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Connecting Unconventional Cognition to Humans
Unification and Generativity

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Abstract The idea of applying cognitive kind terms and concepts to 'unconventional' systems has gained steam. Perhaps unsurprisingly, this idea also has been met with skepticism. There is an implicit worry amongst skeptics that the idea of applying cognitive kind terms and concepts to non-humans, or at least to non-humans that are anatomically quite unlike humans, amounts to a Mere Honorific Conclusion: to say that a system is cognitive is to say it is merely worthy of investigation. In this paper, I use this conclusion as a framing device for exploring how we ought to approach the idea of cognition in unconventional systems, and I explore two avenues for blocking it: unification and generativity.

Keywords Cognition. Unconventional Cognitive System. Memory. Unification. Generativity.

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1 Introduction

The idea that we ought to 'de-humanize' cognition, or apply cognitive kind terms and concepts to non-human, 'unconventional' systems (Baluška, Levin 2016) has gained steam in philosophy and cognitive science.[1] This development is in part a response to reports of cognition or specific cognitive activities, such as memory, in plants (Gagliano et al. 2016), single-celled organisms (Gershman et al. 2021), and slime molds (Dussutour 2021). Likewise, it in part reflects the implications of innovative theorization, including 4E (extended, embedded, embodied, and enactive) cognition (Menary 2010), the biogenic approach to cognition (Lyon 2006), and basal cognition (Levin 2021). Perhaps unsurprisingly, the idea of studying cognition in unconventional systems also has been met with skepticism by a diverse group of philosophers and scientists. Some examples of objections include claims that uses of cognitive kind terms in these cases are non-literal (see Figdor 2018), explanatorily unnecessary (Adams, Garrison 2013), or evolutionarily ill-motivated (Taiz et al. 2019). This provides a precis of the proponents and skeptics in what I call 'the unconventional cognition debate'.

Though not explicitly stated, there is a worry amongst skeptics that the idea of applying cognitive kind terms and concepts to non-humans, or at least to non-humans that are anatomically quite unlike humans, amounts to what I dub a Mere Honorific Conclusion (MHC): to say that a system is cognitive is to say that the system is merely worthy of philosophical and scientific investigation. This conclusion equates to saying that (say) 'non-human systems make decisions' simply amounts to saying that 'non-human systems exhibit a phenomenon that is worthy of investigation'. Even if this latter claim is true, such a conclusion leaves open a rebuttal: non-humans might exhibit phenomena worthy of investigation, but this alone does not supply any reason for us to treat them as cognitive.

For my contribution to this collection on "De-humanizing cognition, intelligence and agency", I use MHC as a framing device for exploring how we ought to approach the idea of cognition in unconventional systems. While I doubt that any proponent in the unconventional cognition debate would explicitly accept this conclusion, the facts that (1) proponents admit some dissimilarities between human

1 Like others, I use the term 'unconventional' to refer to systems that traditionally have not be thought of as cognitive, which is not intended to be a rigorous taxonomic criterion. I include aneuronal organisms, collectives, non-neuronal biological systems (such as the immune system), and artificial systems. I appreciate the label because it reflects that whether a system is conventional is based on perspective of the community rather than the characteristics of the systems. Were another perspective dominant, this labeling might change.

and unconventional cognitive phenomena, and (2) arguments provided by proponents are both empirical and conceptual in nature raise concerns about what, over and above an honorific, it means to apply cognitive kind terms and concepts to these systems. In Section 2, I make MHC precise, describe why it would be an unfortunate conclusion, and show why a skeptic might draw this conclusion in this debate.

I explore two avenues for blocking MHC in the unconventional cognition debate. The first avenue relates to the role of unification. I address the potential for this research to conceptually unify cognition, including in humans. I address the upshots of this avenue in Section 3. The second avenue relates to the role of generativity. I address the potential for this research to generate and orient new research on cognitive systems, including humans. I address the upshots of this avenue in Section 4. I conclude by arguing that research on cognition in unconventional systems must connect to the study of human cognition if MHC is to be blocked. By taking both avenues seriously, proponents of the unconventional cognition debate can set up their stance as a research program. A research program of this character has the potential to connect the study of cognition in humans and its study in unconventional systems, producing valuable insights about both in the process.

2 A Mere Honorific Conclusion?

A common sentiment amongst skeptics in the unconventional cognition debate is a tentative willingness to grant that the phenomena that are reportedly elicited from these systems are worthy of investigation but a denial that sufficient reason has been presented for them to grant that these phenomena are cognitive.[2] For instance, when discussing phenomena elicited in studies on plants, Adams reports that he suspects "that what is really impressing [proponents] are the information-handling and feedback controlled direction of plant behavior", but he notes that this activity "Does not rise to the level of sufficiency to warrant the label 'cognitive processing'" (2018, 22). Likewise, Ten Cate notes that the phenomena elicited in the study of plants are "intriguing" (2023, 1), but he suggests that these phenomena "seem to be labelled as 'cognitive' mainly because they are beneficial" to the organism in question (2023, 3). Finally, Robinson

2 This sentiment is not held for all reports. For instance, follow-ups indicate that association studies in pea plants (Gagliano et al. 2016) do not replicate (Markel 2020). A replication failure undercuts defenses for the claim that these phenomena occur (Colaço 2018). Proponents aim to replicate the study (Segundo-Ortin, Calvo 2023), but see Colaço et al. 2022 for worries about these attempts.

and colleagues agree that plants "are highly complex organisms featuring multiple interactions with their environment", but they argue that proponents "appeal to psychological and neurobiological concepts… without providing empirical basis for such a far-reaching proposal" (2020, 1).

These examples show that skeptics do not always deny that interesting phenomena occur in unconventional systems. What they are skeptical of is that these phenomena are cognitive. The strongest reading of this skeptical take, which I use as a framing device in this paper, is what I call a Mere Honorific Conclusion:

> **Mere Honorific Conclusion (MHC):** To apply a cognitive kind term or concept to a system is to say that the system is merely worthy of philosophical and scientific investigation for the phenomena that are elicited from it.

By "cognitive kind term or concept", I refer to terms and concepts that are used in philosophy and cognitive science to pick out the relevant cognitive systems, capacities, or phenomena. This set includes 'cognition' as well as COGNITION, but MHC also can be directed towards terms and concepts for specific cognitive activities like memory, decision-making, and consciousness.[3] MHC is thus not equivalent to suggesting that uses of these terms are metaphorical or exaggerations, though it is not wholly incompatible with these conclusions.

MHC would be an unfortunate conclusion to draw, as appeals to cognitive kind terms and concepts as mere honorifics waters them down (Rupert 2004). 'Cognition' and other terms, when used traditionally, are intended to denote that the system in question possesses key properties or exhibits key phenomena that align with the intension of these terms. These terms are intended to refer to cognitive kinds, the tokens of which we can systematize and perhaps explain via reference to these kinds. Honorifics are not vacuous: uses of these honorifics at least suggests that interesting phenomena can be elicited from these systems, which is an empirical position that can be and has been challenged (see fn. 1). Nonetheless, the fact that the systems are worthy of investigation does not tell us anything about the characteristics of the phenomena that can be elicited from these systems. If there are no inferences to be drawn between human cognition and unconventional 'cognition', there is good motivation for not using the terms in this way.

MHC thus is a distinct conclusion from one in which cognitive kinds ought to be dissolved into multiple kinds (Ramsey 2021). Were

3 Correspondingly, it can be applied to predicates that incorporate these terms (Figdor 2018), such as 'plants remember'.

there distinct kinds of cognition – that of humans and that of unconventional systems – one might argue that uses of cognitive kind terms and concepts are incommensurable, which might motivate cleaving human cognition and cognition in unconventional systems into distinct categories. MHC, by contrast, suggests that there is no honorific-independent motivation to call unconventional systems and the phenomena that can be elicited from them 'cognitive'. There is no widespread historical tendency to conceptualize these phenomena in terms of cognition, nor do the characteristics of these phenomena match how cognition has been conceptualized. All that these terms and concepts connote when applied to unconventional systems is that they are worthy of investigation, MHC indicates, which instead might motivate simply no longer applying these terms and concepts to these systems. Researchers can still study these systems, but they should do this because they are independently interesting and worthy of investigation, not because they are cognitive.

I strongly doubt that any proponent in the unconventional cognition debate explicitly commits to MHC. Nonetheless, there are two features of these proponents' positions that offer defeasible support for drawing this conclusion. The first feature is that proponents recognize that there are distinctions to be made between cognition in humans and in unconventional systems. The design of studies on humans and non-humans is different, as evidenced by the sorts of operationalizations, manipulations, and measurements that are made when studying association in pea plants (Gagliano et al. 2016) as opposed to those made when studying association in rodents (Ennaceur, Delacour 1988). Likewise, functional attributions in non-humans often have a teleological flavor to them (Ten Cate 2023), while attributions in humans more often follow a causal functional analysis (Cummins 1975). Further, the mechanistic schema sought to explain these phenomena in unconventional systems, when they are understood at all (Ten Cate 2023), often have marked differences in entities and activities when compared to humans (see, e.g., Taiz et al. 2019).

Proponents can argue that many of these cases are distinctions without a difference, as proponents and skeptics alike permit operational, functional, and mechanistic distinctions when comparing human cognition to those of other mammals like rodents (Colaço et al. 2022). Likewise, proponents can also appeal to analogical reasoning from humans to non-human animals and back. This type of reasoning is common, though not all together uncontroversial, in comparative cognition (Andrews 2009). Nonetheless, these distinctions must be addressed, lest they support the idea that the only deep similarities between these cases are their worthiness of investigation, leading to MHC.

The second feature of proponents' positions that offers defeasible support for this conclusion is that the unconventional cognition debate is both empirical and conceptual. The empirical dimension

is salient: we can debate what phenomena can be elicited and how these phenomena should be characterized (Colaço 2020). However, the conceptual dimension should not be overlooked. Some proponents aim to fit their appeals into established paradigms for addressing cognition in humans and other mammals, such as Segundo-Ortin and Calvo's (2023) appeals to Shettleworth's descriptions of cognition (2010). However, many implicitly or explicitly adopt approaches that run counter to the mainstream of cognitive science. Recently, I put this point in the context of the plant cognition debate. It "is not about whether plants meet a set of well-delineated and agreed-upon criteria according to which they count as cognitive" (Colaço 2022b, 452). Rather, this debate is at least in part one over the appropriate answer to what cognition is.

Several approaches to conceptualizing cognition are put forward by proponents in the unconventional cognition debate. For instance, several proponents are sympathetic to accounts of enactivism (see, e.g., Segundo-Ortin, Calvo 2023). Lyon, by contrast, has introduced the biogenic approach to cognition, which "starts with the facts of biology as the basis for theorizing and works 'up' to the human case by asking psychological questions as if they were biological questions" (Lyon 2006, 11). This approach posits cognitive principles that are informed by evolutionary biology, self-organizing complex systems, and autopoiesis. One principles states that cognition "relates to the (more or less) continuous assessment of system needs relative to prevailing circumstances, the potential for interaction, and whether the current interaction is working" (Lyon 2006, 19).

Yet another approach is basal cognition, which draws a "continuum between the humble origins of information processing in the metabolic homeostatic mechanisms of ancient cells and more complex learning, representation, and goal directed activity" (Levin 2021a, 117). According to this approach, cognition is "necessary for any autonomous biological system's survival, wellbeing and reproduction" (Lyon et al. 2021, 4). While the latter views are described in terms of being an 'approach' rather than a full-blown theoretical or conceptual framework, each of them involves some construal of what cognition is or what specific cognitive activities are. Thus, each approach speaks to our conceptualization of cognition.

The fact that the debate is in part over what cognition is lends prima facie support to MHC. If proponents are also (say) supporters of enactivism or basal cognition, then their attempts to show that unconventional systems fit a conceptualization of cognition that is consistent with these approaches will not help to sway skeptics who are already unsympathetic to these approaches. In fact, traditionalists, such as supporters of a representational theory of mind, might take the fact that other accounts of cognition are too permissive to be a point against them (Adams 2018). As the saying goes: one person's

modus ponens is another's modus tollens. If skeptics are not sympathetic to these alternative approaches, then merely showing that an elicited phenomenon meets the criteria for one of these approaches might provide a reason to accept that this phenomenon occurs, but this is not equivalent to showing that this phenomenon ought to count as cognitive. Hence, skeptics can recognize that the phenomenon occurs and is thus worthy of analysis, but they can also deny that calling it cognitive means anything more than this, leading to MHC.

3 The Unification Avenue

With MHC stated, I explore two avenues for blocking it in the unconventional cognition debate. The first of these avenues involves the aim of unification. Specifically, the idea is that the study of unconventional cognitive systems might offer new insights into cognition generally, allowing philosophers and scientists to achieve a unificatory account of all these systems that results in an extension of our use of cognitive kind terms and concepts in the process.

The aim of unification in the unconventional cognition debate is shown in a recent discussion by Levin, a key adherent of basal cognition. Paraphrased from a talk of his (2021b), Levin states that skeptics in the debate often accept that the research he and other proponents conduct is valuable and the phenomena they elicit are worthy of study, but they question why we ought to use cognitive terms to describe it. What, they question, is gained from calling the phenomena elicited from unconventional systems 'cognition' rather than (say) 'schmognition'? The spirit behind this skeptical question, it should be noted, is very much in line with MHC. Levin's response to this question, reflected in some of his publications (see, e.g., Fields et al. 2020), is that partitioning these phenomena via different terms undercuts our ability to provide a unified account of them. The aim of basal cognition, in other words, is to account for unconventional as well as human cognition.

This paraphrased discussion captures that unification goes beyond simply showing that the phenomena elicited from unconventional systems are similar to those in humans. Figdor, for example, highlights the use of analogical reasoning between humans and alleged unconventional cognitive systems like plants and bacteria. Fidgor's examples show that researchers often argue that phenomena elicited in unconventional systems are qualitatively similar to those elicited in humans (2018, 30), and they also argue that phenomena in these systems match models of human phenomena, establishing a quantitative similarity as well (2018, 55). Nonetheless, these espoused similarities do not alone serve as reason to defend that these systems are cognitive. Qualitative similarities need not capture what is constitutive

of cognition or a cognitive ability. For instance, memory formation might involve signaling or storage, but showing that a phenomenon involves signaling or information storage of a sort does not entail that this phenomenon meets the total set of criteria traditionally associated with memory (Colaço 2022a). Likewise, the fact that a single model adequately represents phenomena of human cognition and those of unconventional systems does not prove that they are the same kind of phenomenon, as one strength of modeling is that we can use a model to represent or explain otherwise diverse phenomena (Batterman, Rice 2014). For instance, some proponents in the unconventional cognition debate model memory in terms of the Free Energy Principle (Gershman 2023), but this principle can be applied to a variety of phenomena that are otherwise different from one another. These examples indicate that, while a perceived similarity might be worthy of investigation, the sort of unification desired by some proponents in the unconventional cognition debate demands something more than relating phenomena elicited from unconventional systems to established qualitative descriptions or quantitative models currently used in cognitive science.

If determining similarities or promoting analogical reasoning is not sufficient for blocking MHC, what more is needed to fulfill proponents' unificatory aims? Figdor supplies an answer to this question, noting that the qualitative and quantitative similarities between humans and unconventional systems might "provide reason to reconsider what the terms mean when applied to humans" (2018, 58). Thus, proponents should not just try to fit phenomena elicited from unconventional systems into how we currently use cognitive kind terms and concepts. Instead, these proponents are better off trying to change how we think about cognition across the board, including how it manifests in humans. The aim of unification here is conceptual: if we want to de-humanize cognition, we ought to revise our cognitive kind terms and concepts rather than merely accommodating unconventional cognitive systems with them.

The unification avenue cannot consist in just presenting unconventional cognitive cases as defense for alternative approaches to conceptualizing cognition (or vice versa). As I mentioned in Section 2, one person's modus ponens is another's modus tollens: if skeptics reject these alternatives, then showing that the alternatives apply to systems that the skeptics do not want to count as cognitive is not going to convince them otherwise, nor should it. Instead, I wager, proponents ought to focus on the existing limitations of accounting for phenomena in systems that both proponents and skeptics agree are cognitive. That is, part of the unconventional cognition debate ought to orient itself to the assessment of cognitive phenomena in humans. Correspondingly, part of the conceptual dimension of the debate ought to challenge the applications of cognitive kind terms and

concepts to humans.

While many proponents in the unconventional cognition debate are dissatisfied with understanding cognition solely or even principally in terms of humans, I take it as a (hopefully uncontroversial) point of agreement that no one who wants to 'de-humanize' cognition desires to end up with a view according to which humans do not count as cognitive systems. Rather, I expect that they aim to end up holding that humans are cognitive systems, even if they are not (nor should we assume them to be) the exemplars of these systems. If my presumption is correct, then it stands to reason that these alternative approaches should help to illuminate human cognition just as they help to illuminate cognition in unconventional systems. The unification avenue thus can contribute to accounting for the phenomena that lie in the extension of cognitive kind concepts as understood by both sides of the debate. In other words, the unification avenue can contribute to accounting for phenomena to which all concepts of cognition in this debate apply.

The unification avenue does not begin with a single concept of cognition whose intension demarcates a set of phenomena in its extension. Rather, it begins with a set of phenomena that overlaps the extensional spaces of different concepts in the unconventional cognition debate.[4] This set is thus a shared space that everyone in the debate aims to account for, and, if the point of agreement is indeed uncontroversial, it includes cognitive phenomena that occur in humans. Our accounts of human cognition are not settled affairs. Looking at cases in human memory science as one set of examples, there are numerous reports of odd memory phenomena, referred to as "memory quirks" (Cleary, Schwartz 2020), that are difficult for researchers to characterize let alone explain and square with existing memory theories and models. Likewise, there is a continued debate over the mechanisms that underwrite human memory phenomena. For instance, many scientists, some of whom are proponents in the unconventional cognition debate, argue that human memory phenomena, including memory encoding, storage, and retrieval processes, cannot be accounted for solely in terms of synaptic activity. These scientists push the position that intracellular molecular mechanisms play an ineliminable and distinct role from synapses in humans and other organisms, though this is a controversial position (see Colaço, Najenson 2023). One strength of the unification avenue is that the investigation of unconventional cognitive systems might lead to new insights in conceptualizing and ultimately accounting for these human phenomena in addition to phenomena in unconventional systems.

This should be part of the unconventional cognition debate:

4 See Akagi 2018 for more details on concepts and their extensional spaces.

proponents should aim to bring insights from unconventional systems to bear on human cognition in an endeavor to unify our accounts of cognition and address human phenomena that are not well-captured by existing accounts. Proponents can home in on the properties that cluster amongst phenomena all agree are cognitive and can separate them from properties that do not. While this avenue alone does not guarantee that those in the debate will identify the essential features of cognition, if there indeed are such features, it provides a method for systematizing and explaining phenomena that all agree are cognitive by connecting them to what we learn about phenomena in unconventional systems. Some proponents in the debate pursue this avenue. It is evident in Lyon's criticisms of 'anthropocentric' approaches failing to account for many human phenomena (2006) or Ciaunica and colleagues' arguments that insights from cognition in single-celled organisms should inform our understanding of cellular cognitive mechanisms in the human brain (2023). Crucially, these pursuits are intended to extend insights from alternative approaches to conceptualizing cognition, filling out or challenging our understanding of human cognition and the neural mechanisms that ostensibly underwrite it. These concepts deployed in these cases are not intended to explain; they are intended to orient research that will help to characterize and explain human phenomena that currently are neither well-characterized nor well-explained (Colaço 2022a).

These cases show an upshot to pursuing a unification avenue. Fitting unconventional cognitive systems to existing accounts of human cognition, as currently understood, is inadequate. New conceptualizations of cognition should also give new insight into humans, just as they do for the unconventional systems. Unless proponents aim to defend the idea that there is no shared set of phenomena in the extensions of different concepts of cognitive kinds in this debate, at which point MHC rears its head, a unification avenue allows them to connect conceptualizing via shared phenomena for which they can account. This pursuit should be done in the endeavor to conceptually unify these systems while simultaneously changing how we conceptualize cognition across the board, blocking MHC in the process.

4 The Generativity Avenue

The second avenue for blocking MHC in the unconventional cognition debate involves the aim of generativity. Specifically, the idea is that the study of unconventional cognitive systems can orient new research on cognitive systems, allowing philosophers and scientists to discover novel phenomena that they likely would not discover if they were not oriented to them. The generativity avenue is based on the conjecture that there are new phenomena to be discovered in

unconventional systems as well as in humans, and conceptualizing cognition in new ways can inform these discoveries.

Several proponents in the unconventional cognition debate suggest that there is a generative aim in their research. For instance, Lyon emphasizes her aim of "stimulat[ing] debate about the correct way to proceed to answers" in debates over what cognition is when describing her biogenic approach (2006, 11-12). Likewise, supporters of basal cognition note that, in conceding cognition to unconventional systems, their focus is on: "Whether proceeding as though this were the case, in a biologically realistic fashion, is productive" (Lyon et al. 2021, 14). In another approach called cobolism, Keijzer argues that his approach both fits existing cases and suggests: "new research on phenomena that have cognitive characteristics irrespective of whether we are currently willing to call these phenomena cognitive" (Keijzer 2021, S152). The ideas of stimulating research, being productive, and suggesting new research all reflect the generative dimension of research on unconventional cognitive systems.

While discovering and characterizing phenomena can be valuable to philosophical and scientific analysis, this generativity alone need not block MHC. As I mentioned in Section 2, skeptics in the unconventional cognition debate seem amenable to accepting at least some reports of novel phenomena in unconventional systems. Where they express skepticism is in considering these phenomena as relevant to the study of cognition. If these novel phenomena are only counted as cognitive according to alternative approaches to conceptualizing cognition, skeptics seem justified in resisting these approaches as appropriate and remaining steadfast in the idea that applying cognitive kind terms and concepts to these phenomena does nothing more than reflect that these phenomena are worthy of investigation. As with the unification avenue, some additional connection must be made between these phenomena and how skeptics already use these terms and concepts.

Indeed, definitions that proponents have presented are often broad, leading some skeptics to question the value of these definitions for studying cognition. Focusing again on memory, one example of these broad definitions is from Lyon's biogenic approach, where memory is "the capacity to retain information for a length of time greater than zero" (Lyon 2006, 20). Another example is from Baluška and Levin, consistent with basal cognition, where "memory can be defined as experience-dependent modification of internal structure, in a stimulus-specific manner that alters the way the system will respond to stimuli in the future as a function of its past" (Baluška, Levin 2016, 2).

Adopting these definitions heuristically might help us to orient researchers to the discovery and characterization of phenomena in unconventional systems that they might not find otherwise, the skeptic

might say, but their broadness does little to help with the study of memory in humans. Further, the skeptic might continue, these definitions show that memory in humans, traditionally defined in a far richer way, is only superficially similar to these 'memory' phenomena in unconventional systems (Colaço 2022a). Without much substance connecting these definitions to the study of memory more generally, MHC is not blocked.

One option that might provide a block to MHC in this case is for us to think of these definitions as hypotheses that orient research and are tested via this research, as opposed to treating them as expressions of what (in this case) memory is. In recent work, I have argued that these broad definitions are hypotheses: "The content of the definition orients researchers to its test, and researchers adopt it because its content demarcates phenomena on which they test" (Colaço 2022a, 93). This allows researchers to "investigate phenomena to which the definition applies, which they may not do if it did not apply to these phenomena" (Colaço 2022a, 93).

The idea is for proponents and skeptics to test the definition against the set of phenomena in its extension, with the aim of determining what other properties cluster amongst these phenomena. For the definitions of memory I have discussed, this set of phenomena includes those in humans and many of those in unconventional systems. Accounting for definitions provided by proponents in the unconventional cognition debate as hypotheses is thus useful because it provides a rigorous way of thinking about what cognition (or a specific cognitive activity) is without requiring a commitment that the given definition is correct (Colaço 2022b, 453).

In recent publications, the 'discoveries' that I addressed revolve around determining new similarities amongst a set of phenomena (2022a; 2022b). However, as is the case with any empirical hypothesis, these hypotheses can also play a role in orienting research to the discovery of phenomena that lie in the extension of these hypotheses. As hypotheses, these definitions can be used to make predictions about phenomena that fit their extension but have not yet been discovered. One can derive observable implications from these definitions that can orient and guide the discovery process.[5] Thus, once one thinks of definitions not as expressions but instead as hypotheses, these definitions can be employed in distinct ways that drive the search for phenomena in the definitions' extensions. While not all definitions will be suited to being hypotheses, the broad definitions provided by proponents have extensions that overlap with the extensions of conventional definitions. Thus, these hypotheses are not pursued simply because they are interesting, as this would result in

5 See Bich, Green 2018 for a related view.

MHC. Rather, we can assess these hypotheses via a shared body of 'data', which are the phenomena in the extensional space and the relations between them.

Much as our accounts of human cognition are not settled affairs, we have likely not exhausted the discovery and characterization of interesting and appropriate cognitive phenomena in humans. One advantage to thinking of these broad definitions as generative hypotheses is that they apply to humans and unconventional cognitive systems in equal measure. By implication, these definitions can also orient research on the discovery and characterization of phenomena in humans, rather than simply accommodating known human cognitive phenomena. Thus, if one adopts an approach to conceptualizing cognition that is inclusive of all paradigmatic cognitive systems as well as the unconventional systems of focus in this debate, one can drive research on novel phenomena that are not exclusive to these unconventional systems. The approaches that I discussed in Section 2 can be productive for the study of human cognition, playing the same role across the gamut of systems to which these approaches apply.

The idea of searching for novel phenomena in humans via the generative guidance of alternative conceptualizations of cognition parallels the idea of accounting for human cognitive phenomena via the unificatory guidance of these approaches. It is admittedly more speculative – after all, it is unclear what researchers might find – but there is an opportunity for us to discover novel human psychological phenomena. Likewise, there are initial reports and proofs of concept of mammalian neuronal signaling phenomena that are in part informed by research stemming from the unconventional cognition debate. In memory science, for example, recent insights about a possible mechanism for the neural readout of a molecular engram (Mollon et al. 2023) builds upon the molecular model of memory that I discussed in Section 3. This research intersects with and supports the study of memory in single-celled organisms (Gershman et al. 2021; Gershman 2023). In this case, alternative approaches guide the search for these non-synaptic signaling phenomena in the human brain as well as in unconventional systems.

These cases show an upshot to pursuing a generativity avenue. Merely discovering and characterizing phenomena in unconventional cognitive systems is inadequate. New conceptualizations of cognition should also orient the discovery and characterization of human cognitive phenomena, just as they do for the phenomena that can be elicited from unconventional systems. This pursuit should be done in the endeavor to generate new research in these systems while simultaneously adding to the set of phenomena that are in the extension of terms and concepts of cognition across the board, blocking MHC in the process.

5 Conclusion

Should we apply cognitive kind terms and concepts to unconventional systems? In this paper, I have used the Mere Honorific Conclusion as a framing device for exploring the unconventional cognition debate. I argue that the unificatory and generativity avenues, when understood as applying to humans, offer a clear defense to the pursuit of cognition in unconventional systems and a block to this conclusion. Together, these avenues, already suggested in the literature, supply a strong case for the investigation of cognition in unconventional systems as a research program that can be evaluated in terms of new accounts for and new discoveries of cognitive phenomena, human and otherwise. Both avenues can block MHC by taking advantage of the set of phenomena in the overlapping extensional space of different cognitive kind terms and concepts in the debate. Accounting for and discovering new phenomena in this space allows for a way of challenging what cognition is while maintaining a connection to the phenomena that all in the debate aim to count as cognitive.

As a research program, this investigation is dependent on accounting for and discovering human phenomena. Even if proponents in this debate do not wish to take humans as exemplars of a cognitive system, they should not eschew human cognition in their investigations, as the research program depends on connecting insights on phenomena in unconventional systems to those in humans. Correspondingly, there is an empirical dimension to this research: should proponents be unable to substantiate these connections with their investigations, the research program will degenerate and ought to be reoriented or abandoned.

My arguments in this paper are not intended as a defense of the idea that unconventional systems like plants, single-celled organisms, or slime molds are cognitive. Rather, my claims are intended as an exploration of when proponents might be justified in investigating these systems and trying to connect these investigations with those of traditional cognitive science. Skeptics should acknowledge that these connections are possible, that our understanding of cognition likely can be revised based on new scientific research, and that the outcomes of this research might provide a defense for cognition in unconventional systems. At the same time, proponents should acknowledge that the outcomes of this research might ultimately provide a good reason to reject that these systems are cognitive. Such is the nature of a research program.

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