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comprehensive theory of reference, but they do not try to give us this theory of reference or attempt to settle these questions.

In *Minds without Meanings* and the earlier works by its authors on which it draws, Fodor and Pylyshyn have taught us much and given us much to think about. They also leave us much work to be done.

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Kourken Michaelian, *Mental Time Travel: Episodic Memory and Our Knowledge of the Personal Past*.

Cambridge, MA: MIT Press, 2016. xx + 291 pp.

*Mental Time Travel* defends the extraordinary claim that episodic memory is imagination, or what Michaelian calls the "simulation theory." While some aspects of the simulation theory are revisionary, it is a compelling account that offers crucial insights into memory's important role in everyday human mental and epistemic life. Michaelian covers several topics in depth but is always able to keep an eye on the big picture; *Mental Time Travel* is both an exploration of the simulation theory and a helpful overview of the psychology of memory.

The book focuses on three main questions about episodic memory: what is episodic memory, how does episodic memory give us knowledge, and why did episodic memory evolve? Michaelian argues that memory, as a whole, is likely not a natural kind and that episodic memory ought to be studied on its own

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rather than as a part of a more general “memory” system. He then proceeds to defend the simulation theory and the idea that episodic memory is the ability to engage in “mental time travel.” The final section of the book is dedicated to investigating why such an ability might have evolved and whether some nonhuman animals also possess it.

In answering the “what is it” question, Michaelian relies heavily on the psychological evidence for adopting the simulation theory. While the alternative causal and commonsense theories may do an adequate job of matching our intuitions about memory, they fail to capture the often unintuitive psychological reality. A major upshot of psychological studies is that episodic memory is one of the many functions of a more general episodic construction system. This system is responsible for remembering events from the agent’s personal past as well as imagining future or merely counterfactual events. According to the simulation theory:

“S remembers an episode  $e$  just in case

- S now has a representation  $R$  of  $e$
- $R$  is produced by a properly functioning episodic construction system which aims to produce a representation of an episode belonging to S’s personal past.” (107)

Thus, rather than attempting to distinguish remembering from imagining, the simulation theory situates episodic memory as a kind of imagination.

The remainder of *Mental Time Travel* examines the implications of the simulation theory for the other two main questions. The most interesting part of the book is Michaelian’s explanation of how memory gives us knowledge. He posits that memory is a two-level metacognitive belief-producing system consisting of an information producer and an endorsement mechanism. The endorsement mechanism either endorses or rejects the content generated by the information producer, and endorsed content results in a belief. The reliability of this two-step process depends on the ratio of accurate to inaccurate information produced, as well as the ratio of endorsed accurate contents to endorsed contents as a whole. Hence, there are two ways memory might achieve the level of reliability required for knowledge. First, the information producer itself can be reliable. Second, an unreliable information producer can be part of an overall reliable two-level system, as long as the endorsement mechanism selectively endorses truths. I discuss examples of each case below.

A good candidate for a reliable information producer is the incorporation of testimonial information. This is a constructive process by which testimonial information about a past event is incorporated into an agent’s memory of that event. Michaelian posits that testifiers are generally honest and competent, and so they will tend to provide accurate information about the past event. In that case, we would expect incorporation to increase overall accuracy more often than it decreases it. Thus, the incorporation of testimonial information

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would tend to make memories more reliable than they would be without the intervention of this process.

In the case of an unreliable information producer, memory can still reliably generate true beliefs if the endorsement mechanisms are selective enough. Consider the endorsement mechanism of *source monitoring*. Source monitoring allows the agent to distinguish the source of a memory. Is it a memory of an experienced event, a dream, a scene from a film, or something else? Selectively endorsing information from the more accurate sources can improve reliability.

Source monitoring exploits characteristic differences among episodic memory representations to distinguish between them. For example, memories of dreams and experienced events tend to be perceptually vivid in a way that memories of imagined events are not. The correlation is not perfect, but it provides a useful heuristic. Heuristics like this are needed because human memory does not explicitly store sources; instead, the source-monitoring system screens retrieved memory representations for clues. The content of the memory is then either endorsed or rejected. If the source-monitoring system is effective (and the psychological research strongly suggests that it is), then it can result in an overall reliable memory system in the face of less reliable information producers.

Other endorsement mechanisms are likely to be essential to human memory (such as “process monitoring”), but, unlike source monitoring, these have not been seriously studied. Clearly, more experimental investigation is needed. In the meantime, Michaelian’s work should inspire researchers to make more of an effort to recognize and distinguish between different endorsement mechanisms.

In Michaelian’s view, information production and endorsement mechanisms together generate a high enough ratio of true to false beliefs to provide memory knowledge. Overall, this seems correct. However, I believe that there is a real possibility of skepticism about some types of episodic memory. It is likely that there are endorsement mechanisms that select for properties other than truth. This is apparent in the case of autobiographical memory. A relatively stable sense of self is important, even if it sometimes comes at the expense of believing the truth about one’s personal past. Thus, in this domain, we might expect endorsement mechanisms that select for stability rather than truth. Indeed, psychological research has shown that people tend to erroneously project their current beliefs, opinions, and emotions onto their past selves, and the endorsement mechanisms do not reject that information. This might lead one to be a skeptic about autobiographical memory beliefs, and the two-level account does not rule out this kind of skepticism.

Finally, the book turns to the purpose of memory. Why did episodic memory evolve? There is evidence that nonhuman animals have episodic-like memory, but it is an open question whether any have a conscious “mental time

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travel” type of memory. Michaelian argues that existing explanations of the evolutionary advantages of episodic memory in fact support only episodic-like memory, rather than the rich form requiring consciousness. Two crucial components of the conscious character of episodic memory are autoeosis (the subjective feeling that a memory is yours) and chronesthesia (the feeling that the experience is from the past). Michaelian claims that the usefulness of these feelings is found in their metacognitive roles as part of process monitoring. The explanation is an original attempt to account for the evolution of the conscious forms of episodic memory, without which our mental lives would be diminished considerably.

In sum, *Mental Time Travel* is a comprehensive look at the metaphysics, epistemology, and evolution of episodic memory that will be of interest to philosophers and psychologists alike. Michaelian’s approach will serve as an excellent template for methodologically naturalistic examinations of other forms of memory.

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