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ORIGINAL ARTICLE

Embodied constructivism: the imagination as a vehicle for mental time travel

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Abstract

In this article, I propose an account of episodic memory and episodic future-directed imagination for which I invent the term, 'embodied constructivism'. Embodied constructivism, I claim, is a more sophisticated, enactivist version of Augustine of Hippo's constructivist account of memory and expectation on which rest his epistemic claims concerning how God is known and remembered. However, embodied constructivism avoids metaphysical issues facing Augustine's account by drawing on cutting-edge theories in philosophy of memory, studies in experimental psychology, and recent findings in cognitive neuroscience. Embodied constructivism is a synthesis of two contemporary theories of memory: an embodied theory of memory generation – specifically, autopoietic enactivism – with a constructivist model – specifically, simulationism. As embodied constructivism asserts, mentally travelling to the past to relive it in episodic memory and mentally travelling to the future to pre-live it in future-directed imagination are co-functional processes. In addition to preserving Augustine's epistemic claims concerning how God is remembered and known, a further upshot of embodied constructivism is that it illustrates the importance of philosophy of science to theology in its reliance on a scientifically rigorous model of memory in defence of epistemological theology.

Keywords: Augustine of Hippo; embodied constructivism; memory and imagination; simulationism; autopoietic enactivism

Introduction

In this article, I propose an account of episodic memory and episodic future-directed imagination for which I invent the term, 'embodied constructivism'. 'Episodic memory' is memory of past events, whereas 'episodic future-directed imagination' is imaginings of future scenarios. Embodied constructivism, I claim, is a more sophisticated, embodied version of Augustine of Hippo's account of memory and expectation. The North African Church Father, Augustine of Hippo (354–430 AD), is 'perhaps the greatest Christian philosopher of Antiquity' (Tornau 2020). As I argue, embodied constructivism is impervious to, and resolves, problems facing Augustine's account of memory. This is important because Augustine's epistemic claims concerning how a (human) cognitive agent knows and remembers God relies on the constructivist dimension of his account of memory. That is, the idea that memory of past events is constructed via the same or similar processes like the imagination of future events.

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Embodied constructivism is a synthesis of two contemporary theories of memory: an embodied theory of memory generation – specifically, autopoietic enactivism – with a constructivist model – specifically, simulationism. On the one hand, autopoietic enactivism holds, like other embodied theories of cognition, that cognition is generated via an organism's navigation of its environment. On the other hand, simulationism holds that a causal link is not necessary between an event and the remembering of that event. Further, that episodic memory is generated via the same cognitive constructive processes as episodic future-directed imagination.[1] Although embodied constructivism is a version of Augustine's constructivist model of memory, it radically diverges from Augustine's model in its incorporation of enactivism in its synthesis. Thus, embodied constructivism is a novel model of memory in both Augustine's contemporaneous context as well as in the contemporary one.

As embodied constructivism asserts, mentally travelling to the past to relive it in episodic memory and mentally travelling to the future to pre-live it in future-directed imagination are co-functional processes. As I go on to show, embodied constructivism is consistent with cutting-edge theories in the philosophy of memory, studies in experimental psychology, and recent findings in cognitive neuroscience. In addition to preserving Augustine's epistemic claims concerning how God is remembered and known, another upshot of embodied constructivism is that it illustrates the importance of philosophy of science to theology.

Scope and structure

In the first section, I characterize and subsequently re-locate Augustine's constructivist model of memory within the contemporary landscape of philosophy of memory. In characterizing Augustine's constructivist model of memory, I note its theological significance as well as some problems facing Augustine's constructivism. Hence, if constructivism is left undefended, these problems also undermine its theological significance. In defence of Augustine's constructivism, in the second section, I construct embodied constructivism from two contemporary accounts of memory. In the third section, I evaluate embodied constructivism as a model of memory and demonstrate how it preserves Augustine's epistemic claims concerning how God is known and remembered.

Characterizing and re-locating Augustine's constructivism

The constructive nature of memory is not the dominant model of memory within Augustine's contemporaneous context. Neoplatonists, Plotinus and Porphyry, whose influence on Augustine cannot be overstated, assert the Platonic/Aristotelian wax-tablet model of memory. That is, memory is acquired via impressions imprinted from experiences (of events). Notably in his *Ennead V* (V 3 [49] 2; (Plotinus 1969), Plotinus draws on Plato's wax-tablet model of memory.[2] Augustine's assertion of the constructive nature of memory raises two pertinent questions. First, what is Augustine's constructivist model of memory? Second, what is the theological significance of Augustine's constructivist account of memory (and expectation)?

Augustine on the co-functionality of memory and expectation

According to Augustine, sensory images which are acquired from sensory experience are stored according to the kinds of sensory images they are. So, olfactory images comprise one category, visual images another, and so on (*Conf.* 10.8.13). These images, sorted according to sensory categories, are further sorted according to kinds of sensory data. So, the

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visual category of sensory data includes light, colours, and shapes; tactile category includes hardness, softness, hotness, coldness. To me, these sensory data, being the simplest component of a sensory image imaginable to Augustine, are concepts. That is, basic building blocks of thought. In alignment with this inference, Augustine describes individual sensory data of colour, shape, sound, odour, and taste as concepts (*De Tri.* 11.8.14). What is not clear is how multimodal images, comprising more than one kind of sensory image constructed from concepts, are generated in memory.

These concepts or 'monomodal sensory images' – as I term them – are stored in a location of the interior world, an area also accessible to the souls of nonhuman animals (*Conf.* 10.25.36). For Augustine, the soul resides in the interior world and the body in the exterior. Affect states are stored in a different location of the interior world, an area which is beyond the part of the interior world accessible to non-human animals. This seems to indicate that Augustine thinks that animals lack affect states, or at least, they are unable to access their affect states. Indeed, Augustine describes affect states as '*affectiones animi mei*' – that is, emotions of the intelligible dimension of the soul (*animus*) rather than the sensible (*anima*). Beyond the location where affect states are stored is the region of pre-existent phenomena. The intelligible dimension of the soul, or *animus*, resides in this location of the interior world. It is via the presence of the *animus* as a pre-existent phenomenon of the interior world that the soul is mindful of itself. That is, the soul's encounter with the pre-existent *animus* is how self-referential knowledge takes place.

Remembering is a process that involves a dynamic interaction with equally dynamic objects of the interior world. To remember, one '*retractanda grandis memoriae recessus*' – that is, 'proceeds into grand recess of memory'. Then, once in the grand recess of memory, one requests the thing one is trying to remember. Some things are immediately at hand, whereas some take longer to find. Whilst looking for the harder to find things, (incorrect) possibilities may offer themselves as the goal of retrieval. These incorrect possibilities are rejected until the correct, hitherto hard to find, thing is retrieved from obscurity. Because the objects of memory are stored as monomodal sensory images remembering the past involves 'weaving'[3] these concepts into retrieved memories. It is via the same process of 'weaving' concepts together that expectation – that is, thinking about the future – takes place. According to Augustine, from the same process of memory one predicts '*faciam hoc et illud*' (*Conf.* 10.8.14): 'I shall do this and that'. This conception of memory and expectation as co-functional processes situates Augustine as a proponent constructivism.

I identify a key theological significance of Augustine's constructivism undermined by the issues which threaten constructivism: the idea that God is encountered and known (only) in memory. 'On learning about you, you remain in my memory, and there I discover you' (*Conf.* 10.24.35). This, to me, is the primary motivation for Augustine's radical model of memory. A wax-tablet model of memory, wherein remembering is limited to past embodied and finite experiences, does not account for how the infinitude of an incorporeal God is encountered, known, and remembered. That is, only experiences perceived in the material world qualify as memory. Further, via a wax-tablet model, to say that 'I have an autobiographical memory of God' requires an embodied personal encounter with God in the material world at some point in the past. For Augustine, this is problematic. How then does he account that he nonetheless knows and remembers God (*Conf.* 10.16.24)? This might not be a problem for someone who is satisfied with a spiritual explanation disconnected from natural philosophy. However, Augustine takes natural philosophy very seriously.

Therefore, he needs to construct a model of memory that coheres with his contemporaneous science as well as accounts for how he knows and remembers God. That is how he arrives at a constructivist model of memory. There are at least two reasons why Augustine takes natural philosophy seriously. I consider these in turn. The first reason is his training

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in natural philosophy.[4] Although Augustine was primarily influenced by Neoplatonism, and shortly after his conversion from Manicheanism he was a fanatically anti-materialist, he was nonetheless interested in the material world. Evidence of his keen interest in the material world as well as a commitment to seeking a consistency between theology and natural philosophy is clearly seen in one of his early works, *De Quantitate Animae*. In *De Quantitate*, he consistently seeks and offers explanations to problems raised by his soul/body dualism.

Augustine's interest in the material world is explained by the second reason why he takes natural philosophy seriously. He thinks God, or attributes of God, can be known through natural phenomena. In her 'Measure, Number and Weight in Saint Augustine's Aesthetics', Carol Harrison notes that according to Augustine, measure, number, and weight are present in the Creator before the existence of creation (Harrison 1988). For these two reasons, his training in natural philosophy and his belief that attributes of God can be known through natural phenomena, a consistency between natural phenomena and theology is of paramount importance for him. Therefore, the model of memory he asserts must be consistent with his contemporaneous understandings in natural philosophy. Thus, the constructivist model of memory is not accidental to Augustine's theology, it is foundational to his theological edifice concerning how God is known and remembered.

The primary theological significance of Augustine's constructivist account of memory and expectation is epistemological; on how God is known (only) in memory. There are different strands to this epistemological significance.

The first strand of the theological significance of Augustine's constructivist model of memory, I identify, is this. How is God known and remembered in the interior world wherein the soul resides without an embodied experience of God in the exterior world wherein the body resides? A constructivist model of memory allows Augustine to confidently assert that he knows and remembers God in the absence of an embodied experience of God because according to a constructivist model of memory, experience of an event in the past is not required for remembering that event. According to Augustine: 'people think that memory refers to past experiences. But some knowledge is not derived from past experiences, nor known through the senses. Thus, memory does not necessarily refer to the past and it need not involve images derived from past sense experience' (Coleman 1992, 88).

A wax-tablet model of memory, wherein remembering is limited to past embodied and finite experiences, does not account for how God is known and remembered in the absence of a first-person embodied experience of God in the physical world.

The second strand of the theological significance of Augustine's constructivist model of memory, I identify, is this. How does a finite human mind know, and remember, the infinite being of God? It seems to me that for Augustine, God's boundless being can only be encountered in an infinite memory. More specifically, that human memory has the potential to remember an infinite number of encounters with God's boundless being. Although not explicitly noted by Augustine, I infer that for his claim that God is known and encountered in memory to be true, memory must have infinite capacity for God's infiniteness to be found within its spatiotemporal field. An archival form of memory limited to a person's past experiences does not allow for remembering God's infinite being and acts within its static and limited dimensions. On the other hand, the dynamic permutations and combinations of a reconstructive memory are (potentially) infinite. This dynamic infiniteness of a reconstructive kind of memory further supports Augustine's epistemic claims concerning the divine ontology: God's boundless being can be known and encountered within a reconstructive memory's infinite, spatiotemporal field. In support of this inference, Augustine asserts

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that the 'fields, caves and hollows' of his memory are innumerable (*Conf.* 10.17.26). Further, the infinite faculty of memory is consistent with Augustine's assertion of the interior world, in which memory dwells, as infinite.

The third strand of the theological significance of Augustine's constructivist model of memory, I identify, is this. For Augustine, and as seen in early and medieval church liturgy, eschatology is a recollection of the future. That is, (what are taken to be) future acts of God are recollected. I think this view of eschatology as recollection comes from an understanding of God as atemporal. God eternally is. Therefore, the things taken to be the future acts of God some*when* exist. Thus, to think of these acts, is to remember them. In alignment with this, Mary Carruthers quotes a twelfth-century monk: '[t]he frequent recollection of the city of Jerusalem and of its King, is to us a sweet consolation, a pleasing occasion for meditation' (Carruthers 1998, 69). This remembering of the city of Jerusalem is a recollection of the future. A constructivist model of memory, not restricted to the past, explains how the future can be recollected unlike a wax-tablet model.

To explain eschatological recollection in late antiquity and in the medieval period, Carruthers begins with a biblical understanding of recollection. According to her, 'the injunction "to remember", "to be mindful of", is a characteristic of the Hebrew Bible' (Carruthers 1998, 67). Carruthers uses Psalm 136's 'by the rivers of Babylon … we remembered Zion' to explain the motivation for Augustine's *De Civitate Dei*. For Augustine, and in subsequent medieval monastic praxes, the eschatological future is recollected. John Zizoulas further expatiates the Christian praxis of recollecting the future in his *Remembering the Future: Toward an Eschatological Ontology*. Zizioulas' work draws on scripture; early church praxes from extant liturgical texts like the *Didache*; and historical and contemporary Eastern Orthodox liturgy. Zizoulas concludes that liturgical anamnesis is a celebration not only of the past but of the future. In the Eucharist both the past and future acts of Christ are remembered and celebrated (Zizioulas 2023, Intoduction).

A two-stage problem facing constructivism

Despite its identified epistemological significance and its three theological strands, there are historical and contemporary problems facing constructivism. These problems threaten to undermine constructivism and, by extension, Augustine's epistemic claims concerning how God is known. In this work, I present a two-stage problem facing Augustine's constructivism derived from Aristotle's account of memory and mirrored in various forms of historical and contemporary challenges to a constructivist model of memory. The Aristotelian problem anticipates and blocks Augustine's account; however, Augustine does not defend his model of memory from it. It seems to me that it is because of the intuitive appeal of the problem that a constructivist model of memory faded into obscurity until recent findings in experimental psychology and cognitive neuroscience.

First stage: Episodic memory is a cognitive ability of reproducing events that have happened. Whereas expectation or episodic future-directed imagination is a cognitive ability that constructs events that have not yet taken place and may never occur. The pastness and futurity characteristics of memory and expectation, respectively, appear to delineate them as two disparate, albeit related, cognitive abilities (*dM* 449b10–25; Aristotle, *dA*428a12–15).

Second stage: For Aristotle, the pastness characteristic of memory implies that memory is archival in nature: that is, remembering the past consists in a reproduction of stored information. Whereas the futurity characteristic of episodic future-directed imagination implies that expectation is constructive in nature: that is, imagining future events consists in constructing possible scenarios. These archival *versus* constructive natures of memory and expectation, respectively, further delineate them as disparate abilities (or processes) which realise distinct phenomena.

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It is worth asking how is a cognitive process 'distinct'? A cognitive process, α is distinct from another β if α's functionality, as a mechanism, does not significantly depend on β. Peter Machamer, Lindley Darden, and Carl F. Craver in their 'Thinking about Mechanisms' (2000) offer further guidelines on how to determine the boundaries of a mechanism specifically in molecular biology and neurobiology. I follow Machamer, Darden, and Craver in taking a mechanism as an explanation of 'how a phenomenon comes about' (Machamer et al. 2000, 2). The phenomena under consideration in this work are episodic memory and episodic future-directed thinking. According to Machamer, Darden, and Craver: 'Mechanisms are entities and activities organised in such a way that they are productive of regular changes from start or set-up to finish or termination' (Machamer et al. 2000, 3).

Therefore, when I assert that a cognitive process α is distinct from β, I mean α's functionality is not significantly dependent on β's. Further, that distinct entities and activities comprise α and β. In the case of co-functional processes, the opposite is true: α's and β's functionalities depend on one another; and α and β share (a significant number of) the entities and activities that give rise to their respective phenomena. Using embodied constructivism, I aim to demonstrate that episodic memory and episodic future-directed imagination are co-functional processes as asserted by Augustine and *contra* the two-stage problem. Thereby defending Augustine's constructivism and preserving his epistemic claims on how God is known.

Re-locating Augustine in the contemporary landscape

In *New Directions in the Philosophy of Memory*, Kourken Michaelian and Sarah K. Robins note that 'older conceptions of memory in terms of storage and retrieval have given way to new conceptions of remembering as a constructive and simulational process' (Perrin 2020, 13). One of the older conceptions of memory to which Michaelian and Robins refer is from Charles Martin's and Max Deutscher's *Remembering*. Martin and Deutscher argue that remembering necessarily requires a causal connection between an event and its memory. More specifically, to remember something directly or to remember it happening requires that the rememberer [sic] observed or experienced that thing (happening)' (Martin and Deutscher 1966, 163). The causal theory of memory is intuitively palatable.[5] Its intuitive appeal explains its dominance as a theory of memory.

There are strong parallels between Martin and Deutscher's classical causal theory of memory and Plato/Aristotle's wax-tablet model. According to both models, memory is acquired via an experience imprinting impressions or leaving memory traces – in the case of the wax-tablet model or in the case of causal theory of memory, respectively. Further, that the representations retrieved in memory correspond to the event or thing experienced or observed. However, I see an important difference between Martin and Deutscher's classical causal theory and a wax-tablet model: The latter holds that impressions in a wax-tablet are analogous to *phantasmata*: that is, representations of experience. Whereas classical causal theory holds that memory traces carry required causal connection between perceptual representations and their subsequent retrieved representations (Michaelian et al. 2020, 16). That is, memory traces are not themselves representations as are wax-tablet impressions.

Although, in an early letter to Nebridius, Augustine refers to species or traces of memory, he does not use the term in the way it is used in causal theories of memory. Augustine does not offer a fully developed account of traces, on a close look, however, it seems to me that what he refers to as traces are images acquired from sensory experience, which he does flesh out in *Confessiones*. Therefore, Augustine's traces are closer to Aristotelian *phantasmata* rather than traces as understood in causal theories of memory. I note that where Aristotelian images are multimodal representations comprising various sensory modalities,

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Augustinian images are monomodal. The difference between Aristotelian and Augustinian images lead to important differences between both accounts of memory.

An important upshot of the construction of memories out of monomodal images instead of multimodal images is that experience of an event is not required for remembering the event. I think the dynamism and flexibility that monomodal images confer account for why Augustine's account of memory asserts the construction of memory from monomodal images. Aristotelian multimodal images are in stasis after being imprinted from an experience of an event and subsequently reproduced in the remembering of that event. On the other hand, if memory of an event is generated from the construction of basic concepts rather than reproductions, or traces, of static images of one particular event; then an experience of that event is not required for constructing memory of the event. The absence of traces as bearers of a causal connection between perceptual experience of an event and memory of that event from Augustine's account sets it apart from causal theories of memory.

Not all causal theories of memory involve memory traces as bearers of a causal connection between an event and its memory. Some 'distributed and procedural causal theories'[6] radically depart from orthodox view of memory traces. For instance, John Sutton argues that memory traces are 'blended, not laid down independently once and for all, and are reconstructed rather than reproduced' (Sutton 1998, 2). For Sutton, memory comprises a network of interconnected web of information in which past experiences correspond to patterns of activation within the network. Sutton's account thus draws on a connectionist model of cognition which, in turn, parallels neural architecture. According to Michaelian and Robins, Sutton's account is a radical rejection of the notion of traces in causal theories in that 'there are no traces in the sense of *distinct vehicles* carrying *distinct contents*' (Michaelian et al. 2020, 21). That is, entities bearing (some form of) representations of experiences. Traces, in Sutton's account, comprise patterns of activation within a network, wherein other patterns of activation cohere with other experiences (Perrin 2020, 33–51). This parallels how patterns of activation in the brain seem to give rise to perceptual experience and action.

Prima facie, Sutton's notion of memory traces aligns with Augustine's constructivism because of its rejection of memory retrieval as reproduction and an assertion of retrieval as construction; this proves to be illusory on further analysis. Even though it radically departs from classical causal theories of memory, Sutton's distributed account nevertheless requires a causal connection between an experience and its memory, whereas no such connection is required in Augustine's constructivist account. I note that Augustine does not deny the role of experiences in the acquiring of sensory images. Indeed, he recognizes that sensory images are acquired from experiences of the exterior world. What Augustine denies is that experience of a *particular* event is necessary for remembering that event. That is, one can remember visiting Alexandria despite having never been to Alexandria. The absence of a necessary causal connection between an experience and its memory is essential for Augustine who wants to say that his memory of God is true in the absence of an encounter with God in his exterior world. The presence of a causal connection between an experience and its memory in procedural accounts is also what rules them out from being aligned with Augustine's constructivism. The causal connection in procedural accounts is between a process that gives rise to an experience and a corresponding process that gives rise to its retrieved memory.

If Augustine's account is not aligned with classical causal or with distributed and procedural theories of memory, where then can his account be (re-)located in the contemporary landscape of accounts of memory? I argue that Augustine's constructivist account, as advanced in Book X of *Confessiones*, is closest to post-causal accounts of memory. Michaelian

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and Robins define 'post-causal' theories as accounts that 'recognizably descend' from (classical) causal theories but nonetheless reject the idea that a causal connection with experience is a necessary requirement for memory. The version of post-causal theory of memory that I think is the closest to Augustine's constructivism is the simulationist[7] model of remembering. I find the simulationist model appealing because, like Augustine's constructivism, it holds that remembering past events and imagining future ones are co-functional cognitive abilities. That is, remembering just is imagining. Thus, simulationism is an account of mental time travel because it takes episodic memory and episodic future-directed imagination to be continuous processes. Further, it is untethered by necessity of causal connection between an experience and its memory. Therefore, in constructing embodied constructivism, I begin with a simulationist model of memory.

Constructing embodied constructivism

In advancing embodied constructivism, I make three claims.

The first claim. Memory comprises at least two distinct processes: (a) formation or construction and (b) retrieval. Viewing memory as a dynamic, multifaceted phenomenon is a rejection of an archival, or 'wax-tablet' model, and the classical causal theory, of memory. As I argue, the wax-tablet analogy fallaciously conflates the storage dimension of memory with the retrieval dimension. Embodied constructivism, on the other hand, avoids this fallacious conflation.

The second claim. Memory is embodied in which concepts are acquired via a cognitive agent's navigation of its environment. Subsequently, these concepts are stored as patterns of action. In turn, these stored patterns of action effect – that is, are causally related to – the construction of future-directed episodic models that guide an agent's intentional behaviour. By 'intentional behaviour', I refer to voluntary behaviour intentionally performed usually to fulfil an expectation. To illustrate, Subject '*S*' performs an action '*A*' because *S* desires a thing '*P*' and believes that performing *A* will attain *P*. Therefore, *S* intentionally does *A*. Where [performing *A* will attain *P*] is an episodic future-directed construct.

The third claim, which is a radical one, consists in a process I identify and term 'automorphism'. I use automorphism in a different sense from how it is used in mathematics. In mathematics, so that a given range of function and its domain are the same, 'automorphism' is used to denote a one-to-one correspondence plotting the members of a set unto itself (Clapham and Nicholson 2013). Tangential to the mathematical sense, I use 'automorphism' to denote the simulation process by which an agent makes another out to be cognitively akin to oneself. It is via automorphism that an agent simulates, or constructs episodic memory, and episodic future-directed imagination. The allowance for episodic constructs from another's perspective is unique to embodied constructivism: most accounts, if not all, of mental time travel focus on constructs from the rememberer's or imaginer's perspective.

Simulation as the mechanism for mental time travel

The simulationist model of memory originates from simulation theory of mindreading. 'Mindreading' being the cognitive ability of attributing mental states to another. A highly influential account of mindreading is put forward by Alvin Goldman in his *Simulating Minds*.[8] Simulation theory holds that mindreading occurs when a cognitive agent mentally puts herself into the shoes of another. By imagining what I would do given a certain set of beliefs and desires, I understand another's mental state and/or predict what another would do. Simulationist model of memory is a variation of the simulation theory of mindreading. I do not intend to defend[9] a simulationist/constructivist model of memory as it is

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characterized in contemporary literature. The main intention of this article is to defend *Augustine's* constructivism by synthesizing embodied constructivism – a more sophisticated version – which draws on contemporary philosophy of memory and cognitive neuroscience. Consequently, in the next section, I point to studies in cognitive neuroscience which seem to support a constructivist model of memory.

Simulationist model of memory, like embodied constructivism, is specifically about episodic memory in the declarative genus within the generally recognized taxonomy of memory. In the declarative genus are those types of memory that are explicit and articulable. Whereas, in the non-declarative genus are implicit and inarticulable memory. An example of declarative memory is recalling, 'Edinburgh is in Scotland'. An example of non-declarative memory is recollecting how to swim. No matter how detailed a description of swimming is, it is not possible to be aware of, and thus fully articulate, all the sensorimotor activities involved in the act of swimming. The declarative taxon within the hierarchical taxonomy is further divided into episodic and semantic memory[10] by Endel Tulving (Tulving 1972). According to Tulving, semantic memory is memory of facts, such as 'Edinburgh is the capital of Scotland'. On the other hand, episodic memory, or 'what-where-when' memory is memory of experienced events. Such as a recollection of a birthday party I attended two weeks ago.

In characterizing his constructivist/simulationist model of memory, Michaelian asserts that:

> Things remembered need not be things formerly perceived or known, in the sense that remembering can – without ceasing to qualify as genuine remembering, in a full, strict sense – give us access to a past episode that goes beyond the access we had at the time at which it occurred (Michaelian 2016, 60).

The simulationist view that remembering is not limited to specific past experiences is congruent with Augustine's. In his *De Trinitate*, he compares his remembering of Carthage to which he has been in the past to Alexandria which he has not. He finds both cases of remembering on a par (*De Tri.* 8.6.9). The difference between both cases of recollection – aside from having experienced one (Carthage) and not the other (Alexandria) – is that he needs the attestation of those who have been to Alexandria to determine whether his recollection is accurate. Michaelian, (perhaps unknowingly) agreeing with Augustine, says, 'there may even be cases in which the agent remembers an event that he did not even originally experience'. Augustine's and Michaelian's shared idea that memory is (imaginatively) constructed rather than reproduced raises an important question: if remembering just is to imagine, how is a successful episodic memory differentiated from an unsuccessful episodic imagination?.[11]

According to Michaelian, the differentiating factor between a successful and an unsuccessful episodic memory of an event is that 'the relevant representation is produced by a properly functioning episodic construction system' (Michaelian 2016, 97), which he identifies as the process of simulation. Further, that simulation process is also responsible for imagining the future. So construed, simulation is the mechanism for mental time travel. Mental time travel is the cognitive ability of mentally travelling back in time to relive the past in episodic memory; and mentally travelling forward in time to pre-live the future in future-directed episodic imagination. In characterizing his simulationist model of memory, Michaelian references Manning et al.'s (Cassel et al. 2013) quote of Augustine thus recognizing him (Augustine) as an early proponent[12] of constructivist account of mental time travel (Michaelian 2016, 99).

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For Augustine, memory and expectation are conjoined cognitive processes which are constructive in nature. That is, reliving the past and pre-living the future involve a dynamic (re)construction, in the present, of information acquired in the past. As I see it, constructivism entails that memory and expectation are continuous processes. That is, the same cognitive processes which includes, but is not limited to the imagination, undergird both memory and expectation.[13] This view is known as 'continuism'. Augustine's epistemic claims concerning divine ontology rest on the constructivist and continuist dimension of his account. Viewing memory as an active reconstruction, which is not limited to experience, allows Augustine to aver that God can be known, and recollected, in memory even in the absence of an experience of encountering God in the physical world. Further, eschatological expectations are, for Augustine, epistemically on a par with recollections. This idea motivates his *De Civitate Dei*. Because of the connection of expectations to recollections, it can be said that 'one remembers the future'. That is, thoughts about the eschatological future are true because they are: (a) continuous with, (b) constructed via, and (c) epistemically on a par with recollections.

From simulation to embodiment

I agree with Michaelian that remembering past events and imagining future ones are cognitive abilities which are generated by simulation. I outline studies in cognitive neuroscience in support of this view in the third section. Although embodied constructivism is a variation of Michaelian's simulationist account, there is an important difference between both accounts. Embodied constructivism emphasizes the importance of embodiment to the simulation process. According to Michaelian's account, episodic memory and episodic future-directed imagination are generated via what he terms 'constructive episodic simulation'. Constructive episodic simulation includes neural structures not limited to the hippocampus and the medial temporal lobe: both of which are generally agreed as responsible for memory (Purves et al., 2012).

Embodied constructivism goes further than Michaelian's simulationism and Augustine's constructivism. I argue that the construction of episodic simulation necessarily relies on a process I term 'automorphism', which is at its heart an embodied process. In contemporary philosophy of memory, simulationist accounts are usually viewed as disparate from embodied or enactivist accounts. I think this is because enactivist accounts tend to rely on a causal link (however weakly construed) between an experience and its memory, something simulationists eschew in its entirety. For example, Denis Perrin argues for a 'procedural causality' in episodic recollection, which consists in asserting a causal link between processes involved in perceptual experience and in its subsequent memory (Perrin 2020, 37). Similarly, Daniel D. Hutto (2020) argues for a radically enactive (Hutto 2022) recollecting which consists in asserting that recollection is 're-enacted know-how'. As I aver, Augustine's account is akin to the simulationist account because of the absence of a causal connection between a specific event and its memory. Thus, it is important that the embodiment dimension I include in the construction of embodied constructivism does not re-introduce a causal connection between experiencing an event and its memory.

Despite the apparent difficulty in merging an enactivist model of memory with a simulationist one, as I demonstrate here, it is nonetheless possible. A recognition of the essential role of the perceptual action systems in both enactivist as well as in simulationist theories of memory is a nexus between these two seemingly disparate views. Enactivism, as a theory, is from an attempt to merge concepts from both systems biology and Buddhist practice. In their *The Embodied Mind*, Francisco Varela, Eleanor Rosch, and Evan Thompson offer an initial definition of enactivism as:

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> In a nutshell, the enactive approach consists of two points: (1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that allow action to be perceptually guided (Varela et al. 1991, 173).

Since the publication of *The Embodied Mind* there are 'at least three semi-distinct currents of enactivist theorising': that is, three subspecies of enactivism: 'autopoietic'; 'radical enactivism'; 'sensorimotor' (Ward et al. 2017, 369). Autopoietic enactivists, like Varela, Thompson, and Rosch ground cognition in the dynamic self-organizing structures of biological life. According to this view, cognition is on a continuum with other biological processes. The second subspecies of enactivism, 'sensorimotor' concerns intentionality and phenomenal qualities of perceptual experience (Kevin O'Regan and Noe 2001). As sensorimotor enactivists hold, perceptual experience is generated from a perceiver's exploration of her environment which generates patterns of dependence between the perceiver's sensorimotor activities, sensory states, and the environment. The third subspecies of enactivism, radical enactivism, seeks to replace cognitivism or representation-dependent explanations of cognition with dynamic interactions within the environment (Hutto and Myin 2017).

It is radical because of its circumvention of mental contents in explaining cognition. Of the three subspecies of enactivism, the most appealing to me is Varela, Thomson, and Rosch's autopoietic enactivism for two reasons. First, although not an embodied theory, Augustine's schema of the soul recognizes a continuum from plant life to the summit of human perceptual experience: He elaborates on this continuum in *De Quantitate Animae*. Unlike autopoietic enactivism, the other two subspecies of enactivism are silent on the continuity between life and cognition. The second reason I prefer autopoietic enactivism is because of its two commitments outlined above to perceptually guided action and to sensorimotor patterns which cohere with some of the claims I make about embodied constructivism.

Embodied constructivism: constructing episodic memory and imagination

As introduced, I term the synthesis of an embodied (specifically, autopoietic enactivist) model of memory with a constructivist (specifically, simulationist) model of memory, 'embodied constructivism'. Embodied constructivism asserts that memory is updated via a strengthening and broadening of an organism's patterns of action. Enactivist theories hold that perception and action are inextricably linked. In *Homo sapiens* as well as many other species in the mammalian class of the animal kingdom, the phylogenetic systems that comprise the perceptual-action system are not limited to the brain but encompass the body and its interactions with its environment. From the interaction of an organism's body with its environment, via its perceptual-action system, embodied conceptualizations are formed. I term these embodied conceptualizations 'corpus of conceptualizations'.

Augustine's monomodal images are like embodied constructivism's corpus of conceptualizations. Similar to Augustine's monomodal images, embodied conceptualizations are acquired from sensorimotor experiences but are not static representations of specific experiences. Further, the entities that comprise an organism's corpus of conceptualizations are fundamental building blocks of thoughts. These entities are 'patterns of action' (Glenberg 1997) or 'patterns of activation' (Hutto 2020). Thus, like Augustine's constructivism and simulationism, embodied constructivism does not require a necessary connection between an event and its memory. Unlike Augustine's constructivism, embodied constructivism, as the name asserts, is embodied rather than a purely mental phenomenon. To construct episodic recollections and episodic future-directed imaginings, an organism's

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corpus of conceptualizations is dynamically and flexibly manipulated via a simulation process. Consequently, I see three loci of contrast between embodied constructivism versus enactivist and simulationist models of memory from which embodied constructivism is synthesized.

The first locus of contrast: Although I refer to the conceptualizations used in the simulation process as patterns of action, they are not identical to the patterns of action or activation in typical enactivist models. As aforementioned, embodied constructivism's patterns of action or corpus of conceptualizations are closer to Augustinian monomodal images in that they encode building blocks of memory representations rather than a body of representations which correspond to a given event. This is an important distinction because it means that embodied constructivism, like simulationist model of memory, avoids a causal connection between perception of an experience and the remembering of that event. Embodied constructivism's corpus of conceptualizations comprises flexible concepts which are constantly reconfigured into new ones thus expanding one's patterns of action. These patterns of action are not limited to past experiences like those asserted in enactivist theories. Corpus of conceptualizations or (embodied) concepts are acquired via an organism's navigation of its environment and are used in the construction of episodic memory and episodic future-directed imagination. In support of this recognition of a connection between an organism's navigation of its environment and memory, studies link the hippocampus involved in episodic and spatial memory with the construction of past and future events.[14]

The second locus of contrast is that embodied constructivism is not restricted to how an organism uses its own corpus of conceptualizations to construct episodic memory and imagination from its own perspective. Rather, embodied constructivism includes the construction of another's future-directed episodic imagination using one's own corpus of conceptualizations. This second point of contrast is made clearer when I elaborate the process I refer to as automorphism.

The third locus of contrast between embodied constructivism and simulationism is that embodied constructivism brings together two seemingly disparate models of memory. Nonetheless, embodied constructivism is a variation of a simulationist model of memory in that it eschews a causal connection between a perceptual experience and its memory. In addition, embodied constructivism preserves the constructivist dimension of Augustine's account of memory. Next, I elaborate a two-phase process by which the construction of episodic memory and imagination occurs. The two-phase process draws on various accounts of cognition and memory with which I engage in this paper including Goldman's simulation theory of mindreading (Goldman 2006); Michaelian's simulationist account of mental time travel (Michaelian 2016); Varela, Thompson, and Rosch's autopoietic enactivist account of cognition (Varela et al. 1991); and a process which I identify and for which I invent the term 'automorphism'.

Phase I: An identification of the target for whom to construct an episodic memory or episodic future-directed imagination. The target could be oneself or another cognitive agent. An identification of a target is the first step in Goldman's simulation theory. Although constructed from Goldman's theory, Michaelian's simulationist theory is limited to the construction of one's own episodic memory and episodic future-directed imagination. As Michaelian notes, some view the emergence of future-directed imagination as evolutionarily prior to memory. I note that future-directed imaginings are not limited to the imaginer's own possible experiences but often include what others might do given a set of certain circumstances. Therefore, there is no reason why an account of episodic memory and imagination should not also account for episodic future-directed imaginings from another's perspective. Further, it recovers the original purpose of simulation theory which is other focussed.

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In identifying a target, if the target is another person, then that agent is recognized as distinct from, but also akin to, oneself in significant ways. I term the process by which we humans identify others as distinct from, but also akin to ourselves, 'automorphism'. 'Automorphism' is from the Greek words, 'αύτός' – that is, autos – which is the reflective pronoun 'self' and 'μορφη' – that is, morphē – which means 'form' or 'shape' (Liddell and Scott's Greek-English Lexicon 1955). Tangential to the mathematical sense, I use 'automorphism' to denote the process by which an agent makes another out to be cognitively akin to oneself. 'Automorphism' intentionally has embodied overtones. For in making others out to be like myself, I represent not only the target's cognitive processes as akin to mine but their possible patterns of action as also akin to mine.

Anthropomorphism is an extension of automorphism. To highlight the ubiquity of anthropomorphism, and by implication of automorphism, I evaluate the anthropomorphizing of God in the *Bible*. God in the *Bible* is startlingly human-like, both in thought and somatic actions, for a transcendent being. The human-like nature of God is accounted for in the *Bible* by noting that humans are 'made in God's image' (Genesis 1). In the Genesis 1 creation narrative, human bodily finitude is attributed to God who needs to rest. Human emotions are attributed to God including regret (Genesis 6:6–7) and anger (Exodus 34:6). Body parts, albeit metaphorical ones, are attributed to God such as eyes (Genesis 6:8), ears (2 Samuel 22:7), and arms (Isaiah 40:11).

The climatic locus of the anthropomorphizing of God in the *Bible* is the Christian doctrine of the incarnation (*literal* = en-fleshing) in which God is said to 'become flesh' (John 1). That is, God in human form: in an actual, and not in a metaphorical, sense. Anthropomorphizing of a deity is not limited to the *Bible*, it is found in other Ancient Near East texts such as the human-like god, Marduk, described in the Babylonian *Enuma Elish*. In Greek literature, gods and daemons are fashioned with human-like physiology, passions, and motives; with humans often interacting on almost equal footing with god and daemons. An example is Odysseus outwitting a Cyclops in Homer's *Iliad*. It is not only gods that are anthropomorphized in classical texts. Boethius, in his *Consolation of Philosophy*, for example, humanizes and feminizes Wisdom probably inspired by the depiction of 'Lady Wisdom' in Proverbs and the intertestamental *Book of Wisdom*.

Anthropomorphism persists in contemporary culture. Non-human animals are often depicted with human-like features and language-capabilities in cartoons such as the characters in Peppa Pig. Monikers such as 'Mother Nature/Earth', 'Mama Africa', and the naming of hurricanes are examples of, at least a partially anthropomorphized view of natural phenomena. It has been shown in experiments that both children and adults have a bias for teleological explanations, over causal ones, for natural phenomena such as natural selection (Bloom and Weisberg 2007) and (Kelemen and Rosset 2009). The problem with a teleological explanation for natural phenomena is that the ascription of purpose to natural phenomena is an attribution agency. An attribution of agency to natural phenomena is anthropomorphic because it credits inanimate forces of nature with an intention to act with purpose.

To me, the humanizing of transcendent beings such as gods and daemons, and traits such as wisdom in classical texts, as well as the attribution of agency to natural phenomena, demonstrate the ubiquity of anthropomorphism. This assertion is in alignment with Augustine's epistemology. For Augustine, in both *De Quantitate Animae* and *Confessiones*, God is encountered in the same area of the interior world where self-referential knowledge occurs. Knowing God requires *truly* knowing oneself and vice versa. As I argue, anthropomorphism is an extension of automorphism, thus, the ubiquity of anthropomorphism points to the ubiquity of automorphism. Hence why I identify automorphism as the first phase of the construction of episodic memory and imagination via embodied constructivism.

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Phase II: A simulation process follows the attribution of intention. Simulation, according to Goldman, is the cognitive process 'of putting ourselves' in the '(mental) shoes' of others (Goldman 2006, vii) to understand them. The resulting representation of another's mental state is what is used to predict the other's behaviour. The simulated mental state may consist in beliefs and desires. To illustrate, a mental state may consist in a desire for *X* and a belief that 'doing *Y* will attain *X*'. The Target, *T*'s desire and belief comprise the intention that bring about *T* carrying out *Y* (Davidson 1963). Via classical simulation theory, to arrive at a prediction, simulations are fed into a 'decision-maker' (Nichols et al., 1996, 44). Where a 'decision-maker' is a cognitive system with mental representation as its input and prediction as its output. Via embodied constructivism, the input into a decision-maker is an organism's corpus of conceptualizations. The decision-maker, as the name implies, is how I come to decisions. How the decision-maker converts simulated mental states (comprising one's own corpus of conceptualizations) to prediction is usually inaccessible to the simulator. The 'simulator' being the cognitive agent simulating an episodic construct.

Simulation theory presupposes that the target's decision-making device is the same as that of the simulator's. During the simulation process, the simulator's idiosyncratic beliefs and desires and other information are quarantined to stop them from contaminating the simulation process. For example, my belief that 'doing *Z* will attain *X*', not shared by the target, will contaminate, and skew the output from the decision-maker if it is not quarantined from other beliefs. Via embodied constructivism, instead of beliefs and desires, the simulation process draws on the corpus of conceptualizations of one's own actions in the past. Adjustments are made for the target's bodily constraints and related external factors in simulating episodic memory or episodic future-directed imagination. Thus, the resulting output of patterns of action are constrained by the target's ontogenetic idiosyncrasies.

To illustrate: in predicting what Sophia would do when she finds out tomorrow that she does not have enough apples to make an apple crumble, I consider related external factors such as, Sophia is expecting guests for dinner for which she had been planning to serve the crumble. Thus, I attribute intention to Sophia of the form, 'Sophia wants more apples for her crumble recipe, and she believes that she can get some more from her neighbour's orchard'. Considering Sophia's somatic idiosyncrasies – she is not tall enough to reach apples on a tree – whilst drawing upon my own relevant conceptualizations. Finally, via my decision-maker, I arrive at a prediction of what Sophia would do. Constructing episodic memory is a similar process, however, the target is usually oneself.

The key difference between classical simulation theory and embodied constructivism is that in classical simulation theory, the output from the decision-making mechanism is a decision, '*Y*' say, which causes a decision-attributing belief in the simulator of the propositional sort, '*T* will decide to do *Y*' (Goldman 2006, 28–29). Whereas in embodied constructivism, the output is episodic memory of a past event or episodic future-directed imagination of a future event, the latter being either from one's own or another's perspective.

Critiquing embodied constructivism as a model of memory

In this section, using philosophy of science, I critique embodied constructivism as a model of memory. I go on to argue that embodied constructivism is a robust defence of Augustine's constructivism, as well as his epistemic claims, because embodied constructivism resolves the two-stage problem facing constructivism.

Supports for embodied constructivism: experimental psychology, cognitive neuroscience, and perceptual experience

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After Augustine's constructivist account of memory and prediction, the earliest reference I find to an explicitly constructivist view of memory is F.C. Bartlett's theory of memory (1932). Sir Frederic Bartlett is 'one of the most influential … scientists who contributed to the development of cognitive psychology' in the twentieth century (Bartlett 1995, xvi). In his *Remembering: A Study in Experimental and Social Psychology*, Bartlett presents a range of experiments to test how people remember. Bartlett's experimental angle is radical, because before him, the focus in memory studies was on the contents, and the nature, of memory. Bartlett, however, crafted studies to test memory retrieval.[15]

What Bartlett found was that there are commonalities in the way subjects recalled material. The most relevant of the commonalities is that subjects recalled dominant details and then reconstructed other aspects to form a coherent whole. On the face of it, this may sound trivial. However, if one considers memory as reproductive, the idea that aspects of what is remembered are constructed is problematic, particularly for episodic memory. Reconstructed, rather than reproduced memory of events, challenge Plato's wax-tablet model of memory. As Bartlett observes, 'accuracy of reproduction, in a literal sense, is the rare exception and not the rule' (Bartlett 1995, 93). Consequently, Bartlett concludes that remembering 'appears to be far more decisively an affair of construction rather than mere reproductions' (Bartlett 1995, 205). Similarly, the picture emerging out of neuroscience and cognitive neuroscience is that memory and imagination are generated via the same, or closely related, neural mechanisms.[16]

Further support from perspectival flexibility

The first two supports, from studies in psychology and cognitive neuroscience, for asserting that the imagination is necessary for past and future-directed episodic constructs are empirical. The third support is phenomenological, and it is from perspectival flexibility in remembering. 'Perspectival flexibility' is the idea that episodic memory can be recollected from two perspectives: The 'field-perspective' – that is, first-person – and the 'observer-perspective' – that is, 'an external visual perspective' or third person (McCarroll and Sutton, 2017, 114). To illustrate, I could remember a lecture I gave. One recollection could be from the first-person perspective of giving the lecture from the frontend of the lecture hall. Such a first-person recollecting is the field-perspective. Another recollection of the same lecture could be from a third-person perspective of seeing myself from the backend of the lecture hall giving the lecture from the frontend: This is the observer-perspective. Both recollections, the field and observer perspectives, would qualify as true recollections if they are about an actual event.

The ability to switch from the observer to field perspectives is termed 'perspectival flexibility'. What perspectival flexibility in remembering shows is the reconstructive dimension of memory which must come from the imagination.

Indeed, perspectival flexibility is a characteristic of the imagination. It seems to me that perspectival flexibility also plays a key role in prediction of behaviour, particularly in the behaviour of others. In describing the process via which episodic constructs occurs, I identify the process of automorphism. As I see it, automorphism involves perspectival flexibility. To predict what another person will do, involves imagining what that person will do from their perspective. As a result, these three supports from experimental psychology, cognitive neuroscience, and perspectival flexibility bolster the view that the imagination is necessary for past and future-directed episodic constructs.

Consequently, despite the persistent phenomenological intuition that senses of pastness and futurity in episodic memory delineate episodic memory and episodic future-directed imagination as disparate cognitive abilities, there is a growing body of scientific support for the view that both processes are co-functional. In addition, perspectival flexibility in memory representation emphasizes the constructive feature of episodic memory.

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Embodied constructivism as a defence of Augustine's constructivism

To recapitulate the two-stage problem facing Augustine's constructivism:

First stage: The pastness and futurity characteristics of episodic memory and episodic future-directed imagination, respectively, appear to delineate them as two disparate cognitive abilities.

Second stage: The archival versus constructive natures of episodic memory and episodic future-directed imagination, respectively, further delineate them as disparate cognitive abilities which realise distinct mental phenomena.

Embodied constructivism resolves the two-stage problem because it demonstrates that episodic memory and episodic future-directed imagination are both generated via the same cognitive processes. Despite their respective futurity/pastness characteristics, episodic memory and episodic future-directed imagination are co-functional cognitive abilities in the mechanism of mental time travel. Further, as embodied constructivism demonstrates, both cognitive abilities, not just episodic future-directed imagination, are constructive in nature. A key feature of the mechanism of mental time travel is its constructive nature which gives rise to mental phenomena of episodic memory and episodic future-directed imagination. Following Machamer, Darden, and Craver's delimitation of a mechanism described in the first section. I argue that episodic memory and episodic future-directed imagination are co-functional activities in the mechanism of mental time travel.

Recall that a cognitive process α is co-functional with another process β, if β's functionality is significantly dependent on α's functionality and α's is significantly dependent on β's; such that a disruption to α 's functionality will significantly affect β 's functionality and vice versa. This is because α and β share a significant number of entities and activities that give rise to their respective phenomena. Applying this definition to embodied constructivism as a model of mental time travel; the functionality of episodic memory, as a cognitive ability, is significantly dependent on episodic future-directed imagination. To better illustrate what I mean, here is an abstract illustration: α and β are interconnected components within a certain system and their interdependent activities in coordinated process *Y* give rise to phenomenon *Z*.

Suppose β's participation in *Y* is significantly interrupted, then aside from a corresponding significant difference in α's, revealing α's functional interdependence on β, one or more of three possibilities could arise: **P1** (possibility one), the rate at which *Z* is produced may significantly slow down; **P2**, an ill-formed or null version of *Z*, ¬*Z*, is produced; **P3**, the interrupted component is replaced by δ, so that $\dot{\alpha}s$, and δ's coordinated process once again produces *Z* at the same or similar rate to the original process. This abstract example on α and β as interconnected components of process *Y* can be applied to the role of the imagination and memory in mental time travel. Certain studies involving patients with amnesia show that along with episodic memory loss, there is a corresponding loss of the ability to imagine events in the future (Hassabis et al. 2007); (Klein et al. 2002).

Returning to the abstract example above: the corresponding loss of the ability to imagine the future along with episodic memory point to episodic memory and episodic future-directed imagination as interconnected components, like α and β, whose interdependent activities in coordinated process of mental time travel (*Y*) give rise to the phenomenon of episodic constructs (*Z*). This is because on the disruption of system that generates episodic constructs, which includes episodic memory and episodic future-directed imagination, P2 occurs: an ill-formed or null version of episodic constructs (*Z*), ¬*Z*, is produced.

Embodied constructivism as a scientific explanation

'Models that describe mechanisms lie somewhere on the continuum between a mechanism sketch and an ideally complete description of the mechanism' (Robins and Craver 2009,

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56). Embodied constructivism is on the sketch side of the continuum for various reasons. Although an area of active research, the cognitive sciences of memory are very complex and becoming even more so with technological advances. In the introduction to the section on 'memory' in *The Cognitive Neurosciences*, Tomás J. Ryan and Charan Ranganath observing the rapidly changing landscape of memory research state: 'We have moved from seeing a collection of memory systems providing a static record of experience to a dynamic, adaptive process emerging from the complex interplay of molecular, and circuit-level interactions' (Ryan and Ranganath 2020, 193).

There is a corresponding complexification in the philosophy of memory. A few years ago, constructivism was a niche view in philosophy of memory struggling to gain some ground. However, because of technological advancements and increased sophistication in research, many studies in cognitive neurosciences support a constructivist model of memory. Today, constructivism is one of the leading theories of memory with many new variations emerging everyday: embodied constructivism is one of those new theories. It is, however, unique in ways that I argue for in this article. On the one hand, there is a complexification in the scientific research of memory, on the other hand, there are still considerable methodological limitations.

One such limitation is the difficulty in defining what the imagination is. As Amy Kind notes, 'the question of what the imagination is … is remarkably difficult to answer' (Kind 2016, 1). It seems to me that one reason for the difficulty in defining what the imagination is that a definition of the imagination would assume some of the characteristics of the imagination for which one is arguing. Kendall Walton, in *Mimesis as Make-Believe*, examines 'a number of dimensions along which imaginings can vary' (Walton 1993, 19). However, Walton avoids spelling out what these dimensions have in common. Instead, he asserts that 'an intuitive understanding of what it is to imagine … is sufficient for us to proceed with our investigation (Walton 1993, 19). Choosing not to offer a definition for the imagination is a wise strategy. On the one hand, defining the imagination assumes theoretical commitments concerning what the imagination is. This is problematic because it limits the imagination to those theoretical assumptions, which means that the offered definition may fail to pick out instantiations of the imagination which do not conform to those assumptions. On the other hand, relying on an intuitive view concerning the imagination means that there is a plethora of intuitive views of what the imagination is.

The dilemma of defining the imagination is a potential gap in embodied constructivism since it is a model of how we remember the past and imagine the future. However, I avoid this gap because embodied constructivism is not a model of the imagination *simpliciter* but specifically of how future-directed events are constructed. Unlike defining what the imagination is, it is possible to account for the construction of future-directed events as an activity in the mechanism of mental time travel. Therefore, although defining what the imagination consists in is a potential gap in embodied constructivism, embodied constructivism nonetheless serves as a robust model in explaining the cognitive ability of mental time travel because of its delimited focus on episodic constructs. Further, it is possible to offer a provisional[17] definition of episodic imagination as the simulation mechanism via which past and future episodic constructs are generated. Indeed, as I argue in this article, (episodic) imagination is the vehicle for mental time travel.

Conclusion

In this work, I propose a model of memory for which I invent the term, 'embodied constructivism'. Embodied constructivism is an attempt to preserve the constructivist dimension of Augustine's account of memory thereby preserving his epistemic claims on

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how God is remembered and known. Unlike Augustine's constructivism, embodied constructivism is a synthesis of an embodied theory of memory, autopoietic enactivism with a constructivist theory of memory, simulationism. As I argue, although both models are taken to be disparate, it is nonetheless possible to bring them together. The recognition of the essential role of perceptual action systems, both in theories of embodiment as well as in simulationist accounts of memory, is a nexus between these two seemingly disparate views of memory. So, although simulationist theory rejects a causal connection between an experience and its memory unlike enactivist theory; according to embodied constructivism, memory occurs via an organism's corpus of conceptualizations acquired from the organism's interactions with its environment. Corpus of conceptualizations, like Augustine's monomodal images, comprises building blocks rather than memory traces.

Embodied constructivism, like Augustine of Hippo's account of memory, rejects a necessary connection between experience of an event and the remembering of that event. Therefore, like Augustine's account, embodied constructivism can be used to support epistemic claims concerning how God is known and remembered in the absence of an embodied experience of God in the physical world. It also supports how future acts of God are remembered. However, embodied constructivism avoids metaphysical issues facing Augustine's account by drawing on cutting-edge theories in philosophy of memory, studies in experimental psychology, and recent findings in cognitive neuroscience. In addition to preserving Augustine's epistemic claims, embodied constructivism as a rigorous model of mental time travel which has implications for epistemological theology, illustrates the importance of philosophy of science to theology.

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Notes

1. I explain autopoietic enactivism and simulationism is more detail in the second section.
2. See van den Berg (2010).
3. The word Augustine uses for 'I weave' is '*contexo*': *Conf.* 10. 8.15.
4. For a comprehensive biography, see Brown (2000).
5. For variants of this theory see Debus (2017); Dokic (2014); Klein (2015); Klein (2014).
6. For examples of distributed and procedural causal theories see Bernecker (2009); Michaelian (2011).
7. For proponents of this model see Shanton and Goldman (2010); De Brigard (2014); Michaelian (2016).
8. Goldman (2006), along with Jane Heal (2003) and Robert Gordon (1986), are early proponents of simulation theory of mindreading.
9. For robust defences of contemporary constructivist model of memory, see Schacter and Addis (2007); Michaelian (2016).
10. Semantic memory is not enough to account for the kind of remembering of God that Augustine asserts. It seems to me that Augustine wants to go beyond knowing facts about God to knowing the being of God. Knowing the being of God requires a relational knowing which occurs in experiences of events and recollected in episodic memory.
11. In raising this question, I am not referring to what makes memory of the past true versus imagination of the future. Although important, the epistemological difference of memory versus imagination is not the focus of this article due to space constraints. For an extensive elucidation of the epistemic implications of a simulationist/constructivist model of memory see Michaelian (2016).
12. I note that viewing Augustine's account of memory and expectation as an account of mental time travel is anachronistic. Mental time travel being a contemporary designation. However, as I argue, Augustine's account of memory anticipates, and aligns with, what is regarded as mental time travel in the contemporary context.
13. For examples of contemporary continuists accounts see, Glenberg (1997); Atance and O'Neill (2005); Rosenbaum et al. (2005); Buckner and Carroll (2007); Suddendorf and Corballis (2007); Hassabis et al. (2007).

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14. See the third section for references of studies that link hippocampal functions to past and future episodic constructs.
15. I note that Bartlett's study on reconstructive processes in repeated recall has not been successfully replicated. In similar studies carried out by Alan Gauld and Geoffrey M. Stephenson (1967) and Mark A. Wheeler and Henry L. Roediger (1992) subjects exhibited greater accuracy in recall of given material.
16. For examples of studies see Kanwisher et al. (1997) Ogden (1993), 571; Addis et al. (2007), Szpunar et al. (2007), Addis et al. (2007), 1363, Klein et al. (2002), Klein et al. (2002), 353, Rosenbaum et al. (2005), Buckner and Carroll (2007), Hassabis et al. (2007), and Schacter and Addis (2007).
17. Thank you to the reviewers for suggesting that I offer a provisional definition.

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