15 Naturalism and Simulationism in the Philosophy of Memory

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15.1 Introduction

The adoption of a broadly naturalist approach has been a distinctive feature of recent philosophical study of memory. This approach is characterized by a general admiration for the aims and methods of mature sciences and a willingness to engage with empirical and conceptual developments in a variety of disciplines—from psychology and neuroscience to evolutionary biology, linguistics, and anthropology. Naturalist philosophers of memory have taken their lead from such developments, refining their questions, theories, and aims of inquiry. This has resulted in scientifically informed discussions of a range of important issues, such as the nature of memory traces (Robins 2023), the relationship between memory and imagination (Langland-Hassan 2021), and the role memory plays in the preservation and generation of knowledge (Senor 2022). Most notably, the last decade has seen the emergence of recognizably naturalist theories of memory, which have challenged both common-sense intuitions and long-standing philosophical orthodoxy (De Brigard 2014; Michaelian 2016a; Perrin 2018, 2021; Werning 2020).

In this chapter, we examine the naturalist approach in the philosophy of memory through the lens of the *simulation theory of memory* (Michaelian 2016a, 2024). The theory, anchored in developments in the cognitive sciences, sees memory as a kind of constructive simulation performed by a functionally specialized neurocognitive system. Our goal in the chapter is to illustrate the roles distinctive naturalist tenets have played in the development of the theory. By showing the simulationist's naturalism 'at work', we aim to cast light on the nature of the theory, the source of its often counterintuitive claims and commitments, and the kind of challenge it poses to traditional philosophical theories of memory. At the same time, our focus affords a careful and systematic examination of the characteristics of the naturalist approach, similarly exemplified in a number of recent accounts in the literature.

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We proceed as follows. In Section 15.2, we introduce our view of naturalism as a kind of methodological stance characterized by a cluster of epistemic guidelines. In subsequent sections, we illustrate the roles these guidelines have played in the development of the simulation theory. In Section 15.3, we show how scientific evidence has guided both the selection of the research question and the initial elaboration of the theory. In Section 15.4, we show how such evidence has led the simulationist to reject a familiar, common-sense picture of memory. In Section 15.5, we trace the recent radicalization of the theory, highlighting the simulationist's continual reflection on the concepts and assumptions employed in the theory. Section 15.6 is the conclusion.

15.2 What Is Naturalism?

'Naturalism' has been taken to mean, or imply, a variety of things (Flanagan 2006; Ritchie 2008; Clark 2016). In the literature, it is customary to distinguish between *metaphysical* and *methodological* forms of naturalism. Metaphysical naturalism, known also as physicalism, is a doctrine about the world as consisting only of entities posited by an appropriately basic science—paradigmatically physics. Hence, on the standard view, metaphysical naturalists see all existing entities—including mental, biological, and social ones—as ultimately physical (Smart 1978; Stoljar 2010). Methodological naturalism, in contrast, concerns the character of philosophical practice. It is typified by engagement with empirical inquiry, privileging of scientific evidence, and a general wariness of *a priori* theorizing (Papineau 2020; Ritchie 2022). Methodological naturalists are sometimes also characterized as committed to a doctrine about scientific inquiry as the only genuine source of knowledge or understanding (e.g., De Caro and Macarthur 2010). Yet understood as doctrines, both metaphysical and methodological naturalism face famous, and arguably insuperable, difficulties. The arguments for this conclusion are well-rehearsed and we will not revisit them here (see Hempel 1980; Williamson 2013; Collins 2015). The underlying idea is nevertheless worth highlighting: naturalist doctrines are not adequately grounded in actual science. In the absence of a completed physics, metaphysical naturalism seems to tell us little more than that there is only whatever such physics will eventually discover. Similarly, absent a scientific investigation of the legitimate forms of inquiry, any strong methodological doctrine appears unjustified.

For the purposes of this chapter, we use 'naturalism' in a methodological sense. We do not, however, take naturalism to involve commitment to a specific doctrine or a set of beliefs about the proper mode of inquiry. Rather, we consider it a kind of *stance* or *attitude* exemplified in philosophical

practice. A stance is characterized by a cluster of epistemic guidelines, which can be advanced or expressed in a variety of ways, including some propositional attitudes, but which cannot be directly equated with having beliefs (van Fraassen 2002; Teller 2004). The naturalist stance aims to embody the *spirit* of naturalism: the aspiration to examine the world in a careful and rigorous way and with appropriate humility concerning general doctrines. As Ritchie (2022) has illustrated, this way of understanding naturalism can be traced back to the work of mid-twentieth-century American naturalists and has recently been revived in the work of Maddy (2007), Ladyman and Ross (2007), and Ritchie (2008). At its most general, the naturalist stance is characterized by admiration for the sciences, preparedness to engage with developments in a variety of scientific disciplines, and a general sense that reflection on relevant empirical evidence can help (dis)solve problems traditionally regarded as philosophical. The naturalist stance, as we understand it, has a number of typical, or 'diagnostic', characteristics. In what follows, we'll identify three important ones, which will play significant roles in the rest of the chapter.

15.2.1 Taking One's Lead From Science

The naturalist philosopher sees philosophy and science as engaged in a common pursuit of establishing knowledge about the world via *a posteriori* investigation, while acknowledging obvious differences in day-to-day practice (Papineau 2020). They start 'in medias res'—tentatively identifying a phenomenon of theoretical or practical interest in the worldview they inherit—but refine their questions and theoretical aims by reflecting on the best available scientific evidence. Accordingly, they engage with productive research programs in relevant fields of inquiry, aiming to form a picture of the phenomenon of interest that is explanatory, empirically informed, and predictively useful. Often highly general, the picture integrates scientific insights and brings them into contact with questions of philosophical interest. While coherent and relatively stable, it is always subject to further amendment as evidence accumulates (Maddy 2007; Collins 2015).

15.2.2 Going Where the Evidence Takes You

The naturalist philosopher relies systematically on the best available evidence, aiming to feel equally at home in a variety of scientific disciplines (cf. Maddy 2007). While they may prioritize evidence from research programs they deem particularly successful or relevant, they are sensitive to the plurality of theoretical and methodological approaches and skeptical that any of these, including philosophical analysis, is in some sense 'foundational' (Quine 1960/2013; Ritchie 2022). The naturalist philosopher

is typically suspicious of *a priori* investigation and problematizes appeals to conceptual or modal intuitions. While such intuitions can play a role in philosophical theorizing, they don't have any special status and should be examined carefully and systematically, as any other evidence. Intuitions are neither incorrigible nor privileged (Machery 2015). Indeed, if any kind of evidence is to be privileged, it is evidence from controlled, well-designed empirical studies.

15.2.3 Reflecting, Questioning, and Refining

The naturalist philosopher aims to regularly reflect on the methods, concepts, and assumptions they have employed and to refine or improve them in accordance with the available evidence. While confident in the value of rigor and intellectual honesty, they understand that their chosen methods of inquiry are fallible and subject to improvement. The naturalist philosopher reexamines the (major) assumptions of their account as new theoretical and empirical considerations emerge. In the same way, they scrutinize the concepts that have played relevant descriptive or explanatory roles, aiming to ensure conceptual rigor, empirical adequacy, and alignment with scientific use. While—being human—they often fall short of these ideals, they do their best to pay more than lip service to the spirit of thinking about the world in a scientific way.

15.3 Taking One's Lead From Science: The Simulation Theory of Memory

The simulation theory of memory takes its lead from a relevant scientific inquiry. In this section, we will introduce the theory, illustrating the ways in which scientific evidence guides both the selection and refinement of the research question and the development of the theory.

The simulationist starts with what looks like a straightforward question: what *is* memory? The question resonates with common sense and has been examined by a number of philosophers with various theoretical and methodological commitments. At first glance, answering it requires providing a general, yet informative, characterization of what it is for someone to remember something. Yet the suspicion that such a characterization may not be forthcoming—developed with the growing philosophical appreciation of the diversity of memory (Teroni 2014)—has been strengthened by significant developments in the memory sciences. The key development was the emergence of the *multiple memory systems* approach as a major research framework, according to which memory is not a unitary faculty of the mind but is rather composed of multiple cognitive systems with different information-processing tasks, operating principles,

and neuroanatomical substrates (Schacter and Tulving 1994; Squire 2004). These systems instantiate the different *kinds* of memory. On the standard taxonomy, long-term memory involves nondeclarative and declarative memory systems. Nondeclarative systems support the acquisition of diverse perceptual, motor, and cognitive skills. Declarative systems, in contrast, support the encoding, retention, and conscious retrieval of information. Episodic memory (memory for episodes) and semantic memory (memory for facts) are the two major kinds of declarative memory. The multiple memory systems framework is supported by neuropsychological, imaging, and behavioral evidence from a variety of experimental paradigms (Ferbinteanu 2019).

In light of the systemic heterogeneity, the prospects for developing a general but informative theory of memory are relatively poor. Since 'memory is many things' (Tulving 1995: 751), such a theory would be both infeasible and unwarranted. The simulationist takes the lessons of the memory sciences seriously and seeks to refine his main research question and correspondingly adjust the target of inquiry. The decision to focus on *episodic* memory is justified in two main ways (Michaelian 2016a). First, episodic memory is probably the most comprehensively investigated memory system. As we will see, contemporary developments in the study of episodic memory motivate many of the signature simulationist claims. Second, much traditional philosophical work has focused on the conscious recollection of past episodes, exploring themes that overlap significantly with current work in the sciences (Michaelian and Sutton 2017; Robins 2022). While the simulationist aims to foster such consilience, he does not begin with an independently specified problem of a recognized 'philosophical' provenance—for example, the justification of memory beliefs (cf. Frise 2023). Indeed, he suspects that traditional formulations of such problems suffer from inadequate consideration of scientific concepts and evidence. Rather, the simulationist anchors his inquiry on an experimentally supported taxonomy, only subsequently drawing out consequences for familiar issues of philosophical interest.

For the simulationist, then, the science of episodic memory constitutes a natural starting point. In the formative period of the science, Tulving (1983, 1985) characterized episodic memory as a functionally specialized memory system underlying the (human) capacity for remembering the personal past. On this view, the episodic memory system was taken to process and store information about previously experienced episodes. Since the system was believed to have very limited inferential capabilities—unlike semantic memory—it could afford 'immediate, or first-hand knowledge' of such episodes (1983: 41). This feature was thought to be reflected in the nature of recollective experience, prototypically phenomenally rich

and involving a sense that one is drawing on past first-hand experience. In the intervening years, empirical developments have compelled gradual, yet significant, amendments to this picture. A mounting body of evidence has indicated that episodic memories are dynamically reconstructed from elements from a variety of sources, leading to systematic inaccuracies, misattributions, and belief-influenced distortions (Schacter 1999; Brainerd and Reyna 2005). More recently, neuroimaging, behavioral, and clinical evidence have revealed a close processing connection between episodic memory and imagination (Hassabis et al. 2007; Schacter and Addis 2007). These developments have given birth to a new class of accounts of episodic memory, sharing a key commitment: to a view of the system as enabling not only remembering but also future-oriented and counterfactual imagination. The commitment nevertheless belies disagreement about the core operation of the system, variously characterized as mental time travel (Tulving 2005), episodic simulation (Schacter and Addis 2007) or scene construction (Hassabis and Maguire 2009).

The simulation theory seeks to integrate these insights into a general, high-level picture of episodic memory, bringing them into contact with issues and concerns of philosophical interest. Strongly tethered to the scientific developments, it formulates a general framework for thinking about human memory, one that draws out and makes explicit the vision of memory implicit in current psychology (Michaelian 2016a). This involves synthesis of the new class of accounts of episodic memory and systematization of their shared ideas and commitments. Three main reasons for the formulation of such a general theory are worth highlighting. First, by making the emerging scientific picture explicit, the simulation theory aims to contribute to the systematic reevaluation of our understanding of episodic memory and to the reshaping of metaphors that guide contemporary memory research (cf. Koriat and Goldsmith 1996). Second, the theory provides a useful framework for interpretation of often-surprising empirical findings, while pointing to novel lines of inquiry. Finally, and perhaps most importantly, the theory connects the scientific picture to issues that have preoccupied philosophers of memory since at least Locke. Not surprisingly, the view of episodic memory as reconstructive and mechanistically linked to imagination can be a source of some controversy. As we will see, the view challenges some long-standing beliefs about memory that have seemed—indeed, to many philosophers still seem—obviously and incontrovertibly true. More broadly, it problematizes the uncritical acceptance of overly simple, and empirically suspect, conceptions of memory in both epistemology and the philosophy of mind.

Aiming at synthesis, the simulation theory identifies episodic remembering with an operation of a dedicated cognitive system that also underpins

various forms of imagination. According to the theory, as presented in Michaelian (2016a), a subject *S* remembers an episode *e* if and only if:

(1) *S* now has a representation *R* of *e*.
(2) *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.

Condition (1) is relatively uncontroversial.[1] Condition (2) articulates the main insight of the theory. It sets out to capture the common core of the leading scientific accounts of episodic memory while remaining neutral about the specific, and ultimately empirically discoverable, details. The concept of an 'episodic construction' system is introduced for this purpose. It is meant to be sufficiently determinate to convey the idea that remembering and imagination are products of a general system responsible for representing—in a proprietary way—episodes from the subject's personal past and future. Yet the employment of the concept does not entail commitment to any specific proposal about the core operations of the system. While there are obvious similarities between the various proposals—as we will see, they all seem to paint a picture of a system for the *constructive simulation* of episodes—disagreements about the specifics motivate cautious neutrality. The notion of 'proper function' also plays a role in condition (2). Formally, the simulationist ties a system's proper function to its reliability, understood as the tendency of the system to produce accurate representations when operating under normal conditions. In the context of episodic remembering, the episodic construction system is functioning properly if, *ceteris paribus,* it tends to produce accurate representations of personal past episodes (Michaelian 2016a, 2016b). Hence, on the simulation theory, a subject remembers an episode from their personal past iff they entertain a representation of it produced by an accuracy-conducive episodic construction system aiming at such an episode.

Taking its lead from a relevant scientific inquiry, the simulation theory is continuous with this inquiry in being close to the ground of empirical results. Indeed, it is in virtue of such proximity that the theory purports to enjoy a greater degree of epistemic privilege relative to traditional *a priori* theories. Following Chakravartty (2013), we can characterize proximity to *a posteriori* investigation with two parameters: experiential distance and risk.[2] Experiential distance concerns the degree of detectability of the object of inquiry. Objects directly detectable by the senses (e.g., cats, trees, cups) are less experientially distant than objects whose detection requires special tools (e.g., molecules, proteins, neurons), while some objects (e.g., possible worlds) are not detectable at all. As experiential distance increases, so does the epistemic challenge to making warranted inferences,

ceteris paribus. The experiential distance of the simulation theory's object of inquiry—the episodic construction system—is relatively low. While the system is not directly detectable, cognitive scientists have devised a variety of experimental tools—behavioral tasks as well as neuroimaging procedures—believed to tap its operations (Schacter and Tulving 1994; Ferbinteanu 2019). Risk concerns the degree to which empirical evidence weighs on the assessment of truth and falsity. If, in the course of assessment of a theory, empirical considerations are relatively unimportant, then the risk is low.[3] Despite its neutrality concerning the specific operations of the episodic system, the simulation theory is relatively risky. If it turns out that a system with the requisite functional profile does not support the remembering of past personal episodes, then the theory will be falsified. The flipside of this proximity to *a posteriori* investigation is lack of immunity to counterexamples from possible, but farfetched, scenarios. Modally modest, the simulation theory does not aim for such immunity, presenting rather an account of remembering as it unfolds in the real world.

In this section, we introduced the letter of the simulation theory, as presented in Michaelian (2016a), illustrating the role scientific evidence plays in its initial elaboration. To get a proper sense of the ways in which the theory captures the spirit of the new memory science, however, we need to follow the simulationist's path to the rejection of a familiar, common-sense picture of memory. The path, as we will see in the next section, is traced by the best available evidence.

15.4 Going Where the Evidence Takes You: Simulationism and Anti-Causalism

The simulationist follows the evidence. In this section, we will see how this simple policy leads him to reject the necessity of a causal link between memories and past experiences and to characterize episodic memory and imagination as capacities of the same kind. Empirically motivated changes of memory concepts can produce a radically revisionist theory.

The simulation theory of memory identifies episodic remembering with an operation of a dedicated episodic construction system. On the theory, entertaining a representation of an episode from the personal past produced by the system—when functioning properly—is *sufficient* for remembering the episode. The sufficiency is important: the simulation theory does *not* require a causal link connecting a current memory with a specific past episode that is the object of the memory.[4] Hence, the theory differs from both common-sense views, portraying memories as kinds of reproductions of earlier experiences suitably linked to them (Michaelian 2016a, Ch. 5), and long-dominant causal theories of memory (Martin and Deutscher 1966; Bernecker 2010). On causal theories, a current mental state is a

memory if and only if it is appropriately causally connected to a relevant past experience. Typically, a causal connection is considered appropriate iff it is sustained by a *memory trace:* a representation of the remembered episode formed upon the original experience and causally operative at recall. By appealing to traces, causal theories aim to explain why memories seem to depend on past experiences—intuitively, one cannot remember what one hasn't experienced—and how they are brought about by them (see Andonovski 2021).

The simulation theory is, *in principle*, compatible with the claim that every episodic memory is appropriately causally connected to a relevant past episode. This is a straightforward consequence of the proximity to *a posteriori* investigation. Avowedly risky, the theory considers empirical considerations crucial for the assessment of its truth or falsity. Taking this into account, it may turn out that a properly functioning episodic construction system aiming to represent an episode from the subject's personal past necessarily employs memory traces formed upon the experience of the episode. Indeed, this was likely the view of Tulving (1983, 1985), who posited a proprietary store for episodic recall. Unlike causal theories, however, the simulation theory does not take the existence of an appropriate causal link to be *conceptually* necessary. Rather, it treats it as a hypothesis, to be assessed by looking at the best available evidence furnished by the memory sciences. Indeed, this is what makes the simulation theory a different *kind* of theory from the classical causal theory. Thus, even if it turns out that all memories are appropriately causally connected to past experiences, the simulation theory will not 'collapse' into a kind of causal theory, at least to the extent that the latter aims to articulate *conceptual* truths about memory. The consequences of adopting this stance are dramatic. Not only does the evidence not warrant positing a causal condition, but it provides good reasons to believe that not all *actual* memories are causally linked to specific past experiences.

There are three principal kinds of evidence for anti-causalism. First, and most importantly, there is the evidence linking memory and imagination to the operations of a common, functionally integrated, *episodic system*. It includes neuroimaging studies implicating brain networks reliably engaged in both memory and imagination (Schacter et al. 2012), clinical data showing impairments in amnesiacs' ability to imagine novel episodes and scenarios (Tulving 1985; Hassabis et al. 2007), and findings of significant behavioral parallels, such as analogous effects of temporal distance and valence (D'Argembeau and Van der Linden 2004). Second, results from diverse experimental paradigms indicate that episodic memory representations undergo systematic *transformations* at multiple stages of processing. Such transformations may involve selection, schematization, and integration but also incorporation of testimonial information (Winocur

and Moscovitch 2011; Dudai et al. 2015; Schlichting and Preston 2015). Third, and relatedly, the episodic system appears capable of *generating* content not present in the original experience of an episode, which can lead to systematic distortions and varieties of false memories, including ones of entire non-occurrent episodes (Intraub and Richardson 1989; Loftus and Pickrell 1995; Brainerd and Reyna 2005).

Taken together, these findings support a picture of a general 'episodic construction' system for the representation of past and future episodes, which draws on diverse, perceptual, and conceptual elements from the subject's previous experience. In both memory and imagination, the system acts on the same information—that is, there is no dedicated 'store' for remembering—and is governed by the same rules of operation, aiming to (re)construct a representation of an episode that is most appropriate in the relevant context (cf. De Brigard 2014; Addis 2020). In the case of imagination, the system uses information from a variety of sources to produce a representation of the target episode. In the case of memory, the system will indeed often rely on information acquired upon the subject's original (perceptual) experience of a past episode. Yet crucially, *it need not always do so*. If sufficient information from other sources is available—and it often is, for example, in representations of similar past episodes—a properly functioning episodic construction system will be able to produce an accurate representation of the episode relying solely on such information. Following the evidence, and in accordance with condition (2) above, the simulationist categorizes these cases as cases of *genuine* remembering. Hence, he rejects the necessity of an appropriate—that is, trace-sustained—causal connection between a memory and a past experience. According to the simulation theory, a genuine memory need not include *any* content originating in a subject's experience of the remembered episode (Michaelian 2016a, 2024).

Not surprisingly, this simulationist commitment has generated a lot of controversy in the literature. For convenience, we can distinguish *a priori* and empirically based criticism. While *a priori* strategies vary, a common element is the appeal to philosophical—conceptual or modal—intuitions about memory. Hence, on a prominent view, the very concept of memory involves a commitment about the proper causal connection between, and information flow from, past experience to remembering (Martin and Deutscher 1966; Bernecker 2010). This is reflected in the distinctive epistemic authority granted to witnesses, typically attributed to them on the assumption that they have retained information acquired *via* first-hand experience (Craver 2020; McCarroll et al. 2022). On this view, the simulationist is either making a conceptual mistake or simply changing the topic. In doing so, he is eliding distinctions of clear epistemological relevance: between genuine memories (appropriately based on past first-hand experience of episodes), mere imaginings (not causally linked to relevant past

episodes), and states of relearning (not causally linked to the past episodes in the appropriate, trace-sustained way) (Martin and Deutscher 1966; Andonovski 2021).

The simulationist response to this criticism is fourfold and clearly exemplifies his naturalist commitments. First, the simulationist challenges the exclusive appeal to philosophical intuitions in establishing the constitutive elements of the ordinary concept of memory. Such intuitions are often unreliable and anchor illusory claims to conceptual expertise (Machery 2015). Systematic experimental investigation of the commitments and linguistic intuitions of concept users is thus necessary. Indeed, preliminary experimental evidence raises doubt about the existence of a clear, well-defined ordinary concept of memory (e.g., Dranseika 2020). Second, and more importantly, the simulationist is not primarily interested in the ordinary concept of memory, but in a *phenomenon*—episodic memory—whose distinctive features are revealed by the best available scientific evidence. As we saw in Section 15.3, the simulationist takes the scientific lead both in refining the research question and in developing the theory. While philosophical intuitions may provide some preliminary reference-fixing constraints, they play a minimal role in the theory's development. Hence, when intuitions for the necessity of appropriate causation appear to clash with the available empirical evidence, they should simply give way. The third point is closely related. For broadly Quinean reasons, the simulationist is suspicious of a principled distinction between empirical and conceptual changes. Indeed, if there are domains in which such a distinction is likely to be apt, they will be the domains of mature scientific theories (Rey 2022). So, when accused of 'changing the topic', the simulationist shifts the burden of proof back to the critic, tasking them with specifying the exact way(s) in which appeals to conceptual truths can ground philosophical analyses of memory. Finally, the simulationist considers the evidence-driven elision of distinctions—even ones commonly accepted—a positive development, reflecting progress in the pursuit of knowledge about memory. Epistemological theories do not provide strict *a priori* constraints for the development of scientific concepts. Rather, they should be revised to accommodate such development.

The simulationist response to empirically based challenges is somewhat different. The latter have focused primarily on the importance of memory traces for episodic remembering. Werning (2020), for example, points to the existence of what he calls 'minimal' traces, encoding information linked to the sequential firing of hippocampal place cells. While these traces do not carry representational content, they are causally operative at recall, purportedly securing the reliable production of accurate memory representations.[5] Perrin (2018, 2021), similarly, presents evidence for specific sensorimotor patterns—present at encoding and operative at

retrieval—arguing for the necessity of appropriate causation in remembering. The simulationist agrees that memory traces may play a relevant causal role in (indefinitely) many cases of episodic remembering. Yet he denies that episodic remembering *requires* a trace-sustained causal connection to a past experience, a proposition whose plausibility Werning and Perrin have failed to establish. Even if we grant that reactivation of hippocampal or sensorimotor patterns constitutes evidence for appropriate causation—a problematic assumption, since reactivation does not seem to entail a causal connection of *any* kind (Michaelian 2022)—the data does not provide support for the necessity of such causation. The contemporary causalists unwarrantedly generalize from a small and unrepresentative subset of cases, typically of remembering simple stimuli over relatively short timescales. As Perrin (2021) admits, there is currently no evidence of robust sensorimotor pattern reactivation in episodic memories over longer timescales.[6] And, while future research may produce such evidence, this is not a good reason for the introduction of a causal condition in remembering (Michaelian 2022). Taking his naturalism seriously, the simulationist views this condition as an 'external'—and poorly motivated—*a priori* constraint on scientific theorizing.

A similar dialectic, which we cannot afford to reproduce here, has played out in the so-called (dis)continuism debate (Perrin 2016; Michaelian 2016c; Robins 2020; Langland-Hassan 2022). Based on the evidence for a common cognitive system, the simulationist endorses *continuism*, the view that episodic memory and future-oriented episodic imagination are capacities of the same kind. *Discontinuism,* typically endorsed by causal theorists, is the view that the two capacities are different in kind. The simulationist acknowledges a variety of—neural, representational, and phenomenological—differences between episodic memory and future-oriented imagination, yet insists that these are *not* sufficiently important, or fundamental, to establish a difference in kind. He appeals to the evidence, and to the emerging scientific picture of memory, to respond to various metaphysical and epistemological arguments for discontinuism. In doing so, he challenges appeals to intuitions about the ordinary concepts of memory and imagination as well as to concepts not properly aligned with scientific developments and referring to experientially distant objects of inquiry.

The sciences of memory, like all other natural sciences, are not beholden to common-sense concepts and categories (Collins 2007). Hence, empirically motivated developments, or changes to memory concepts, can produce radically revisionist theories of memory. The simulation theory of memory is such a theory. In this section, we saw how a simple policy of following the evidence, paired with cautiousness about philosophical intuitions, has led to the simulationist rejection of a familiar, and deeply philosophically entrenched, picture of memory. In the next section, we will

trace the further 'radicalization' of the theory in Michaelian (2024), while outlining the main outstanding challenges for its development.

15.5 Reflecting, Questioning, and Refining: Radicalizing Simulationism and Future Challenges

The simulationist regularly reflects on the methods, concepts, and assumptions he has employed, refining or amending them in accordance with the available evidence. In this final section, we will see how this reflective attitude has resulted in a new, radicalized version of the simulation theory. We will also highlight some outstanding challenges, pertaining to the theory's key concepts and assumptions.

According to the simulation theory, as developed in Michaelian (2016a), a subject remembers episodically iff they entertain a representation produced by a properly functioning episodic construction system aiming to produce a representation of an episode from the subject's *personal* past. The theory, at least at first glance, appears to aim at thematic continuity with common sense, linking episodic memory to an intuitively familiar kind of remembering—the kind we engage in when we look back upon our lives. This is not at odds with its naturalistic character. As we have seen, the notion of episodic memory was introduced to the scientific literature to refer to the cognitive system underlying the human capacity for remembering the personal past (Tulving 1983, 1985). The system was taken to store information about previously experienced episodes in a non-conceptual form, thus affording direct, first-hand knowledge of them (1983). Indeed, this function was thought to be reflected in the nature of recollective experience, which typically involves a sense that one is drawing on past first-hand experience. Tulving (1985) labeled the kind of consciousness conferring this sense 'autonoetic consciousness'—or 'autonoesis'—characterizing it as a distinctive feature of episodic memory. These initial depictions of episodic memory and autonoesis have played significant roles in subsequent scientific developments (see Dafni-Merom and Arzy 2020). It is thus not a surprise that the simulation theory, aiming at synthesis, would characterize episodic remembering as a kind of personal remembering.

Yet there are a number of problems for this characterization. Most importantly, recent empirical evidence suggests that the episodic construction system is also involved in the representation of episodes seemingly *not* of the subject's personal past or future, as well as of merely possible situations for the purposes of physical or social navigation (Hassabis et al. 2007; Spreng and Mar 2012). This evidence has led some theorists to characterize the system as one for representing scenes/scenarios, which need not be located in the subject's past or future (Hassabis and Maguire 2009; Cheng et al. 2016). Relatedly, there is now evidence that episodic memory and

autonoetic consciousness can come apart, with reports of 'depersonalized' recollections (Klein and Nichols 2012)[7] and experiments illustrating the low degree of integration between episodic representation and subjective temporal orientation (Mahr et al. 2021). These results raise doubts about the theoretical motivation for identifying a specific cognitive process linked to the representation of *personally* experienced episodes. If it turns out that the personal/non-personal distinction is not well aligned with the emerging scientific picture of the episodic construction system, then the simulationist would need to appeal to other—seemingly extra-theoretical—reasons for making it. Hoerl (2022) makes precisely this point, charging the simulationist with introducing the personal past condition (2) on an *ad hoc,* empirically unmotivated, basis (see also McCarroll 2020). This issue is compounded by the notorious difficulty of providing a satisfactory, and theoretically adequate, definition of 'personal past'. On the simulation theory, the episodic construction system can produce a genuine memory representation that does not include any content originating in a subject's past experience of the target episode. There thus seems to be no principled reason to require that a genuine memory *be* of an episode that the subject has previously experienced, which the theory indeed does not. Yet the theory does require that a remembered episode belongs to the subject's personal past. So, whatever belongingness to the personal past amounts to, it cannot be a simple matter of having been experienced by the remembering subject (Michaelian 2016a: 106–107, 2024: 15–16).

Faced with these difficulties, the simulationist opts *not* to introduce further extra-empirical considerations for the personal past condition. Rather, consistent with his naturalism, he simply eliminates it. On the 'radicalized' simulation theory, presented in Michaelian (2024), a subject *S* remembers an episode *e* if and only if:

(1) *S* now has a representation *R* of *e*.
(2) *R* is produced by a properly functioning episodic construction system which aims to produce a representation of a past episode.

To remember episodically, then, is simply to represent—employing the resources of the specialized episodic construction system—an episode from the past, *regardless of whether that episode belongs to the rememberer's personal past*. Hence, a subject can, *in principle,* remember episodes that have happened to other people (e.g., her grandparents' experiences during the Second World War) in the same way she can remember episodes that have happened to her (e.g., her first day in high school). Of course, for a variety of reasons—including the lack of good information usable by the episodic construction system—detailed and highly accurate memories of such episodes will be exceedingly rare (Michaelian 2024: 10–14).

Nevertheless, when non-personal memories involve representations produced by a properly functioning episodic system, they do qualify as *genuine* episodic memories. Relatedly, the theory considers autonoesis *in*essential to episodic memory, while granting that it may characterize personal episodic memories (pp. 18–20).

Radical simulationism does not entail that we cannot, for practical or epistemic reasons, distinguish between personal and non-personal memories. On the contrary, such a distinction may be useful in a variety of contexts, some of which—for example, delivering a testimony from the witness stand—we may consider particularly important. It does entail, however, that the distinction does not reflect a fundamental difference in underlying mechanisms. From the 'perspective' of the episodic construction system, there is no difference in kind between personal and non-personal episodic memories. For both, the system employs the same operation, using information from a variety of sources, to (re)construct a representation of the target past episode that is most appropriate or plausible given the relevant context. In other words, personal memory—*unlike* episodic memory—is not a natural kind (2024: 14–17; cf. Michaelian 2011). Consequently, theorists interested in bringing out the picture of memory implicit in contemporary psychology—a picture that is explanatory, empirically informed, and predictively useful—should adopt the radicalized simulation theory. Indeed, it is only by taking this picture as a starting point that we can engage in the difficult project of re-thinking our practical commitments, such as granting witnesses a distinctive epistemic privilege, in an intellectually rigorous and honest way (Craver 2020; McCarroll et al. 2022).

The simulationist takes the scientific lead in zeroing in on the phenomenon of episodic memory and follows the evidence, integrating it into a general, high-level picture that can be brought into contact with issues of philosophical interest. This is a continual process, which requires repeated reflection on the employed methods, concepts, and assumptions. Maintaining the coherence—and, equally importantly: empirical adequacy—of the picture will often compel the elimination of problematic (pre-theoretical) assumptions. The radicalized theory, seen from this perspective, is simply a more coherent and empirically adequate simulation theory. As the science of memory progresses, the theory will continue to change in ways that aim to reflect such progress. In doing so, its characterization of episodic memory will become increasingly distant from common-sense concepts and categories. For the simulationist, this is not a bug but a valuable feature of naturalist theories.

In the remainder of the section, we will briefly examine some outstanding challenges for the theory. The most important issue, perhaps, concerns the relation between episodic memory and episodic imagination. The simulation theory characterizes remembering and *future*-oriented imagination

as capacities of the same systemic kind, yet does not collapse the distinction between the two, appealing—in condition (2')—to a process of 'aiming' to produce a representation of a *past* episode. Neuroimaging and clinical studies have yielded preliminary evidence of processing differences between episodic memory and episodic future thought (e.g., Benoit and Schacter 2015; Irish and Piolino 2016). Future research will tell whether these are sufficiently robust to motivate the identification of specific cognitive processes for the representation of *past* or *future* episodes. On a related note, the simulationist should clarify the relation between episodic memory and episodic *counterfactual* thought—that is, imagining alternative ways in which past episodes could have occurred. This will require engagement with the nascent scientific literature on this capacity (De Brigard and Parikh 2019) as well as careful examination of the concept of *episode* appealed to in the theory. On a sufficiently liberal conception, episodic counterfactual thought would arguably involve a representation of a past episode, thus satisfying condition (2') of the theory.

There are other concepts, playing significant explanatory or dialectical roles in the theory, which are not appropriately aligned with scientific use. Perhaps the most obvious one is the concept of *aim*, appealed to in conditions (2) and (2'). Michaelian (2016a: 113) characterizes such appeal as 'shorthand for talk of the system responding to given retrieval cues provided by either the agent or his environment'. While this characterization may be satisfactory for reference-fixing purposes, it is not clear whether the concept genuinely constitutes a part of the common core of leading scientific theories of the episodic system. Future, empirical and conceptual, developments will establish if the concept can be aligned with, or 'translated' into the idiom of, such theories. Similarly, scientific developments may compel precisification or refinement of the concepts of *system* and *process*, given that the alignment of neural and cognitive accounts of memory systems—including the episodic construction system—remains a difficult problem (Ferbinteanu 2019). More broadly, the concept of *causation* has featured prominently in the debate between the simulation theory and causal theories of memory. Despite this, memory theorists have by and large treated the concept as primitive, engaging minimally with the philosophy and science of causation. With the steady increase of theorists examining causation in memory, we expect future work to significantly advance our understanding of the nuances of the debate (Werning 2020; Najenson 2021; Andonovski 2021; Robins 2023).

Finally, the simulation theory, while philosophically radical in one sense, is philosophically traditional in another. Namely, the theory—even if only as a matter of convenience—characterizes the concept of episodic memory *classically*, positing individually necessary and jointly sufficient conditions token episodic memories need to satisfy. There is growing awareness in the

literature that this is a substantive assumption, which may have to be reexamined. Indeed, with extensive evidence against the classical theory of concepts (Laurence and Margolis 1999), and an apparent family resemblance between instances of episodic and semantic memory (Andonovski 2020), such reexamination may be needed relatively urgently. While an important challenge, this does not constitute a principled problem for the theory. On the contrary, non-classical—for example, prototype—theories of concepts seem to fit better with the psychofunctional characterization of episodic memory favored by the simulationist.

These challenges will play out as the now flourishing field of philosophy of memory matures and builds more solid bridges with both the sciences of memory and other areas of naturalistic philosophy

15.6 Conclusion

In this chapter, we examined the recent naturalist turn in the philosophy of memory through the lens of the simulation theory. At its core, naturalism is a way of *doing* philosophy, characterized by a commitment to rigorous, scientifically informed inquiry and an understanding that our theories are always subject to revision in light of new evidence. The simulation theory provides a clear example of this methodological stance, exemplified in a number of recent accounts in the philosophical literature (De Brigard 2014; Perrin 2018, 2021; Werning 2020; Andonovski 2021). The naturalist approach has not only resulted in more nuanced accounts of memory but affected the philosophical understanding of key debates and the evaluation of the relation between philosophy and the sciences of memory. With increasingly rapid developments, we expect naturalist theories of memory—both simulationist and neo-causalist—to continue to gain prominence in the coming years.

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Notes

1 Recent relationalist accounts of episodic memory can nevertheless be seen as challenging this condition (e.g., Barkasi and Sant'Anna 2022). We will not examine such accounts in this chapter.

2 Chakravartty (2013) characterizes experiential distance and risk in the context of his characterization of naturalist *metaphysics*. On a reasonably liberal conception, indeed, the simulationist can be seen as positing a metaphysical theory of a naturalist kind (cf. Ladyman and Ross 2007). The simulationist is nevertheless not committed to any form of metaphysical naturalism, as characterized in Section 15.2.
3 For a good example of a low-risk theory of episodic memory, see Hoerl (2022), who takes empirical investigations to impose only 'some constraints' on the theory (p. 4), constraints which he doesn't specify or examine in any detail.
4 The theory also does not include a *previous experience* condition, requiring that a remembered event was experienced by the subject at the time of occurrence. See Section 15.5 for more details. For a discussion of the role this condition has played in philosophical theories of memory, see Openshaw (2023).
5 In addition to the empirical evidence, Werning (2020) also appeals to a general principle—the Reichenbach common cause principle—to establish the necessary causal connection between memories and particular past experiences. For reasons of space, we cannot discuss this argument here. For a critical discussion of Werning's use of the Reichenbach common cause principle, see Andonovski (2021).
6 For the current state of play regarding pattern reactivation in long-term memory, as well as the transformation of activity patterns from perception to memory, see Favila et al. (2020).
7 It is worth noting that some theorists have challenged both the description and the interpretation of the case presented by Klein and Nichols (2012). See, for example, Roache (2016).

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