Episodic and semantic memory and imagination: The need for definitions

Thinking About Human Memory.

By Michael S. Humphreys and K. A. Chalmers. Cambridge: Cambridge University Press, 2016. Hardcover, £69.99.

Humphreys and Chalmers' 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 analyze tasks into five components: (1) the subject's goals in performing the task; (2) the cues used by the subject to perform the task; (3) the information required by the subject in order to perform it; (4) the opportunities available to the subject to learn the required information; and (5) 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 *G*oals, *C*ues, *I*nformation, *O*pportunities, and *N*oise.

Following 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. While the emphasis in this chapter on the fact that the goals of the participant 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 participant'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 himself, 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, namely, information and opportunity. Chapter 4 argues that the information required 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 required 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. Our understanding of noise, in contrast—the final component of the Gold CIONs approach—will often depend on our views on memory storage, and chapter 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. Though the heart of the book is undoubtedly constituted by the chapters setting out the Gold CIONs approach, and though 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 in the remainder of this review, for this review is part of a joint book review, in which my review of Humphreys and Chalmers' book is to be published alongside their 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.

Though their focus throughout the 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 that we can come to a definition, they suggest, is a set of “rules of thumb” (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. While 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” (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, i.e., a feature capable of distinguishing between episodic and semantic memory in all cases. But whether a criterion can be given for a given concept depends on what sort of concept it is. When dealing with the nature of scientific concepts, philosophers often employ 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". Natural kinds, in other words, group objectively similar entities together, and hence the vocabulary of a mature science should consist largely of natural kind concepts. Merely *nominal kinds*, in contrast, group objectively dissimilar entities together, and hence nominal kind concepts have little role to play in a mature science. The case of jade is a standard example. 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. Nothing counts as a sample of water, for example, unless it is composed (primarily) of H_20. Newer views, however, 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 homoeostatic property clusters (Boyd 1999; Craver 2009), clusters of properties the presence of some of which tends, through the action of an underlying mechanism, to covary with the presence of others. If kinds are characterized as homoeostatic 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 homoeostatic property cluster kind. Even if it were to turn out to be 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 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” (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. Rules of thumb, however, may amount to a perfectly good definition of a homoeostatic 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 required is a list of properties (e.g., autobiographical reference and rapid learning) that

1 There are interesting resonances between the idea of homoeostatic 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.

tend but need not always cluster together due to the action of an underlying mechanism (e.g., the hippocampus).

I offer the idea that episodic memory may be best understood as a homoeostatic 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 et al. 2016) to argue against the influential causal theory of memory (Martin & Deutscher 1966; Bernecker 2010), which sees remembering as being sharply distinguished from imagining, and for an alternative simulation theory which 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, and 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 he imagines a past event that he did not experience.

The simulation theory is offered as an account of episodic memory only, i.e., 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' 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 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: Goldman 2006, for example, 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. While 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 proposition 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 homoeostatic 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' stimulating book for having provided me with the occasion to begin to explore these ideas.

References

Bernecker, S. (2010). *Memory: A Philosophical Study*. Oxford University Press.

Boyd, R. (1999). Homeostasis, species, and higher taxa. In R. A. Wilson (ed.), *Species: New Interdisciplinary Essays*. Pp. 141–185.MIT Press.

Byrne, R. M. J. (2007). *The Rational Imagination: How People Create Alternatives to Reality*. MIT Press.

Craver, C. F. (2009). Mechanisms and natural kinds. *Philosophical Psychology*, 22(5), 575-594.

Dokic, J. & Arcangeli, M. (2015). The Heterogeneity of Experiential Imagination. In T. Metzinger & J. M. Windt (eds), *Open MIND*. 11(T). MIND Group. DOI: 10.15502/9783958570085

Goldman, A. I. (2006). *Simulating Minds: The Philosophy, Psychology, and Neuroscience of Mindreading*. 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*. Harcourt Brace Jovanovich.

Michaelian, K. (2016). *Mental Time Travel: Episodic Memory and Our Knowledge of the Personal Past*. MIT Press.

Michaelian, K., Klein, S. B., & Szpunar, K. K. (Eds.). (2016). *Seeing the Future: Theoretical Perspectives on Future-Oriented Mental Time Travel*. Oxford University Press.

Robins, S. (2016). Representing the past: memory traces and the causal theory of memory. *Philosophical Studies*, 173(11), 2993-3013.

Sutton, J. (1998). *Philosophy and Memory Traces: Descartes to Connectionism*. Cambridge University Press.

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