settings widely distributed in space and time. These cognitive institutions, in turn, enable, limit, or enforce how people think and which affordances they perceive and actualize.

The motivation behind our proposed integration of cognitive institutions into ecological psychology is twofold. First, as illustrated with reference to Gibson's discussion of the mailbox and the postal system, there seem to be ecological structures which cannot be captured with the existing conceptual tools—affordances and behavior settings—but which can be well captured in terms of cognitive institutions. Second, we aim to contribute to the ongoing critical turn in ecological psychology (e.g. Crippen 2025; McClelland and Sliwa 2022; Spurrett and Brancazio 2024): by offering a viable account of cognitive institutions *for ecological psychology*, our hope is to facilitate engagement with recent work in "political philosophy of mind" (Tzima and Slaby 2024) that capitalizes on cognitive institutions as an important analytical tool to scrutinize oppressive, harmful, and structurally unjust forms of mind-shaping (Gallagher 2020; Maiese 2021; Maiese and Hanna 2019).

We begin in Sects. 2 and 3 by introducing behavior settings and cognitive institutions, respectively. In Sect. 4 we then analyze their complementarities and develop our proposed integration of cognitive institutions into ecological psychology. Finally, in Sect. 5 we briefly articulate the broader implications of our proposal, emphasizing its relation to recent work in political philosophy of mind and its potential to contribute to the ongoing critical turn in ecological psychology.

2 Behavior Settings

The crucial importance of place and context was made abundantly evident to Roger Barker and colleagues throughout their more than twenty years of field work monitoring the behavior of children in their natural environments. As they observed, the differences in behavior for any given child *across* places and situations (e.g., in a classroom vs. a post office) was greater than that between different children in the *same* place (e.g. all in a classroom). Put differently, and generalizing, our behavior in a given place is more similar to that of others in the same place than it is similar to our own behavior in different places. To make sense of this finding, Barker introduced the notion of a "behavior setting" (Barker 1968). Typical examples of behavior settings discussed by Barker were pharmacies and basketball games, in addition to the classrooms and post offices already mentioned. And in recent years, the same concept of "behavior setting" has been applied to more examples, such as a psychological

[1] Note that this paper focuses on spelling out the relation between the two *concepts*—i.e., behavior settings and cognitive institutions—to clarify what they are about and what they can accomplish as analytical tools. On the surface, the two concepts seem to apply to the same *phenomenon* broadly construed, both shedding light on the socio-material nature of cognition. This phenomenon has long been studied by many authors, including influential figures such as Dewey (1922), Merleau-Ponty (1945/2010), and Heidegger (1927/2008), all using different concepts and terminology. Still, however insightful it may be, their work is not of central interest to the present argument: our focus is not on the phenomenon but on the analytical tools ('behavior settings' and 'cognitive institutions'), and specifically on their potential use within the conceptual framework of Gibsonian ecological psychology.

laboratory (Heft 2007), a workplace meeting (Raja and Heras-Escribano 2023), or various "places for reasoning" such as an academic conference or social media (Gastelum-Vargas et al. 2024).

So, what exactly is a behavior setting? According to Barker (1968, pp. 18–34), behavior settings span across material objects in the environment and collectively enacted behavior patterns, and they can be best described in terms of "structural and dynamic attributes" (p. 18). Let us consider these in turn.

Structural attributes refer to "standing patterns of behavior-and-milieu" (p. 18), by which Barker means "extra-individual" (p. 18), joint actions that are linked to particular material features of the surrounding where those joint actions take place, i.e., the milieu. What makes these collective behavior patterns "extra-individual" is that they transcend the particularities of any individual's behavior, that is, the general behavior pattern of those joint actions remains the same regardless of who participates in it: for instance, customers and clerks in a convenience store tend to behave in generally the same way in different interactions regardless of who the specific individual customers or clerks are in particular occasions. Importantly, however, any spatio-material arrangement on its own (i.e., the physical space as such) does not yet qualify as a behavior setting, nor do extra-individual behavior patterns qualify as behavior settings on their own. It is the coupling between spatio-material arrangements of the milieu and extra-individual behavior patterns that defines the structural attributes of any behavior setting (Barker 1968, pp. 18–20).

Dynamic attributes, on the other hand, refer to the dynamically evolving degree of interdependence between different behavior-milieu couplings, and any behavior setting is defined by a set of collective behavior-milieu couplings that shows a high degree of interdependence (Barker 1968, pp. 20–23). In virtue of exercising those behavior-milieu couplings characteristic of any particular behavior setting, participants enact and contribute to the maintenance of a behavior setting. Hence, it follows that behavior settings do not exist independently of their participants (Barker 1968, p. 32). This is why individuals do not simply enter (say, walk into) a preexisting behavior setting but rather they join a behavior setting by actively participating in it and thereby contributing to its dynamical constitution as it emerges from joint actions in a particular milieu (Heft 2018).

Consider Barker's (1968) example of the classroom as a behavior setting: On the milieu side, there are certain material objects like chairs, desks, a blackboard, a projector, etc. that are arranged in a particular layout. Usually, the teacher's desk is located to one side of the room, and students' desks are oriented such that every student can see the teacher without necessarily seeing all of the other students as well. On the joint action side, there are extra-individual behavior patterns that remain invariant with respect to who exactly the teacher is and who exactly the students are, such as patterns of communication and asymmetric power relationships. A teacher may talk at any time, and students are usually silent and listen while the teacher is talking. If students want to say something, they have to raise their hand and wait to be taken by the teacher before they may talk. The behavior setting 'classroom' is enacted by students and teachers as soon as they enter the room and class starts, and it dissolves as soon as class ends and students and teachers leave the classroom. Only during this time span, the students' and teachers' behaviors are shaped by those collective behavior patterns characteristic of the behavior setting 'classroom'.

Note, however, that the regulatory power of behavior settings can affect participants differently. Although participants tend to behave roughly similarly while being part of the 'classroom', their perception–action of affordances is still relative to their idiosyncratic abilities, bodily characteristics, and cultural background and experience, thus leaving room for individual variation. Applied to Barker's example of a typical Western classroom, this means that those norms of communication and asymmetric power relationships co-regulated by the behavior setting 'classroom' may discourage or encourage students' participation in class discussions selectively, and who is empowered or harmed often depends on cognitive style, cultural background, dominant gender roles etc. This insight, by and large implicit in Barker and colleagues' research on "behavior settings," has been explicitly addressed in more recent work that engages with the same phenomenon despite not using the same Barkerian ecological terminology and conceptual apparatus (see, e.g., Crippen 2025; Crippen and Lindemann 2024).

3 Cognitive Institutions

The notion of *cognitive institutions* (Slaby and Gallagher 2015), formerly *mental institutions* (Gallagher and Crisafi 2009), has been introduced in the context of a socio-cultural turn in the extended cognition literature (Merritt et al. 2013). According to Slaby and Gallagher (2015), "cognitive institutions consist of those practices, rules and structures that have been instituted for cognitive purposes (such as making judgments, making decisions and solving problems) in previous activities that are both cognitive and social" (p. 34). A prime example is the legal system (Gallagher and Crisafi 2009). The core function of the legal system is to arrive at judgments whether a person, a company, or a state has violated the law and to make decisions on how, if at all, violations of law shall be penalized. Making judgments and decisions are undoubtedly instances of cognition, yet in the case of the legal system, these judgment and decision-making practices follow a systematic procedure that exceeds

any individuals' cognitive capacities: they depend on various previous collective cognitive practices of those who have been involved in writing laws, developing a code of criminal procedure, establishing standards of legal argumentation, or coming up with particular understandings of concepts such as 'right', 'guilt', or 'proof'—all meant precisely to guarantee that judgments and decisions aren't subjective, arbitrary, up to the whims of any one individual. Gallagher and Crisafi elaborate on this, making clear the original ties of the concept of "cognitive institution" to philosophical debates about extended cognition:

> "In such cases, judgments don't happen purely in the head, or even in the many heads that constitute the court. Judgments emerge in the workings of a large institution—i.e., the legal system. The legal process is a cognitive one—it is cognition producing, insofar as it produces judgments—and cognition produced, in the sense that it is the product of many (and perhaps generations of) cognizers, although it is not reducible to simply the cognitive processes that occurred in their individual heads." (Gallagher and Crisafi 2009, p. 48)

Other recent applications of the concept of "cognitive institution" have included the examples of science and particular scientific disciplines like neuroscience (Slaby and Gallagher 2015), the family (Gallagher 2013), economic markets (Petracca and Gallagher 2020), cryptocurrency (Petracca and Gallagher 2024), cultural institutions like museums (Gallagher and Crisafi 2009), and higher education (Maiese 2021). Each of these cognitive institutions involves a set of typical cognitive practices, but these do not exist in isolation from other practices and/or other institutions. Rather, Slaby and Gallagher (2015) highlight that there are *institutional entanglements* among cognitive institutions, which can also give rise to conflict. Consider the following vivid description by Knorr-Cetina (1982), which can be interpreted as illustrating how the cognitive institutions 'science' and 'market economy' are intimately entangled in Western scientific practice as we know it:

> "Scientists talk about their 'investments' in an area of research, or an experiment. They are aware of the 'risks', 'costs' and 'returns' connected with their efforts, and talk about 'selling' their results to particular journals and foundations. They seem to know which products are in high 'demand', and the areas in which there is nothing to 'gain'. They want to put hot 'products' on the 'market' as quickly as possible and 'earn credit' for them." (Knorr-Cetina 1982, p. 110)

Whether we see the impact of the market economy on scientific practice as negative or positive, the important point is that the effect is there. The cognitive institutions 'science' and the 'market economy' are deeply entangled, and this makes a difference in how scientists think and act.

Furthermore, note that cognitive institutions do not only enable but also enforce certain cognitive practices, meaning that they limit or preclude the exercise of alternative cognitive practices (Gallagher 2013; Gallagher and Crisafi 2009). Participating in the legal system enables particular ways of judging, talking, thinking, and problem solving, yet the legal system as a cognitive institution ensures that only these very specific ways of cognizing are deemed appropriate. In some cases, these limiting effects may be seen as harmless side-effects. In other cases, however, cognitive institutions can become means of structural oppression that impose severe biases or enforce harmful cognitive practices. This is why the notion of cognitive institutions has become an important analytic tool in *political philosophy of mind* (Slaby 2016; Tzima and Slaby 2024) to critique detrimental forms of *mind-shaping* from a political perspective focusing on power dynamics and structural injustices (Gallagher 2020; Maiese 2021; Maiese and Hanna 2019). A socially extensive view of cognition[2]—according to which most cognitive practices are shaped by cognitive institutions in one way or another—makes clear just how ubiquitous mind-shaping is. This gives political philosophy of mind the task of critically analyzing potentially harmful, oppressive, or unjust instances of mind-shaping.

4 Integrating Cognitive Institutions into Ecological Psychology

Consider Pablo, a catholic priest living in a small town in northern Spain. Every Sunday, he holds a service in his church. As soon as Pablo and the other members of his community enter the church at the time of the service, Pablo starts to act in accordance with his role as a priest. He opens the service, preaches the sermon, administers the holy communion, and blesses the attendees of the service before they leave. Even though Pablo is an avid yoga practitioner, it would be unimaginable for him to do some yoga during the service. Instead, Pablo keeps an upright posture and talks with a calm and serious voice for the entire duration of the service. All the other attendees are silent during the service and listen to Pablo, except when they pray and sing all together.

After the service, Pablo meets some of his friends at a cafe. Now Pablo laughs a lot, speaks in a much faster pace, and is no longer the only person doing the talking.

[2] We prefer the term *socially extensive* over *socially extended* to highlight that we do not endorse Clark and Chalmers's (1998) parity principle (see Gallagher and Crisafi 2009; Hutto et al. 2014).

Occasionally, he checks on his phone the current score of his favorite soccer team—something he would never do during mass. At some point, Pablo and his friends start talking about politics. One of them, a physicist, supports an initiative to legalize assisted suicide if someone is suffering from an unbearable terminal illness. Another friend, a lawyer, expresses their support too, as does the cafe owner behind the counter, but Pablo has strong feelings against assisted suicide. As a devout catholic, he believes that humans must accept their fate instead of trying to take control over every aspect of their life, including death, and he tries to convince his friends not to support that initiative. After intense debate, the friends all split the check, say goodbye and leave. Pablo then heads to his parents' house to check on them. Over the past few years their health has declined dramatically, his father with increasingly reduced mobility and his mother struggling with severe dementia symptoms. The house itself is Pablo's childhood home, yet it feels completely different now that Pablo's older sister, a recently-retired medical doctor (general practitioner), moved back in to take care of their parents and practically turned everything into a hospital ward. It doesn't help that Pablo and his sister don't get along. Even after so many years, she still judges him for being irresponsible and idealistic, not getting a 'real' job and having a normal life. Meanwhile Pablo struggles with what he sees as an overly authoritarian attitude on the part of his sister; she has always been focused on symptoms and diseases rather than the patient as a whole person, and Pablo feels that the care he gives his parishioners is of equal if not greater value.

4.1 Behavior Settings and Cognitive Institutions Differ in Scope

Behavior settings and cognitive institutions are similar: both capture the situated, socio-material nature of cognition, revealing how higher-order structures play a crucial role in shaping how individuals act, think, relate to others, and live their lives. But if, as analytical tools, "behavior setting" and "cognitive institution" both accomplish the same job, then could it be that we need only one of them? If the two are equivalent (or close enough) and ecological psychologists already make good use of "behavior setting," can we conclude that thinking in terms of "cognitive institution" has nothing additional to offer us? We don't think so. More careful consideration makes it clear that, despite their similarities and overlaps, the two have important differences and, we will propose, can complement one another.

In the preceding story, we can identify three behavior settings that are clearly distinct from each other: 'religious service at church', 'meeting friends at a cafe', 'visiting parents'. Participation in the behavior setting 'religious service at church' is, for all involved, inextricable from one specific cognitive institution: 'catholic church'. For Pablo (in ways that may be different for others, such as some of his friends) the same cognitive institution fundamentally shapes his engagement in all of the other behavior settings too, even as other cognitive institutions are also clearly present for him (e.g., 'the market economy', 'the medical system', 'the legal system', 'the family'). To articulate the relation between "behavior setting" and "cognitive institution" and to get clearer on what the two analytical tools can help us understand, we analyze their differences and complementarities along three dimensions: (i) spatial scope, (ii) temporal scope, and (iii) possibility of overlaps (see Table 1).

The first dimension is the spatial scope. For any behavior setting, the boundaries of the physical space where it takes place exhausts that behavior setting's spatial scope (Barker 1968, p. 26; Heft 2001, pp. 253–254; Heft 2018). The spatial scope of the behavior setting 'religious service at church' corresponds to the physical boundaries imposed by the walls of the church where the service takes place.[3] As soon as Pablo and his friends leave the church and sit down at a cafe, this constitutes a different behavior setting whose spatial scope is defined by the spatial boundaries of the cafe. In contrast, the cognitive institution 'catholic church' does not have clearly defined spatial boundaries. It is spatially distributed across various places, including not only cathedrals, chapels, convents, monasteries, and other church buildings throughout the world, but also the homes of people who conduct religious rituals with their family members, or classrooms at schools where religious education takes place. Moreover, the 'catholic church' as a cognitive institution also informs the cognitive practices of those who regularly participate in it even when they are in other places that do not belong to the family of behavior settings from which the 'catholic church' has emerged. This is illustrated, for instance, by Pablo's reasoning about assisted suicide while he is at a cafe with his friends or when he is attempting to problem solve and coordinate with his sister the care of their ailing elderly parents.

The second dimension for comparing "behavior setting" and "cognitive institution" is in terms of their temporal scope. Behavior settings can vary greatly in their temporal scope, from very short to regularly recurring to theoretically infinite (Barker 1968, p. 26; Heft 2018), but the key observation is that the temporal scope of a cognitive institution is

[3] Or, more precisely, the physical boundaries of the area inside the church where the service is held. Church buildings often have other areas that have other uses and play no direct role in the 'religious service at church' behavior setting. At the same time, as indicated earlier, the behavior setting cannot be reduced to the physical space taken on its own: the physical space where service is held has an entirely different character at other times, so that, for instance, tourists might come in and do things that are not accepted during mass, such as walking around to admire the art on display, taking pictures, etc.

Table 1 Comparison of behavior settings and cognitive institutions in terms of relative differences in spatial and temporal scope and possibility of overlaps

	Behavior settings	Cognitive institutions
Spatial scope	Clearly defined spatial boundaries	Fuzzier and more widely distributed
Temporal scope	Relatively more limited	Relatively more persistent
Overlaps?	No, individuals can participate in only one behavior setting at a time	Yes, there are institutional entanglements

usually longer compared to those behavior settings that are associated with it. The behavior settings 'religious service at church', 'religion class at school', or 'family prayer before dinner' all have definite temporal boundaries, with a clear beginning and an end. Relative to these behavior settings, the cognitive institution 'catholic church' is temporally more persistent. If a single behavior setting belonging to the family of behavior settings making up the cognitive institution 'catholic church' comes to an end, the workings of the 'catholic church' will not be affected. For the 'catholic church' to continue to enable and constrain its participants' cognitive practices, those behavior settings from which the 'catholic church' emerges have to reoccur regularly, but these recurrences can be temporally and spatially scattered.

Third, we consider the possibility of overlaps. Recall how behavior settings emerge from behavior-milieu couplings. Humans can be in only one place at a time participating in only one extra-individual behavior pattern at a time. This means that a person can participate in only one behavior setting at a time. In contrast, a defining feature of cognitive institutions is that there are "institutional entanglements" (Slaby and Gallagher 2015). As already seen, this means that multiple cognitive institutions can affect an individual's cognitive practices at the same time. The point here is that these entanglements also suggest that participation in a single behavior setting can be shaped by more than one cognitive institution. This seems to be the case at the cafe, which is a private business (cognitive institution: 'the market economy'), where discussion about a proposed law ('legal system') concerning terminal illnesses ('medical system') could get so heated as to have negative effects on the friendship if the friends stop meeting as regularly, which in turn would be bad for the business—the last thing the cafe owner wants. There are also entanglements when visiting at the parents' house, where the behavior setting 'childhood home' is all but gone, and the parents' medical needs have to be negotiated against limited financial resources and shifting family dynamics (reversals on caregiving roles between parents and children, tensions between siblings etc.).

In summary, behavior settings and cognitive institutions play a similar functional role in that both have to do with the deep effect of context in behavior: both behavior settings and cognitive institutions co-constitute the individuals' perception–action of affordances. But there are important differences. Cognitive institutions are more abstract and more pervasive, formatively shaping their participants' cognitive practices beyond the spatio-temporal boundaries of any single behavior setting. To be clear, however, in a pragmatist spirit, more abstract means neither immaterial nor unrelated to action. Rather, the apparent abstractness of cognitive institutions results from the wide spatio-temporal distribution of those concrete actions that manifest and reproduce them. Heft (2020, pp. 820–823) makes a similar point when he discusses the "conceptual character" of the postal system and whether or not it can be perceived. Heft is concerned with how to account for the "conceptual awareness" of the postal system in ecological terms, which seems to be a prerequisite for anyone living in a letter-writing-and-receiving community to perceive a mailbox as an opportunity to send a written message, enclosed in an envelope with a stamp on it, to another person (see Gibson 1979/2015, p. 130). As Heft (2020) elaborates, "[a] postal system is not an entity to be perceived in its entirety, but rather the designation refers to a series of social practices that are distributed across individuals, places, equipment, and time" (p. 821). The same description applies to cognitive institutions, yet this is not a coincidence: rather, we propose, the 'postal system' itself can be seen as a cognitive institution, one that shapes particular ways in which people behave, make plans, solve problems and so on in many different places and situations, including (but not being limited to) how they behave when they enter particular behavior settings such as a post office. On the view we are proposing, then, cognitive institutions and behavior settings are intertwined, but cognitive institutions are grounded in collective cognitive practices that are more spatio-temporally distributed compared to those of behavior settings.[4]

[4] Readers familiar with distributed cognition (Hutchins 1995) may recognize similarities between our ecological account of cognitive institutions and Hutchins's discussion of distributed cognitive systems. A comprehensive discussion of this relation is beyond the scope of this paper, but this much seems intuitive to us: even if, on a view like Hutchins's, behavior settings and cognitive institutions were both described as distributed cognitive systems, the distinction that we propose between the two in terms of *relative* differences in spatio-temporal scope would still hold.

4.2 More Local and More Global Enabling Constraints

In a recent contribution, Raja and Heras-Escribano (2023) have employed the notion of *enabling constraints* (e.g. Gelman and Williams 1998; Manning and Massumi 2014) to capture how behavior settings co-regulate participants' behavior in ways yielding collective behavior patterns usually not observed in other situations:

> "[A]n enabling constraint is a limitation (therefore a constraint) that some [factor] x of [a set of factors] X impose[s] on [a system] S making it exhibit a functionality that would be absent without the limitation (therefore enabling)." (Raja and Heras-Escribano 2023, p. 90)

Conceiving the causal power of behavior settings in terms of enabling constraints thus underlines that the regulation of individuals' perception–action of affordances and the emergence of new collective behavior patterns are by no means driven by antagonistic forces. As individuals participate in a behavior setting, the degrees of freedom of their perception–action repertoire decrease, meaning that their behavior is co-determined by the behavior setting they are participating in, and yet participating in a behavior setting can enable participants to engage in perception–action of affordances that they might otherwise not be able to exercise.

We suggest that the mind-shaping power of cognitive institutions can be conceptualized in terms of enabling constraints too.[5] However, given cognitive institutions' more global scope relative to behavior settings, those enabling constraints operative in cognitive institutions are relatively more global as well, in two respects.

First, cognitive institutions function as relatively more spatio-temporally extensive enabling constraints that directly affect individuals' cognitive practices. For example, the 'catholic church' as a cognitive institution enables and constrains Pablo's way of reasoning, communicating, and judging over an extended period of time and in different places. On a relatively more local spatio-temporal scale, the behavior setting 'religious service at church' imposes additional enabling constraints that interact with, but do not exhaust, those of the cognitive institution 'catholic church'. That is, while some of Pablo's cognitive practices, like his beliefs about assisted suicide, are shaped by the 'catholic church' and remain stable whether Pablo is at church or at a cafe, a change in behavior setting from 'religious service at church' to 'meeting friends at a cafe' affects whether or not Pablo perceives his phone as an affordance to check the current score of his favorite soccer team.

Second, cognitive institutions function as enabling constraints over families of behavior settings. That is, the 'catholic church' is the guiding thread that enables and accounts for relevant similarities between behavior settings such as 'religious service at church', 'religion class at school', 'episcopal conferences' and so on. In absence of the cognitive institution 'catholic church', it would seem inconceivable to build a chapel and conduct a religious ceremony in it: the cognitive institution confers on the place and on the rituals the distinctive meaning that they have. Yet, note that there is circular causality at play as well. The cognitive institution 'catholic church' dynamically emerges from and thus constitutively depends on collective cognitive practices performed in those behavior settings that it simultaneously enables and constrains: we understand the cognitive institution, in part, by reference to the special places and rituals that belong to it, and vice-versa.

As a final point, note that we are using the notion of enabling constraints purely descriptively. This means that institutionalized cognitive practices and families of behavior settings enabled by cognitive institutions do not have to be only positive, but can also be harmful, oppressive, or unjust from a given point of view. Analytically speaking, enabling constraints provide a general descriptive notion under which those relatively more local and global mind-shaping effects of behavior settings and cognitive institutions on individuals' cognitive practices can be subsumed. But this realization also invites us to take the next step, toward a critical analysis of how particular cognitive institutions and behavior settings shape certain cognitive practices for the better or worse. We will come back to this in Sect. 5.

4.3 Putting Affordances, Behavior Settings, and Cognitive Institutions Together

Behavior settings have been described as *ecological structures of a higher order* relative to affordances (Heft 2001, 2013). As we have argued, cognitive institutions are complementary to behavior settings in that the former are temporally more persistent, spatially more widely distributed, and thus relatively more global. In further expanding on Heft's (2013, p. 165) passing remark regarding the existence of and the need for institutional structures on top of behavior settings, we thus propose to conceptualize cognitive institutions as yet *higher* higher-order ecological structures that extend and are compatible with ecological psychology's existing conceptual framework.

The result is a nested hierarchy of ecological structures with perception–action of affordances at the level of individuals, who are embedded within some behavior setting where perception–action of affordances takes place, and these

[5] The notion of enabling constraints has been applied in institution theory already (Czech 2014). Here we apply the same idea to the *cognitive* dimension of institutions.

behavior settings are embedded within cognitive institutions (see Fig. 1). This conceptual arrangement is compatible with Heft's view of the nested hierarchical organization of natural systems (Heft 2001, pp. 237–244). To be clear, and in contrast to other conceptualizations of hierarchical organization (c.f. Simon 1977), we mean for this nested structure to be conceived as a *nonlinear* and *dynamical* hierarchy of ecological structures, meaning that we are dealing with interdependent levels that cannot be decomposed and are not properly studied in isolation from each other. Given their interdependence, the boundaries between levels are permeable and relative in that they amount to relative (rather than absolute) differences in spatial and temporal scope without entailing causal encapsulation.

The two inner dashed circles in Fig. 1 represent the existing state of theorizing in ecological psychology regarding affordances and behavior settings, which was the starting point for this paper. Individuals' actions are necessarily situated in some context, illustrated by the nesting of perception–action of affordances within behavior settings. The characteristics of these situations—the behavior settings—affect which opportunities for action an agent perceives and actualizes. In other words, behavior settings function as enabling constraints over individuals' perception–action of affordances. At the same time, behavior settings do not exist independently from the participants' joint actions in a specific place but are enacted by interactions among participants and between participants and the objects and surfaces present in this specific place. Thus, there is circular causality between the participants' joint actions constituting the behavior setting and its enabling and constraining effect on the participants' behavior (indicated by the bidirectional arrow between behavior settings and individuals). Moving to the outer dashed circle, cognitive institutions enter the picture. Similar to behavior settings, cognitive institutions directly affect individuals' cognitive practices, but the mind-shaping effect of a single cognitive institution is visible across multiple situations and extends across more places and longer durations than any single behavior setting. In addition to the relatively more local enabling constraints imposed by behavior settings, cognitive institutions thus function as relatively more global enabling constraints over individuals' behavior and cognition. Moreover, cognitive institutions also have a constraining and enabling effect on those families of behavior settings that "embody" the cognitive institutions in question. Again, there is circular causality at play. Cognitive institutions are not independent from but grounded in and constantly reproduced by those collective cognitive practices and families of behavior settings which are simultaneously shaped by cognitive institutions. Given the limitations of two-dimensional drawings, Fig. 1 does not clearly illustrate the entanglements between different cognitive institutions, nor the reciprocal dependencies between affordances, behavior settings, and cognitive institutions across different timescales, but we hope that the reader will interpret the figure less statically than it is depicted.

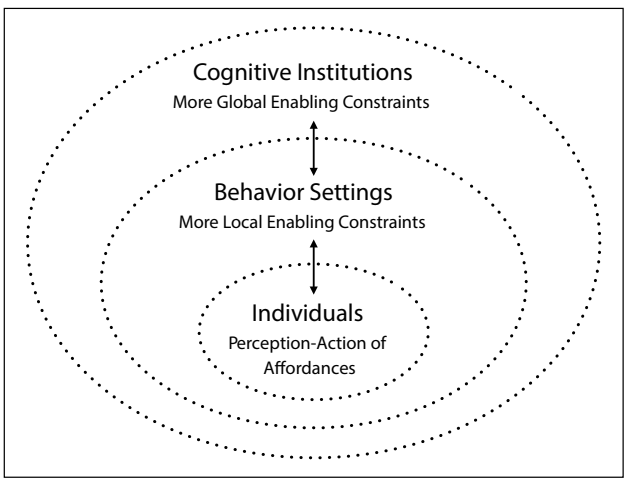

Fig. 1 A nonlinear dynamical hierarchy of ecological structures

5 Conclusions

In Sect. 2 we began our discussion of previous work in ecological psychology on situated cognition by highlighting how participating in a given behavior setting co-determines our perception–action of affordances in such a way that we behave more similarly to other people in the same place compared to how much our own behavior varies as we move from place to place. Yet, there are continuities in behavior and cognitive practices across places as well. On a group level, there seem to be continuities between the behavior settings 'religious service at church' and 'family prayer at home'. Despite their obvious differences, there is something these two behavior settings have in common in the way they shape our cognitive practices that puts the family prayer at home further apart from a meeting with friends at a cafe than from attending the mass at church. On an individual level, despite the decisive role that behavior settings play in enabling and constraining the perception–action of affordances, some cognitive practices remain stable across places. No matter whether Pablo is meeting his friends at a cafe or preaching the sermon at church, many of his reasoning practices and beliefs remain unchanged—as do those of his friends, and of everyone else.

We believe that these insights are not news to anyone who, like Heft, think that there are institutional structures operating on a yet higher level than behavior settings (Heft 2013, p. 165). Still, up to now, this intuition had remained unarticulated, as even Heft himself did not further develop how these institutional structures could fit into ecological

psychology's framework, complementing its central concepts of affordances and behavior settings. In parallel, the notion of "cognitive institution" has been put forward by enactivists in the context of the extended cognition literature, without any clear indication of whether and how cognitive institutions and behavior settings might be related to each other. This is the gap that our paper addresses. We argued that cognitive institutions are compatible with theorizing in Gibsonian ecological psychology if we conceive of them as yet higher higher-order ecological structures (compared to behavior settings), thus filling the conceptual void that the discussion by Heft (2013) already revealed. By seeing the postal system as a cognitive institution, we can explain why a literate person living "in a community with a postal system" perceives a metal container on the sidewalk as affording "letter-mailing" (Gibson 1979/2015, p. 130). The 'postal system' as a cognitive institution refers to all those cognitive practices related to asynchronous written communication over (long) distances, as well as the logistics of collecting, sorting, transporting, and re-distributing letters, all of which take place in different locations and in different points in time. Through their repeated collective enactment, these cognitive practices have become institutionalized, thus establishing what Heft (2020) called the "conceptual awareness" of the postal system.

Our proposal, then, is that it is not only viable but also highly productive to integrate "cognitive institution" into Gibsonian ecological psychology's conceptual toolkit, insofar as this move extends the scope and depth of our ecological understanding of the embodied, situated, socio-material nature of cognition as it relates to affordances and behavior settings. But there is more to it. Our proposal has farther reaching implications that connect to the ongoing critical turn in ecological psychology.

In response to Aagaard's (2021) critique of the "dogma of harmony" lurking in some articulations of 4E cognition, a growing number of ecological psychologists emphasize the janus-face character of organism-environment reciprocity. Rather than developing theories based on the (implicit) assumption of harmonious and cooperative organism-environment reciprocity in *ideal* circumstances, these scholars aim to explain how cognition works in the *actual* human econiche, which includes power asymmetries, structural injustices, and various forms of violence. For example, Crippen (2025) analyzes how different classroom settings may either empower or harm students, and how this may unfold selectively along gender, culture, and color lines (see also Crippen and Lindemann 2024). Other examples include work on "political affordances" referring to the (un)availability of opportunities for political action (Crippen 2022), gendered affordance perception (McClelland and Sliwa 2022; Segundo-Ortin 2024), the effect of gendered clothing norms on affordance perception (Spurrett and Brancazio 2024), the normative dimension of behavior settings that can disadvantage cognitive diversity (Cadena-Alvear and Gastelum-Vargas 2024), racism (Heras-Escribano 2019, pp. 180–189), disability (Kikkert and Segundo-Ortin 2024), or efforts toward intersectional approaches in ecological psychology (Paxton et al. 2019).

These developments are paralleled by similar efforts in enactivism and *political philosophy of mind* (Slaby 2016; Tzima and Slaby 2024), where the analytic tool of "cognitive institution" has been used for investigating potentially detrimental, oppressive, manipulative, or structurally unjust forms of mind-shaping (Gallagher 2020; Maiese 2021; Maiese & Hanna 2019).[6] Having shown in this paper how "cognitive institution" fits the rest of the ecological conceptual framework and can be a useful conceptual tool for ecological psychologists, we think it is important to highlight this additional benefit of our proposal: thinking in terms of "cognitive institutions" has the potential to enrich the ongoing critical turn in ecological psychology and to facilitate dialogue with relevant work from adjacent fields such as political philosophy of mind.

In line with Gibson's observation "that some offerings of the environment are beneficial and some are injurious" (p. 129), or what Gibson called "positive and negative affordances" (Gibson 1979/2015, p. 129), our present proposal of integrating "cognitive institutions" into ecological psychology is explicitly meant to account for how cognitive institutions shape perception–action of affordances not only *for good* but also *for ill*. Our descriptive use of the notion of enabling constraints makes analytical room to distinguish between (i) the ontological claim that socio-culturally co-constituted cognitive practices are the ordinary case of cognition, given the abundance of cognitive institutions and behavior settings we participate in, and (ii) an empirical case-by-case analysis of whether particular cognitive institutions and behavior settings shape cognition in detrimental or beneficial ways (see also Aagaard 2021). This, in turn, makes it possible for future work in ecological psychology to critically analyze the institutional dimension of the socio-cultural co-constitution of cognitive practices, adding another layer of complexity on top of affordances and behavior settings.

Funding Open Access funding enabled and organized by Projekt DEAL. No funding was received to assist with the preparation of this manuscript.

[6] There is more work in political philosophy of mind outside of ecological psychology that may enrich the ongoing critical turn in ecological psychology (e.g. Coninx 2023; Liao and Huebner 2021; Maiese 2022; Slaby 2024; Spurrett et al. 2025; Timms and Spurrett 2023), but here we focus on cognitive institutions given the scope of this paper.

Declarations

Conflict of interest The authors have no competing interests to declare that are relevant to the content of this article.

References

Aagaard J (2021) 4E cognition and the dogma of harmony. Philos Psychol 34(2):165–181. https://doi.org/10.1080/09515089.2020.1845640

Barker RG (1968) Ecological psychology: concepts and methods for studying the environment of human behavior. Stanford University Press, California

Cadena-Alvear I, Gastelum-Vargas M (2024) Examining behavioral settings and affordative space for the case of autism spectrum conditions in embodied cognition. Philos Psychol 37(7):1797–1827. https://doi.org/10.1080/09515089.2024.2360132

Clark A, Chalmers D (1998) The extended mind. Analysis 58(1):7–19

Coninx S (2023) The dark side of niche construction. Philos Stud 180(10–11):3003–3030. https://doi.org/10.1007/s11098-023-02024-3

Crippen M (2022) Emotional environments: selective permeability, political affordances and normative settings. Topoi 41(5):917–929. https://doi.org/10.1007/s11245-02209812-2

Crippen M (2025) Selective permeability and situated cognitive harm in multicultural classrooms. Topoi 44(2):457–475. https://doi.org/10.1007/s11245-024-10156-2

Crippen M, Lindemann DM (2024) Selective permeability, multiculturalism and affordances in education. Philos Psychol 37(7):1924–1947. https://doi.org/10.1080/09515089.2023.2255612

Czech S (2014) Institutions as enabling constraints. A note on social norms, social change and economic development. Ekonomia i Prawo Economics Law 13(2):309–319. https://doi.org/10.12775/EiP.2014.023

Dewey J (1922) Human nature and conduct: an introduction to social psychology. Henry Holt and Company, New York

Gallagher S (2013) The socially extended mind. Cogn Syst Res 25–26:4–12. https://doi.org/10.1016/j.cogsys.2013.03.008

Gallagher S (2020) Action and interaction. Oxford University Press

Gallagher S, Crisafi A (2009) Mental institutions. Topoi 28(1):45–51. https://doi.org/10.1007/s11245-008-9045-0

Gastelum-Vargas M, Chemero A, Raja V (2024) Places for reasoning. Philos Trans R Soc Lond B Biol Sci. https://doi.org/10.1098/rstb.2023.0294

Gelman R, Williams EM (1998) Enabling constraints for cognitive development and learning: domain specificity and epigenesis. In: Damon W (ed) Handbook of child psychology: vol. 2 Cognition, perception, and language. John Wiley & Sons Inc, New York, pp 575–630

Gibson JJ (1979/2015) The ecological approach to visual perception. Psychology Press, London

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

Heft H (2007) The social constitution of perceiver-environment reciprocity. Ecol Psychol 19(2):85–105. https://doi.org/10.1080/10407410701331934

Heft H (2013) An ecological approach to psychology. Rev Gen Psychol 17(2):162–167. https://doi.org/10.1037/a0032928

Heft H (2018) Places: widening the scope of an ecological approach to perception-action with an emphasis on child development. Ecol Psychol 30(1):99–123. https://doi.org/10.1080/10407413.2018.1410045

Heft H (2020) Ecological psychology as social psychology? Theory Psychol 30(6):813–826. https://doi.org/10.1177/0959354320934545

Heidegger M (1927/2008) Being and time. Harper Perennial modern thought

Heras-Escribano M (2019) The Philosophy of Affordances. Palgrave Macmillan

Hutchins E (1995) Cognition in the Wild. MIT Press, Cambridge

Hutto DD, Kirchhoff MD, Myin E (2014) Extensive enactivism: why keep it all in? Front Hum Neurosci. https://doi.org/10.3389/fnhum.2014.00706

Kikkert S, Segundo-Ortin M (2024) Disability, affordances, and the dogma of harmony: socializing the EE-model of disability. Topoi. https://doi.org/10.1007/s11245-024-10120-0

Knorr-Cetina KD (1982) Scientific communities or transepistemic arenas of research? A critique of quasi-economic models of science. Soc Stud Sci 12(1):101–130. https://doi.org/10.1177/030631282012001005

Liao S-Y, Huebner B (2021) Oppressive things. Philos Phenomenol Res 103(1):92–113. https://doi.org/10.1111/phpr.12701

Maiese M (2022) Mindshaping, racist habits, and white ignorance. In: Arfini S, Magnani L (eds) Embodied, extended, ignorant minds (vol 463, pp 77–98). Springer, New York

Maiese M (2021) Online education as a "Mental Institution." Philos Psychol 34(2):277–299. https://doi.org/10.1080/09515089.2020.1828573

Maiese M, Hanna R (2019) The mind-body politic. Palgrave Macmillan

Manning E, Massumi B (2014) Thought in the act: passages in the ecology of experience. University of Minnesota Press, Minneapolis

McClelland T, Sliwa P (2022) Gendered affordance perception and unequal domestic labour. Philos Phenomenol Res. https://doi.org/10.1111/phpr.12929

McGann M, Lucas M, McHugh C, Barrett L (2024) People, places, things and communities: Expanding behaviour settings theory in the twenty-first century. Philos Trans R Soc Lond B Biol Sci. https://doi.org/10.1098/rstb.2023.0282

Merleau-Ponty M (1945/2010) Phenomenology of perception. Routledge, Milton Park

Merritt M, Varga S, Stapleton M (2013) Editorial introduction: socializing the extended mind. Cogn Syst Res 25–26:1–3. https://doi.org/10.1016/j.cogsys.2013.03.003

Paxton A, Blau JJC, Weston ML (2019) The case for intersectionality in ecological psychology. In: van Dijk L, Withagen R (eds), Studies in Perception & Action XV

Petracca E, Gallagher S (2020) Economic cognitive institutions. J Inst Econ 16(6):747–765. https://doi.org/10.1017/s1744137420000144

Petracca E, Gallagher S (2024) Trust and reliance in the cognitive institutions of cryptocurrency. Mind Soc. https://doi.org/10.1007/s11299-024-00302-z

Raja V, Heras-Escribano M (2023) Behavior settings, enabling constraints, and the naturalization of social norms. In: Segundo-Ortin M, Heras-Escribano M, Raja V (eds) Places, sociality, and ecological psychology: essays in honor of harry heft. Routledge, Milton Park, pp 86–98

Segundo-Ortin M (2024) Socio-cultural norms in ecological psychology: the education of intention. Phenomenol Cogn Sci 23:1–19. https://doi.org/10.1007/s11097-022-09807-9

Simon HA (1977) The organization of complex systems. In: Simon HA (ed) Models of discovery and other topics in the method of science. D. Reidel Publishing Company, Dordrecht, pp 245–261

Slaby J (2016) Mind invasion: situated affectivity and the corporate life hack. Front Psychol 7:266. https://doi.org/10.3389/fpsyg.2016.00266

Slaby J (2024) Habits of affluence: unfeeling, enactivism and the ecological crisis of capitalism. Mind Soc. https://doi.org/10.1007/s11299-024-00309-6

Slaby J, Gallagher S (2015) Critical neuroscience and socially extended minds. Theory Cult Soc 32(1):33–59. https://doi.org/10.1177/0263276414551996

Spurrett D, Brancazio N (2024) Fashioning affordances: a critical approach to clothing as an affordance transforming technology. Philos Psychol 37(7):1899–1923. https://doi.org/10.1080/09515089.2023.2263478

Spurrett D, Colombetti G, Sutton J (2025) Introduction: scaffolding bad - varieties of situated cognitive harm. Topoi 44(2):345–351. https://doi.org/10.1007/s11245-025-10167-7

Timms R, Spurrett D (2023) Hostile scaffolding. Philos Pap 52(1):53–82. https://doi.org/10.1080/05568641.2023.2231652

Tzima S, Slaby J (2024) Political philosophy of mind: Inverting the concepts, expanding the niche. Phenomenol Cogn Sci. https://doi.org/10.1007/s11097-024-10051-6