Book Review
The Unexplained Intellect: Complexity, Time, and the Metaphysics of Embodied Thought

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GENERAL OVERVIEW

Christopher Mole’s offering is an ambitious undertaking, encompassing discussions of computational complexity, metaphysics, epistemology, cognitive science and philosophy of mind. All this it does at a slim 182 pages. On occasion, this brevity comes at the cost of assuming a lot of the reader. Explanations of complex issues are compact, and the overall argument proceeds at a
quick pace. These explanations are grounded extensively in context of intellectual history. In particular, Mole often returns to the works of Maurice Merleau-Ponty, Iris Murdoch, and Gilbert Ryle. These authors’ works focus on the constraints everyday roles, experiences, and activities place on theoretical accounts. This influence forms the guiding thread of Mole’s argument. At the end of the day, The Unexplained Intellect is an impressive work, which makes an interesting and novel contribution to the literature on the nature of intelligent behavior.

The objective of the book is to argue in favor of a process-based account of intelligent behavior which falls broadly under the auspices of an embodied/embedded/extended philosophy of mind. To accomplish this, Mole sets out to: a) provide a definition of the phenomenon of intelligent behavior; b) provide reason to doubt an extant, dominant account of intelligent behavior; and 3) develop a new account which explains intelligent behavior in terms of temporally extended processes rather than transitions between discrete states.

In Part 1, Mole articulates what he takes to be an accurate and theoretically helpful definition of intelligent behavior. Briefly, an agent displays intelligence when they act in a way that “… [satisfies] complex rational constraints [regulating a performance]” (p. 11, original emphasis). Moreover, Mole manifests his sympathy with the embodied/embedded/extended view of mind by arguing that intelligence is not a separate mental phenomenon which abstractly manages processes like perception and action—but they way in which they mutually support each other. Next, he proceeds to discuss the problems posed for computational accounts of intelligence by the complexity of constraints on performing actions like checking sets of beliefs for coherence. This negative argument creates space
for the work of the next three parts, which comprise Mole’s positive argument.

In Part 2, Mole stresses the importance of temporal orientation for the explanation of some mental phenomena. Here, the notion of “temporal chirality” is developed to describe mental phenomenon which are always “directed” a certain way in time. Temporal chirality, in turn, is used to explain a notion of epistemically encountering propositions. This relates to the problem posed in Part 1 regarding checking sets of beliefs for coherence. Mole states that temporal orientation is key to determining when an agent’s set of beliefs successfully satisfies the myriad constraints of rationality.

In Part 3, Mole argues for the metaphysical fundamentality of processes over states in accounting for mental phenomenon. The process of metaphysically “leveraging” one sort of entity from another is used to demonstrate that, at least for key mental phenomenon, one can profitably explain states in terms of processes—but not processes in terms of states.

In Part 4, builds directly on the work of Parts 2 and 3 to argue that a process-based philosophy of mind gives the best account of intelligent behavior. Mole argues that three distinctive phenomena in the philosophy of mind—perception, action, and inference—are best explained in terms of dynamic, extended epistemic encounters with agents’ environments.

In the remainder of this review, we will look more closely at the load-bearing parts of Mole’s argument.
PART 1

The first part of *The Unexplained Intellect* is likely to be the most challenging for readers. Whereas most will be familiar with the general outline of a computational approach to issues in the philosophy of mind, many will not be fluent in the concepts of theoretical computer science. However, it is indispensable to Mole’s argument that the ramifications of computer scientist’s results concerning complexity are understood. The relevant concepts and results are: P-complexity, NP-complexity, 3SAT, the Church-Turing thesis, and the Cobham-Edwards thesis. All of these bear upon classifying computation problems in terms of whether they are solvable and/or checkable in feasible ways. Here, “solvable” and “checkable” refer to whether there can be found *optimal* solutions to problems (like the infamous Three-Color Problem). Mole notes that quotidian intelligent behavior, like rationally managing beliefs sets, is in the set of NP-hard problems: i.e., problems for which computing an optimal solution would require unfeasibly many steps. What is meant by “unfeasibly many” here is arbitrarily, or infinitely, many steps such that finding a solution is at least physically impossible. Given that agents *do* manage to accomplish such intelligent operations, Mole argues that this suggests standard computational explanations of intelligence are not in the offing.

After making this point, Mole anticipates and addresses a number of replies. He deals with the idea that non-classical, quantum computing might provide profitable ways to explain intelligent behavior; and, he deals with the idea that the results of theoretical apparatuses regarding optimal solutions don’t apply to intelligent agents like humans, who deal mostly in non-optimal solutions.
With respect to quantum computing, Mole poses a dilemma. Either the behavior of agents is not subject to quantum effects and so quantum mechanics has no bearing on computational accounts of intelligence, or the behavior of agents is subject to such effects and there is no need for any account of intelligence. The first horn is straightforward. On the interpretation where quantum effects are limited to the super small scale, “ … warmish and interactive [places] where quantum computing cannot take place” (p. 29). The second horn relies on the idea that the need for an explanation of intelligent behavior only exists when large scale states and events cannot exist in the superpositions characteristic of quantum phenomenon. Mole contends that, if large scale states can be superpositioned, then agents do not act to satisfy complex (often conflicting) constraints, but instead take all possible routes (including the optimal ones) in one world or another.

Regarding the difference between optimal and sub-optimal solutions, Mole argues that this makes no substantial difference. In the various ways that intelligent agents might approximate optimal solutions, such solution would still take unfeasible amounts of time.

Having listed the problems with computational explanations of intelligence, Mole discusses why activities like rational management of a belief set prove so difficult for theoretical computer science. Intelligent behavior largely deals with responding to abstract, global features of particular situations. Moreover, intelligent agents are able to respond to a wide variety of global features and develop ways to respond to novel features. The best explanation for this, claims Mole, involves a move towards embedded/embodied/extended theories of cognition. Here, the claim takes shape in a now familiar way. Agents’ cognitive abilities are structured in such a way as to rely on
features of their environment. What would be impossible for an agent to do entirely with their internal resources, becomes possible when they rely on other agents and the environment. Mole’s particular inspiration for this perspective comes from an appreciation of the work of Maurice Merleau-Ponty. The ultimate goal of Mole’s analysis is to understand intelligent behavior “… as being built up of from the environmentally engaged operations of an embodied system” (p. 66).

PART 2

The second part of the book explores the importance of agents’ temporal situatedness for explaining features of psychological states. Crucially, Mole claims that, “[a] past-to-future temporal orientation therefore seems to be essential to having a mind in which knowledge is achieved and intentions are formed” (p. 70). Thus, if Mole can show that such temporal orientation requires appealing to dynamic (rather than static) mental phenomenon, then he will have shown that some phenomenon characteristic of intelligent behavior demand just the sort of explanation he offers.

Mole’s argument relies a lot on linguistic constructions and our intuitions about them to do work. The central claim is that there are “temporally chiral” attitudes which help to explain agents’ epistemic relations to evidence. Temporal chirality is the phenomenon in which certain attitudes are always oriented in only one temporal “direction”: i.e., past-ward, present-ward, or future-ward. For example, remembering is temporally chiral with respect to the past and expectation is temporally chiral with respect to the future. Importantly, this applies only to non-propositional attitudes, according to Mole. Whereas agents can remember that it will rain tomorrow, they cannot now remember the rain tomorrow.
That chirality is a feature of the non-propositional but not the propositional is what leads Mole to make his point about agents’ epistemic relationship to evidence. While agents can remember that it will rain tomorrow, this remembrance is based on an epistemic encounter with some event: say, a weather report. An agent heard the report earlier in the day, and remembering having heard the report—the content of which was tomorrow’s weather—can now remember that it will rain tomorrow. The point is that, the temporal features of content do not engender chirality; instead, it is an agent’s relationship to some event. (Ultimately, Mole will give his general account in terms of propositions—but that comes later.)

To drive home the point, Mole applies his notion of temporal chirality to the distinction between episodic and semantic memory in psychology. The best way to explain the difference between episodic and semantic memory, argues Mole, is their epistemic character.

The difference between the temporally chiral episodic memories and the temporally achiral episodic ones is ... that the object of semantic memory is, unlike the object of an episodic memory, is a proposition. This difference is crucial because a proposition is the sort of object that can be epistemically encountered as the conclusion of an argument” (p. 91: original emphasis).

The content of an argument’s conclusion can pertain to any time, irrespective of when the argument itself was encountered by an agent. But, eventually, all agents’ beliefs will be related to epistemic encounter with an event—the past-to-future orientation of evidence to beliefs. This encounter will be temporally chiral, and so Mole concludes that the temporal chirality is crucial to understanding the temporal orientation of intelligent behavior.
PART 3

The third part of the book consists of extensive work in metaphysics. Mole starts by addressing the annoyance or discomfort metaphysics engenders in many contemporary readers. While it is not the main point of the work, the defense Mole gives of metaphysics as an important and serious endeavor is convincing and accessible. Appealing to Iris Murdoch’s on metaphysics and morality, Mole highlights the ubiquity of metaphysical issues in both philosophical and scientific explorations. As an example, he discusses the idea of “leveraging” the existence of events like football matches from the existence of entities like football leagues. Further, properties of objects—like a cup being a league trophy—are leveraged from the existence of leagues. The point is that the creation of properties and events is routine, and the existence of leveraging relationships between them is uncontroversial. Given that this is so, Mole concludes that there is no significant problem in deploying metaphysical machinery to make progress on the problem of accounting for intelligence.

The specific work Mole wants to use metaphysical machinery for is to show that mental states should not be the fundamental entities in the philosophy of mind for the explanation of intelligent behavior. Central to this effort is the example of melody perception. “To have responded to a sequence of notes is not yet to have registered anything about the relations among those notes, and to the melody itself these relations are essential” (p. 116). Harkening back to Part 1, being a melody is one of the global properties that intelligent agents are capable of responding to. Not only does the idea of a melody as a collection of notes not seem to do justice to the thing itself, but it also does not do justice to the experience of hearing a melody. Both the metaphysical and phenomenological aspects are important to Mole
throughout. However if we take the extended, dynamic entity that is a melody as fundamental, there is not a problem of understanding—either metaphysically or phenomenologically—individual notes. That is, it is easier to leverage individual notes from melodies than it is to leverage melodies from a collection of notes (and their relations to each other).

PART 4

In the final part of the book, Mole brings everything together to make his positive argument. He gives precise formulations of when agents’ epistemically encounter propositions, argues that encounters are dynamic, and then analyzes several crucial phenomenon in the philosophy of mind in terms of dynamic encounters.

Here, Mole wants to say that the $x$ which is encountered does not have to be an event: indeed, propositional encounters are argued to be fundamental.

A subject epistemically encounters an event, per se, if and only if the subject encounters a proposition pertaining to the event in a way that it is influenced by the event itself (p. 129).

Mole insists that encountering an event can only be properly epistemic when an agent has a propositional thought content pertaining to the event. The idea here is that non-propositional thoughts are not apt for being true or false, and hence cannot play an evidential role.

The above definition of an epistemic encounter is then generalized as follows.
A subject epistemically encounters \( x \) only when that subject’s \( x \)-regarding conduct proceeds in a way that is determined by the form of \( x \) (p. 130).

The idea of being determined by the form of \( x \) is explained not in terms of causation, but influence. This is required to avoid being tied to claiming that abstract entities like propositions can cause things. Mole claims that there is nothing problematic with his notion of formal determination by with the following.

The 17-year cicada avoids recurrent predation; an explanation of the way in which it does so must advert to the proposition that 17 is a prime number. The polar bear has evolved to have white fur. An explanation of the way in which it has done so must advert to the proposition that snow is white (p. 132).

Next, Mole argues that encounters must be thought of as dynamic rather than static. When an agent is epistemically encountering some proposition in a particular way, they are engaged in a temporally extended process. Returning to the example of melody perception, the idea is that an agent encounters the proposition *that this is ‘The Star-Spangled Banner’* by way of hearing a person singing it at the beginning of a baseball game. The event of hearing, and thus the way the agent is related to the relevant proposition, is temporally extended. As we saw in Part 3, (perceptions of) melodies cannot be leveraged out of the (perceptions of) individual notes. Thus, an account in terms of states is seen to be inadequate, and an account in terms of processes is required. Moreover, the example of melody perception already gives us an example of perception being explicable in terms of dynamic epistemic encounters.
Beyond perception, Mole also aims to explain intentional action and inference in terms of dynamic epistemic encounters. The details of these arguments won’t be discussed here. The remainder of Part 4 mainly deals with demonstrating how Mole’s account of dynamic epistemic encounters can do important work in philosophy of mind and epistemology. The final issue to be examined here is Mole’s own concluding remarks about his project.

The original goal set out in Part 1 was to provide a satisfactory account of intelligent behavior in the face of the inadequacy of popular computational explanations. Mole’s positive account aims to provide such an explanation in terms of dynamic epistemic encounters. The general definition of intelligence that has operated throughout is performing activities requiring the satisfaction of complex constraints. In the last sections of Part 4, Mole discusses high-level activities such as belief revision, interpersonal relationships and professional roles. All of these are accomplished through intimate engagement with others agents and the environment. The impetus to this sort of explanation comes from Mole’s reliance on Mzerleau-Ponty, Murdoch, and Ryle. However, Moles makes it his own by cashing-out the notions of embodiedness and embeddedness in terms of dynamic epistemic encounters with the world.

[Our] capacity for the intelligent pursuit of truth requires all our faculties for its explanation. An active rapport with world is essential to any intelligence that could be physically explicable. That rapport is amor the most basic of mental phenomena. It is the proper foundation on which to build a theory of the mind (p. 168).
CONCLUDING REMARKS

The Unexplained Intellect paints, overall, a compelling picture. Mole brings together considerations from diverse subject matters and methodological approaches, and synthesizes them into a clear positive account of intelligent behavior.

In a few spots, Mole moves perhaps too quickly and explains things in an unsatisfactory fashion. For example, the discussion of computational complexity and the jargon of theoretical computer science assumes a more substantial understanding of these issues than the general reader of this book might possess. (This is a personal observation, based on the author’s own background knowledge.)

Another instance presents more of a difficulty. When Mole refines his account of epistemic encounters in Part 4, he argues that the metaphysical fundamental type of encounter is of propositions, rather than events. Subsequently, when the notion of formal determination is explicated, Mole insists, “The 17-year cicada avoids recurrent predation; an explanation of the way in which it does so must advert to the proposition that 17 is a prime number” (p. 132). That propositions can do this sort of explanatory work is important, but is not given an explanation in proportion to its importance—neither in the main text or notes.

There is no doubt that The Unexplained Intellect will generate a great deal more discussion about philosophical accounts of intelligence. Both the negative argument against computational explanations, and his own positive account of dynamic encounters, provide rich ground for others explore.