

Book Reviews

EPISODIC AND SEMANTIC MEMORY AND IMAGINATION: THE NEED FOR DEFINITIONS

Thinking About Human Memory

By Michael S. Humphreys and K. A. Chalmers. Cambridge, England: Cambridge University Press, 2016. ix + 227 pp. Hardcover, £69.99

Humphreys and Chalmers's stimulating book sets out a novel and ambitious approach to thinking about human memory. Rather than thinking about memory in terms of general memory systems, they argue, we should think about it primarily in terms of specific memory tasks. In practice, thinking about memory in terms not of systems but of tasks requires us to break tasks into five components: the subject's goals in performing the task, the cues used by the subject to perform the task, the information needed by the subject in order to perform it, the opportunities available to the subject to learn the necessary information, and the sources of noise involved in the memory process. Humphreys and Chalmers refer to this approach to understanding memory in terms of tasks and their components as the Gold CIONs approach, for *goals, cues, information, opportunities, and noise*.

After a short introductory chapter, they devote the bulk of the book to outlining the Gold CIONs approach, with one chapter dedicated to each of its five components. They begin, in chapter 2, with the first component, the attempt to determine the goals of a task. Although the emphasis in this chapter on the fact that the subject's goals may not coincide with those of the experimenter is welcome, the chapter is

much briefer than those that follow, and it might have been helpful to include a more detailed discussion of how the subject's goals are to be identified. They continue, in chapter 3, with the next component of their approach, the analysis of the cues that are available to the subject. These include cues provided by the situation, cues provided by the experimenter, cues provided by the subject, and cues provided by the environment in which the task is performed. Cues of the latter sort, which include the recurrence of events at predictable intervals, are particularly interesting from the perspective of researchers interested in episodic memory, especially those who understand episodic memory as a form of mental time travel, for, as the authors note, they may play a crucial role in the development of the capacity for future-oriented mental time travel.

In chapters 4 and 5, Humphreys and Chalmers tackle the next two components of the Gold CIONs approach: information and opportunity. Chapter 4 argues that the information needed to enable the subject to perform a task can include both associations between stimuli and responses and associations with memories. Chapter 5 focuses both on how to identify the opportunities available to the subject to learn the necessary information and the kinds of conditions that either encourage or discourage learning. The components discussed in these chapters, Humphreys and Chalmers point out, can be understood independently of views about the nature of memory storage. In contrast, our understanding of noise, the final component of the Gold CIONs approach, often depends on our views of memory storage, and chap-

ter 6 sees the role of noise specifically through the lens of a view of storage as distributed or composite. Building on the parallel distributed processing approach, Humphreys and Chalmers treat memories as distributed patterns, assuming that storage of memories occurs via the superimposition of new patterns onto existing patterns. Readers interested in older (Sutton, 1998) or more recent (Robins, 2016) debates over the implications of distributed views of storage for theories of remembering will find this chapter particularly rewarding.

The five chapters on goals, cues, information, opportunities, and noise are followed by a chapter on how human memory is controlled by the subject, by other subjects, and by the environment. The brief concluding chapter is preceded by a lengthy chapter on the possibility of defining episodic memory and the sources (including problems due to the existence of both quantitative and qualitative changes in memory mechanisms, problems due to interactions between episodic and semantic memory, and problems due to the conventional understanding of episodic and semantic memory as systems) of the difficulty of determining whether nonhuman animals and young children have episodic memory. Although the heart of the book is undoubtedly constituted by the chapters setting out the Gold CIONs approach, and although the tone of the chapter on episodic memory is somewhat more tentative than that of the preceding chapters, it is on this chapter that I will focus, for this review will be published alongside Humphreys and Chalmers's review of my book, and it is in its discussion of the challenge of defining episodic memory that their book resonates most strongly with my own.

Although the focus throughout their book is on episodic memory, Humphreys and Chalmers emphasize, at the beginning of chapter 8, that they have not yet proposed a *definition* of episodic memory. By the end of the chapter they are no closer to doing so, but this is not an oversight on their part: Their view is that, at present, no satisfactory definition of episodic memory is available. The closest we can come to a definition, they suggest, is a set of "rules of thumb" (p. 164), the presence of features such as autobiographical reference, rapid learning, and hippocampal involvement, for determining whether a given task should count as an episodic memory task. Although their reluctance to offer a definition is not unreasonable, the lack of an explicit definition inevitably entails an occasional lack of conceptual clarity both with respect to the distinction between episodic

and semantic memory and with respect to the distinction between episodic memory and other processes. For example, Humphreys and Chalmers repeatedly contrast memorial and nonmemorial processes or components of systems—even offering, at the very end of the book, the involvement of nonmemorial elements in the performance of episodic memory tasks as a reason for replacing the notion of an episodic memory system with that of an "episodic problem solving system" (p. 199)—but, absent a definition, the basis for the classification of certain processes or components as memorial and others as nonmemorial remains obscure.

Of course, Humphreys and Chalmers are not alone in being reluctant to offer a definition of episodic memory (Klein, 2015), and their aim in the book is certainly not to propose a definition. Nevertheless, it is worthwhile to reflect on what we want out of a definition. In part, what we want is a means of distinguishing between episodic memory and related phenomena. Humphreys and Chalmers focus on the distinction between *episodic* and *semantic* memory. In my own book (2016), I focus, as is standard in philosophy, on the distinction between *episodic memory* and *episodic imagination*. In the remainder of this review, I discuss both of these distinctions. First, I suggest a new perspective on the distinction between episodic and semantic memory on which Humphreys and Chalmers focus. Second, I consider potential interactions between their treatment of that distinction and my treatment of the distinction between episodic memory and episodic imagination.

When Humphreys and Chalmers argue that we are not in a position to provide a satisfactory definition of episodic memory, what they seem to have in mind is the difficulty of providing a criterion for something's being an instance of episodic memory, that is, a feature capable of distinguishing between episodic and semantic memory in all cases. But whether a criterion can be given for a concept depends on what sort of concept it is. When dealing with the nature of scientific concepts, philosophers often invoke the notion of *natural kinds*. There is a large technical literature on natural kinds, but the basic idea is that natural kinds are kinds that "carve nature at its joints." In other words, natural kinds group objectively similar entities together, and therefore the vocabulary of a mature science should consist largely of natural kind concepts. Merely *nominal kinds*, in contrast, group objectively dissimilar entities together, and therefore nominal kind concepts have little role to play in a mature science. The case of jade is a standard ex-

ample. The term *jade* was formerly applied to two superficially indistinguishable substances, jadeite and nephrite. Though superficially similar, jadeite and nephrite are objectively dissimilar. The concept of jade thus turns out to be a mere nominal kind concept of limited scientific utility.

Older views of natural kinds tend to take the kinds of the physical sciences as their starting point and therefore to assume that kinds can be characterized in terms of the features that are essential to them. If kinds are to be characterized in terms of their essential features, then it should always be possible in principle to provide a criterion for something's being an instance of a given kind. For example, nothing counts as a sample of water unless it is composed (primarily) of H₂O. However, newer views are cognizant of the fact that as we move from the physical to the biological and human sciences, it becomes increasingly difficult to identify essential features. Rather than understanding kinds in terms of essential features, these views understand them in terms of homeostatic property clusters (Boyd, 1999; Craver, 2009), clusters of properties whose presence tends, through the action of an underlying mechanism, to covary with the presence of others. If kinds are characterized as homeostatic property clusters, then it will not always be possible to provide a criterion for something's being an instance of a given kind, for a given property need not always be present.¹

Episodic memory may be a homeostatic property cluster kind. Even if it were impossible to provide a criterion for something's being an instance of episodic memory, that would not necessarily imply that episodic memory is a merely nominal kind. Indeed, the difficulty of providing a definition of episodic memory does not prevent Humphreys and Chalmers from being confident that episodic and semantic memory constitute "two clusters of phenomena" (p. 164) and hence that episodic and semantic memory tasks may be identified by means of rules of thumb. If episodic memory is a natural kind, it may well be a kind unlike those found in the physical sciences and like those found elsewhere in the biological and human sciences, in which case such rules of thumb are all that can be hoped for. However, rules of thumb may amount to a perfectly good definition of a homeostatic property cluster kind. When it comes to a phenomenon as complex as episodic memory, it may be that the search for a simple criterion is out of place and that what is needed is a list of properties (e.g., autobiographical reference and rapid learning) that tend but need not always cluster together because

of the action of an underlying mechanism (e.g., the hippocampus).

I offer the idea that episodic memory may be best understood as a homeostatic property cluster kind merely as a suggestion, a potential way of making sense of the difficulty of providing a traditional definition to which Humphreys and Chalmers point. In my own book, in fact, I do attempt to provide a traditional definition, though one designed to distinguish not between episodic and semantic memory but rather between episodic memory and episodic imagination. More precisely, I appeal to research on episodic remembering as a form of past-oriented mental time travel analogous to forms of future-oriented mental time travel such as episodic future thinking (Michaelian, Klein, & Szpunar, 2016) to argue against the influential causal theory of memory (Bernecker, 2010; Martin & Deutscher, 1966), which sees remembering as being sharply distinguished from imagining, and for an alternative simulation theory that sees remembering as a kind of imagining. I will review neither the details of the simulation theory nor my argument for it here. But I will note that whereas the causal theory understands the distinction between remembering the past and merely imagining it as being due to the presence (in the case of remembering) or the absence (in the case of imagining) of a specific sort of causal link between the subject's current representation of an event and his original experience of it, the simulation theory rejects the requirement of a causal link. Instead, it understands remembering as being a matter of imagining the past: A subject "merely" imagines the past only when imagining a past event that he or she did not experience.

The simulation theory is offered as an account of episodic memory only; that is, it is not meant to apply to semantic memory. But the causal theory does apply to both episodic and semantic memory, and Humphreys and Chalmers's discussion of the distinction between episodic and semantic memory suggests a way of extending the simulation theory to semantic memory. The idea would be to start with the question of the distinction between semantic memory and semantic imagination (e.g., Byrne, 2007) and then to appeal to work on ways in which beliefs are constructed on the fly to undermine the view that there is a sharp distinction between semantic memory and semantic imagination. Rather than seeing semantic memory as requiring a causal connection with an earlier belief, as in the causal theory, the idea would be that no such connection is required, with semantic remembering appearing as a kind of se-

semantic imagining: Just as episodic remembering is a matter of imagining an event that was the object of a past experience (as opposed to some other event), semantic remembering would be a matter of imagining a proposition that was the object of a past belief (as opposed to some other proposition). This would amount to a simulation theory of semantic memory.

It can sound odd to speak of imagining a proposition since when one entertains a proposition, there is typically no imagery involved. For this reason, philosophers usually distinguish between *episodic imagination*, which has an imagistic or sensory character, and *cognitive imagination* or *supposition*, which does not. (The terminology in this area is unsettled; for example, Goldman [2006] distinguishes between “enactment imagination” and “suppositional imagination.”) When I speak of imagining a proposition, it is cognitive imagination or supposition that I have in mind. If the simulation theory can be extended to semantic imagination in this manner, the question will then arise of what the theory implies concerning the relationship between semantic memory and episodic memory. Two views suggest themselves. First, we might treat episodic and semantic imagination—and hence episodic and semantic memory—as sharply distinct capacities. Second, we might treat episodic and semantic imagination—and hence episodic and semantic memory—as instances of a common capacity. Although most philosophers treat episodic and semantic imagination as distinct capacities, in line with the former view, both capacities involve representing hypothetical states of affairs as if they were true or actual (Dokic & Arcangeli, 2015), providing some support for the latter view.

If this view is right, then we would be left with a picture on which the common overarching capacity is imagination. Imagination would divide into episodic and semantic types, depending on whether it takes events or propositions as its objects. Episodic imagination would divide into episodic memory and other forms of episodic imagination, depending on whether it takes experienced past events or other events as its objects. And semantic imagination would divide into semantic memory and other forms of semantic imagination, depending on whether it takes previously believed propositions or other propositions as its objects. (This picture is of course a simplification; in practice, memory and [other forms of] imagination may interact within a single occurrence of remembering or imagining.)

Like the idea that episodic memory may be best understood as a homeostatic property cluster kind,

this extension of the simulation theory is offered here merely as an idea that would have to be developed in more detail elsewhere, but I am grateful to Humphreys and Chalmers’s stimulating book for having provided me with the occasion to begin to explore these ideas.

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NOTE

1. There are interesting resonances between the idea of homeostatic property cluster kinds and continuous or fuzzy accounts of concepts. It would take us too far afield to explore these here, but see Massaro (1989) for background.

REFERENCES

- Bernecker, S. (2010). *Memory: A philosophical study*. Oxford, England: Oxford University Press.
- Boyd, R. (1999). Homeostasis, species, and higher taxa. In R. A. Wilson (ed.), *Species: New interdisciplinary essays* (pp. 141–185). Cambridge, MA: MIT Press.
- Byrne, R. M. J. (2007). *The rational imagination: How people create alternatives to reality*. Cambridge, MA: MIT Press.
- Craver, C. F. (2009). Mechanisms and natural kinds. *Philosophical Psychology*, 22, 575–594.
- Dokic, J., & Arcangeli, M. (2015). The heterogeneity of experiential imagination. In T. Metzinger & J. M. Windt (Eds.), *Open MIND. II(T)*. Frankfurt am Main, Germany: MIND Group. doi:10.15502/9783958570085
- Goldman, A. I. (2006). *Simulating minds: The philosophy, psychology, and neuroscience of mindreading*. Oxford, England: Oxford University Press.
- Klein, S. B. (2015). What memory is. *WIREs Cognitive Science*, 6(1), 1–38.
- Martin, C. B., & Deutscher, M. (1966). Remembering. *Philosophical Review*, 75(2), 161–196.
- Massaro, D. W. (1989). *Experimental psychology: An information processing approach*. San Diego, CA: Harcourt Brace Jovanovich.
- Michaelian, K. (2016). *Mental time travel: Episodic memory and our knowledge of the personal past*. Cambridge, MA: MIT Press.
- Michaelian, K., Klein, S. B., & Szpunar, K. K. (Eds.). (2016). *Seeing the future: Theoretical perspectives on future-oriented mental time travel*. Oxford, England: Oxford University Press.
- Robins, S. (2016). Representing the past: Memory traces and the causal theory of memory. *Philosophical Studies*, 173, 2993–3013.

Sutton, J. (1998). *Philosophy and memory traces: Descartes to connectionism*. Cambridge, England: Cambridge University Press.

A NEW TYPE OF MEMORY SYSTEM OR AN ADDITION TO AN OLD MEMORY SYSTEM?

Mental Time Travel: Episodic Memory and Our Knowledge of the Personal Past

By Kourken Michaelian. Cambridge, MA: MIT Press, 2016. 312 pp. Hardcover, \$43.

Kourken Michaelian describes his book *Mental Time Travel: Episodic Memory and Our Knowledge of the Personal Past* as an act of applied epistemology. In chapter 1 the author sets out the three core questions addressed by the book. For a psychological audience, the restatement of these core questions found in the final chapter is more relevant because it succinctly sets out the relationship between psychology and the philosophical inquiry pursued in this book:

This book has had three main goals: first, to provide a general account of episodic remembering, as it occurs in real human beings, consistent with and shaped by the view of remembering as simulational mental time travel that has emerged in psychology in recent years; second, to provide a general account—again, based on the relevant psychology, including research on metamemory—of the factors ensuring the reliability of simulational remembering; and finally, to provide an account of the evolution of episodic memory, including the distinctive forms of consciousness which characterize it. (p. 237)

In the second chapter the author asks whether memory is a natural kind. By *natural kind* he means a category or distinction that exists in nature, although as he notes there is no one way of determining what constitutes a natural kind. Probably the closest he comes to an empirical definition is the idea that if memory, or a type of memory, can be identified as a natural kind then it will be possible to generalize within that natural kind. The approach taken is to evaluate memory systems with respect to their similarities and differences in terms of the information processing task they perform (the computational level), the procedure they use to accomplish the task (the algorithmic level), and the neurological mechanisms used to implement the procedure (the implementational level). Such an approach is familiar to memory

researchers, and the author's take on this issue is both informative and properly cautious. We have no quarrel with the author's conclusion that semantic and episodic memory are similar in many aspects and are not that similar to procedural memory. In addition, it also seems likely, as the author concludes, that procedural memory and the other forms of what are commonly considered nondeclarative memory do not constitute a natural kind.

Nevertheless, we do have some misgivings about this approach. First, the computational level theories that can be proposed for memory systems are very different from the computational level theories discussed by Marr (1982). The prototypical task discussed by Marr was deriving shape from shading. With this task the physics of light and the optics of the eye determine the pattern of retinal activation. A mathematical (computational) analysis of how that retinal pattern provides information about shape can provide strong constraints on algorithmic theories. With memory, however, we do not know how the input to the task is represented, so the best we can probably do is to identify specific tasks, specify the inputs and the outputs, and describe in very general terms how the inputs can be transformed into the outputs (Humphreys, Wiles, & Dennis, 1994). When applied to a memory system that performs many different tasks, any computational level theory may be so general that it will be of very little use.

There is also a cost to the attempt to identify natural kinds in psychology. Explaining a difference between a procedural task such as a finger-tapping sequence and an episodic task such as cued recall by reference to different memory systems is a very weak explanation, as it inherits all the uncertainties involved in deriving the idea of there being separate systems. In addition, the very existence of such a simple explanation for the differences may divert attention away from other explanations such as the different ways the two tasks are cued. That is, the finger-tapping task does not use discrete cues, as in the cued-recall task, and the cues that are used for finger tapping are inherent within the task (if you can perform part of the task you are provided with the cues needed to perform the remainder).

In chapter 3 the author discusses the aspects from epistemology that the remainder of the book will take for granted. For the psychologist this provides a fascinating insight into issues that are usually ignored and to the style of argument used. However, there were two aspects to this argumentative style that caused us some concerns. First, in a hypothetical