
THE AS YET UNDETERMINED ANIMAL

AUGUSTINE'S 'MEMORIA' AFTER

COGNITIVE SCIENCE

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Abstract

Augustine's exploration of memory remains fertile even today, not only for philosophical analyses of time but for the disciplines of Cognitive science and Experimental psychology as well. The article brings to light specific ways Augustine's richly narrative account of memory in the 'Confessions' books X and XI anticipates and challenges recent research on memory in the scientific literature. Augustine's relevance lays in his claims that memory involves not just the function of an 'offline archive' of past data but also the organic activity of a dynamic system that enables the embodied mind to anticipate the future.

Keywords: Augustine, memory, time, Cognitive science, future

1. Augustinian time yesterday, today and tomorrow

Time, as an object of philosophical analysis, remains no less elusive today as it was in Augustine's fourth-century context. With mathematical breakthroughs in Quantum cosmology about the nature of space, light and gravity, the scientific community has made the function of time more intelligible; Cognitive science, too, has offered theories of mind about the mechanics of memory that has made time as we subjectively experience it less obscure. Scholars in fields as diverse as Philosophy, Astrophysics, Literature, History, Theology and Cognitive science have devoted considerable resources to the task of shedding new light on the form and function of time, each with only partial success. Augustine has much to say that shall remain relevant for contemporary inquiries into time, and into memory in particular; to highlight the connection between Augustinian *memoria* and Cognitive science and Experimental psychology, I will discuss briefly the puzzle of time as Augustine understood it in *Confessions* books X and XI, in order to show Augustine anticipated important empirical breakthroughs about the temporal dynamics of

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memory in recent works by Andy Clark, Roy Baumeister, Hugo Mercier, Dan Sperber, Steven Pinker, Alison Gopnik and other well-known cognitive scientists and psychologists.

Augustine anticipated the dynamic cognitive structure of time, though some may reduce what he had to say to a spiritual exercise, a discourse carried out solely in a theological idiom. One modern author categorizes his work on time to embody a type of theological idealism [1]. I refrain from reducing to Theology what also consists of an intricate philosophical exploration of time in Augustine's *Confessions*, though I have elsewhere excavated the theological possibilities latent in Augustinian time; he no doubt frames every philosophical question, and time is no exception, as a conversation with God [2]. Memory, for example, invokes the Father, the first person of the Trinity, because memory is the origin of temporal experience and ultimately provides the necessary data for rational understanding, just as the Father eternally begets and is thus the origin of the Son [3]. Theology and the immanent Trinity aside, Augustine for long stretches of the *Confessions* focuses on the subjective experience of time, as we experience it, only insofar as time reflects a form of experience in the world. The *distentio animi* for Augustine is a breakthrough for his day not because of the discovery that time spread out in all directions (*distention*), but because of the discovery that time corresponds to the activity and constitution of the mind: time is manifest as a conjunctive grammar that involves both the objective and the subjective dimensions of experience. Some may insist that Augustine's work promotes an inward escapism, but others, including myself, would emphatically argue that Augustine's work is thoroughly 'worldly' in the precise sense that the *distentio animi* corresponds to a an embodied spiritual journey that unfolds in the temporal horizon of the world [4].

My intention in what follows is chiefly comparative. Most treatments of Augustine's 'worldly' conception of memory frame it as an individual's arduous quest for a divine encounter: "Where in my consciousness, Lord, do you dwell? You conferred this honour on my memory that you should dwell in it." [5] While I do not ignore the inevitable theological interpretations of memory that govern Augustine's work (he was a Bishop after all), the following sections, in contrast, aim to sketch an account of the phenomenology of memory in Augustine first-person analysis of time (i.e., the subjective-narrative structure of memory). In this, I propose to depict its movement as wholly temporal (while not extirpating the soul's quest for the supernatural as a larger frame of reference, which I shall not discuss here) and I do so with the expectation that Augustinian *memoria* may open up rich first-person accounts of memory that both invites illumination by and sheds light on third-person analysis of memory articulated by Cognitive science.

I am not unaware of how odd it is, and I will return to this in detail below, that the strictly philosophical analyses of time in books X and XI of the *Confessions* appear to be isolated from the long autobiographical, prayer-like narrative of the first nine books, for which the *Confessions*, precisely as a narrative, remains so famous. Does personal and historical narrative not in some

way fundamentally shape philosophical analysis of time? Does not time always involve a narrative or autobiographical structure, as Paul Ricoeur shows in dialogue with Augustine [6]? Philosophers and historians continue to grapple with such questions, formulated perhaps for the first time in Augustine. It is this problem of 'narrative' temporality that I shall confront below.

The philosophical accomplishments obtained in the *Confessions* have clear limits, if only because Augustine was seized over and again in books X and XI by the mystery of the mind's experience of time as a phenomenon. Concerning the puzzle of time, Augustine's famous inquisition of time still hangs over us: "What is time? Who can explain this easily and briefly? Who can comprehend this even in thought so as to articulate the answer in words? Yet what do we speak of, in our familiar everyday conversation, more than of time? We surely know what we mean when we speak of it. We also know what is meant when we hear someone else talking about it. What then is time? Provided that no one asks me, I know. If I want to explain it to an inquirer, I do not know." [5]

Such existential turmoil did not prevent Augustine from sketching in book XI of the *Confessions* a brilliant and innovative portrayal of time as we experience it, even though we may be forgiven for deciding to exercise speculative restraint where he indulged. Time is at once 'familiar and obscure'. An ambivalence governs his inquiry from beginning to end, but such a dialectic between the familiar and the obscure also evokes in him despair and agony, for time consists of a puzzle that affects his philosophical inclinations at the deepest of levels, so that his mind "is on fire to solve this very intricate enigma" [5, p. 236]. The configuration of the mind, according to Augustine's Neoplatonic heritage, is an existential power that stretches and grows, as it apprehends the world around it through the channels of sense perception; the mind, for Augustine, 'distends', as it measures the intervals of time that break in on it, from moment to moment, without ceasing [5, p. 240].

Just as ocean water demonstrates physical properties in which the water is diffuse at differing rates that occur in direct proportion to temperature, the mind achieves a certain kinematic viscosity in relationship with its immediate climate, so that the dialectic between mind and time prompts Augustine to describe the mind not as rigid, but as *liquidus*. When I hear music, for example, my mind stretches out in both directions: as the notes sink into the past they enable the mind to predict what notes may arrive (should the song remain harmonious). (For the music analogy, discussed in light of the stretching out of the soul, see [5, p. 245]. For Augustine's use of *liquidus*, which I would relate to his expression, "I fall into dissolution amid the changing times, who order I am yet ignorant of: yea, my thoughts are torn asunder with tumultuous vicissitudes, even the inmost bowels of my soul," see [5, p. 244]. For Latin, see Augustine [7].) Time in the mind functions as a double boundary, of past and future, representing a stretch-capacity, or what phenomenologists in the twentieth-century call the ego's stretch-continuum [8].

So enduring are the reflections on the nature of time that unfold in the *Confessions* that late modern philosophers such as Edmund Husserl and Martin Heidegger indicate that we can do no better than begin our philosophical journey into the depths of time with a close reading of books X and XI [9]. Husserl recognizes not just an acute and restive phenomenological eye on display in Augustine's work, but also the sheer persistence it often takes for a philosophical investigation of time to get off the ground. Husserl writes, "Even today, anyone occupied with the problem of time must still study chapters 14-28 of Book XI of the *Confessions* thoroughly. For in these matters our modern age, so proud of its knowledge, has failed to surpass or even to match the splendid achievement of this great thinker who grappled so earnestly with the problem of time." [8, p. 3] Augustine, in those chapters, asks: What is time, and how it is measured? Can I experience the present, the pure 'now' without it immediately sinking into the past? And how does memory work, if it is the 'stomach' of the mind? Does the future exist?

In the world of late antiquity, Augustine's careful interrogation of the nature of time stands out among both Greek and Latin intellectual traditions. He recasts time, as if he were a meticulous phenomenologist *avant la lettre*, in its three directionalities as they interact simultaneously with each other. Time forms a nexus of the ecstasies of past, present and future, which interpenetrate and cross-fertilize. His singular focus on memory in book X of the *Confessions* may foreshadow what cognitive scientists are now saying is a central cognitive power of the mind: memory's proficiency not only in the rote preservation of sense data but also in the threefold creative act of inference, autobiography and anticipation.

We can begin our analysis of Augustine's conception of time with the assurance that it merits the distinction of conceptual overdetermination: the temporal interchange among past, present and future gives rise to a kind of existential overflow. Just so, the working memory does not isolate itself to the past, but assists the mind in the task of reconstructing the present and of anticipating the future. Memory involves the reconstruction of data into a coherent narrative that can stake out possible futures for the self. We turn now to a fuller account of Augustine's existential framework of time in the *Confessions*, and how it may anticipate and even illustrate in a *different* (not *conflictual*) key some hypotheses concerning constitution of temporal experience in recent Cognitive science.

2. The enigma of memory

While Augustine has explored the philosophical architecture of memory and time elsewhere, both in his early and later phases, it is in book X ('Memory') of *Confessions* that is most popular and enduring analysis can be found [10]. It lays the groundwork for a series of investigations of time as such in book XI, in which Augustine discusses the various ways that past, present and future interrelate, not as linear or chronological discrete moments, but as a

complicated matrix of the present, in which past and future irrupt. This points up the possibility of an existential experience of the future that can be experienced in the now, reconstructed by the memory, in order to show that time is an existential-subjective ground, on which all three ecstasies work in conjunction with each other. In this context Augustine speculates that time may recapitulate the present in three distinct temporal ecstasies, even if human vocabularies are inexact in their depiction: "Perhaps it would be exact to say: there are three times, a present of things past, a present of things present, and present of thing to come. Let us accept the usage I do not object and offer no opposition or criticism, as long as what is said is being understood, namely that neither the future nor the past is now present. There are few usages of everyday speech which are exact, and most of our language is inexact. Yet what we mean is communicated." [5, p. 235] Yet, how this threefold structure of time is measured can be a function only of the mind, for it is in the anima "there these three aspect of time, and I do not see them anywhere else" [5, p. 235]. How, then, does the mind measure time?

As we shall see presently, for Augustine, time is not linear. Memory appears to occupy a special role in the constitution of the temporal experience. Initially vexed by the relation of memory to sense perception, Augustine decides to link them together with various metaphors, inexact as they surely are. Memory represents a vast hall, or even a palace, a storehouse of 'images' of sense perceptions [5, p. 186]. "The objects themselves do not enter, but the images of the perceived objects are available to the thought recalling them" [5, p. 186]. Like a stomach that stores the food the mouth tasted, but can no longer taste once in the stomach (the orange juice loses its flavour once in my stomach), so the memory holds not the object in itself, but only image of the object, which can be recalled (or regurgitated). I would call this basic interrelation between memory and sense data the passivity of memory. As we shall see later, it resembles what is now called implicit or non-declarative memory. It serves the purpose, like a silo, of storing large of amounts of bits of stuff, here understood as sense perception data, received through the five senses.

Memory also possesses agency in Augustine. It resembles a cognitive power that permits the mind to configure and reconfigure the data (also preserved by memory) into intelligible and manageable narrative. The memory, should we resort to modern philosophical vocabulary, endows its content with a narrative form or meaning-scheme. The self assumes an intentional stance of inference, unique to memory, which involves the work of not just retrieval but of interpretation and synthesis, "just as food is brought out from the stomach in the process of rumination" [5, p. 192]. Instead of simply re-chewing the food (breaking it down further), though, the memory accomplishes the opposite; it reconstructs the data brought out of its own storehouse, whereby the mind gathers it together into a meaningful narrative or picture; cogitation thereby follows from memory, or better, cogitation operates from the cognitive resources of memory, since the data located deep in the storehouse has to be recollected. The memory, by means of *intentio* or attention, orders data, which are "gathered

(*colligenda*) from their dispersed state. Hence is derived the word cogitate. To bring together (*cogo*) and to cogitate (*cogito*) are words related as *ago* (I do) to *agito* (agitate) or *facio* (I make) to *facito* (I make frequently). Nevertheless the mind claims the verb cogitate for its own province. It is what is collected (that is, by force) in the mind, not elsewhere, which is strictly speaking the object of recollection.” [5, p. 189] Memory is self-organizing; under the direction of memory, the mind gathers together data using force (*agito*) so that it can make (*facio*) a meaningful picture of the past [7, p. 106].

Sheer mechanistic force alone will not accomplish the higher-level cognitive processing required for inference appropriate to the *agito* of working memory. It is said that memory can struggle, too, to find a meaningful story, or even to recall what it wants, as it employs force to discriminate between memories itself. Memory is dynamic, and it often brings data into focus, performing the role of intentional agent. Just as forgetfulness intervenes from time to time, we know from experience that our memory knows what it wants and will wait, sometimes impatiently, until the right file is recalled from the file box of memory. Imagine I have forgotten my wife’s name. I know Amanda is her name, so I can refuse the suggestion that Jennifer or Kate is her name, but I cannot immediately recall the name Amanda. Some other memories may crowd out the name Amanda for some time, until I can focus my working memory and utilize the skill of attentive deliberation or the labour of mental groping (*cogitur*); perhaps I wait until someone suggests her name to me, and I say, “ah, yes!” [5, p. 195].

The mind may wander, as it is prone to do according to recent Cognitive science [11], but Augustine assures his readers that distraction, sometimes simply called *distentio*, can be transformed into concentration or *intentio*, in order to arrange and ultimately thematise latent, sedimented memories. The *distentio animi*, once granted illumination by the memory’s inferential powers, becomes a cognitive motor, an *intentionis animi*. The term is translated as “intellectual work” [5, p. 222] or also as “recreating of my mind” [7, p. 211]. Memory occasions, therefore, more than mere preservation of data it has at one time in the past received and stored. It also actively puts together and rearranges the dispersed data. It can, and often does, in Augustine’s work, take on a moral imperative. *Intentionis* may well evoke a supernatural vocation [*supernae vocationis*], when Augustine writes: “forget what is behind: not distracted but attracted, stretching forth not what shall be and shall pass away, but to those things which are before: not, I say, distractedly but intently, follow I hard on, for the garland of my heavenly calling, where I may hear the voice of your praise, and contemplate these delights of yours, which are neither to come, nor to pass away” [‘*praeterita oblitus*’ non in ea quae futura et transitura sunt, sed ‘in ea quae ante sunt’ non *distentus* sed ‘*extentus*,’ non secundum *distentionem*, sed ‘secundum *intentionem* sequor ad palmam supernae vocationis audiam vocem laudis et contempler delectationem tuam nec venientem nec praetereuntem] [7, p. 278-281]. Episodic or autobiographical memory will be a key that unlocks the power of this kind of theological *intentionis*.

Not all data, clearly, is of the same kind for Augustine. Data make sense only once fitted in a multi-levelled framework of experience, often according to vocation, affection, interpersonal trauma, etc. These particularly intense or concentrated life-experiences, often associated with episodic (or autobiographical) memory, 'mark' memory in a unique way. Memory, to be more specific, automatically remembers past traumas or emotions associated with pain or joy. Memory bears the scars of past trauma and it can recollect those episodic feelings with little effort, even while the sense impression of the pain fades away. I may even gladly remember a past sadness, but Augustine does not seem to think I can relive vividly the trauma once more. Here Augustine would need to be updated, among other things, by recent work on post-traumatic stress disorder [12]. Augustine, in his defence, acknowledges the profound mark emotion can inscribe on the deep emotional structure of memory's *spatium temporis*, so that the grief, terror or pain are retained by the memory "without any conscious act of commitment" [5, p. 192]. Which one of us needs deliberately to commit to memory the lifetime traumas, such as losing a loved one, or childhood accident that resulted in a broken collar bone? What of life's greatest joys, such as witnessing the birth of one's own child (or giving birth itself)? The affective force of the imprint of those experiences (either joyous or sad occasions) is too great for memory to forget, courtesy of the intensity of the affective impact of those episodes.

Memory can also entrust skill sets to its vast halls, such as debate, rhetoric and presumably kinaesthetic or athletic skills associated with sporting activities, for "in their case, I carry not the images but the very skills themselves". I retain the skills I learned from playing basketball in a distinctive way, since I do not simply store the images of the basketball bouncing in my hand, but rather keep within my body the habit and skill and hand-eye coordination it takes to control the ball competently, what is, as we shall see, called motor memory [5, p. 188]. Memory for Augustine reflects a dynamic, not static, state of affairs, in which past and present constantly interact and mutually condition each other. We may assume that *memoria* unfolds outside of the past and outside of the brain, for memory functions on several planes at once: passive, embodied, inferential and autobiographical domains of experience. It is proficient in both preserving and reconstructing (i.e. interpreting) data.

One final point to make here, which will recur below, is that the capacity of memory to infer and interpret data involves the mind's natural inclination toward the future, in the on-going acts of anticipation and prediction, illustrated in simple acts like walking, speech, listening to music, etc. How does memory form the stage on which the future may emerge? Augustine suggests that memory constitutes the movement of expectation. I quote at length: "You can experience what I mean in speeches or songs which we render word for word by memory; clearly, unless we foresaw in thought what was to follow, we would not say it. And yet it is not foresight that instructs how to foresee, but memory. Until we finish what we are reciting or singing, we have uttered nothing which we have not foreseen. And yet when those who are very good at reciting many

things of this sort are not usually admired for their foresight but for their memory.” [3, p. 405]

Memory retains and guides the flow of time in the mind for a specific purpose, so that it may thereby constitute the ground of anticipation as such. All data, whether stored or anticipated, are experienced as phenomena once they enter the space of memory. Hence once more, think of a song you know well. Imagine, Augustine asks you to consider, you are to recite it from memory. The act of recitation is “stretched two ways, into my memory because of the words I have already said and into my expectation because of those which I am about to say” [5, p. 243].

Augustine held to an existential theory of time (perhaps an idealism): that it is the mind that undergoes the tumultuous back and forth of the flow of time, as it irrupts from the future and sinks into the past. Naturally Augustine queries, where is time? Is it ‘out there’ in space? Is it outside of my cranium? Or is it internal, an aspect of the activity of my mind? Is it an intrinsic feature of my inner consciousness of the objects around me? Is time subjective or objective, in other words? The question I think is put succinctly in this way: how is time measured? He asks, “When time is measured, where does it come from, by what rout does it pass, and where does it go? It must come out of the future, pass by the present, and go into the past; so it comes from what as yet does not exist, passes through that which lacks extension, and goes into that which is no non-existent.” [5, p. 236] This should give the attentive reader a clue to Augustine’s definition of the three ecstatic movements of time. Obviously in the mind, as an active agent, contains the past within the memory. Augustine will continue here with the other two components of time, and insist that in the mind the future resides, since it is there that we expect future events and actions. And the present? “For the mind expects and attends and remembers, so that what it expects passes through what has its attention to what it remembers... attention is continuous, and it is through this that what will be present progresses towards being absent.” [5, p. 243] I am not inclined to interpret Augustine’s conception of the *distentio animi* in this reductive fashion. The mind may enjoy the privilege of measuring time in Augustine, but he insists with equal justice that time accommodates an irrepressible objective flow, as if time is imposed on the mind. The ultimate outcome of this key point is that for Augustine the mind (or brain) is not responsible for constructing time ex nihilo, as if time were really an illusion created by the mind’s synthetic powers [13]. With guarded confidence in what counts as the everyday logic of language, Augustine does not deny the existence of time, but he is perhaps indicating that the mind itself opens and closes the temporal flow, as it streams from future into the past, via the waystation of the mind’s present. Without the mind’s constitution of experience, there is no time.

3. Cognitive science - memory is more than preservation

The Augustinian account of memory anticipates important research trajectories in current literature on memory in cognitive science, at least concerning the constitutive power or ‘temporal dynamism’ of memory. What does temporal dynamism involve? Cognitive science has explored the intentional power of memory, attributable in part to its capacity to recreate and endow data with a narrative structure, as well as its prediction processing capabilities, in which memory seeks out or predicts future sequences and events. We quite literally have a creative and dynamic memory, a reservoir of information that assumes many narrative structures.

It is natural to think that the memory (especially long-term memory) occupies an off-line archive where data sits for days or months or years, awaiting activation. Sometimes we may configure the temporal mode of memories as singular episodes, with discrete borders, which are then set off against what could be called vast off-line backdrop of other discrete memories. Memory in this case would be static, not dynamic. In contrast, as we have witnessed above, Augustine suggests that memory opens up possibilities or new narratives of our experience of the world. Though such dynamic interplay between memory and other temporal modes of experience is a feature of subjective experience, and is an insight as old as Augustine, it remains a somewhat innovative theoretical framework for the discipline of Cognitive science, developing in the last few decades. For many decades Cognitive science, to put it bluntly, could not conceive of memory’s function as anything other than a record of the past. Now memory, as it is increasingly acknowledged, is involved in predictive reasoning [14].

For decades, Cognitive science depended on computational models of the brain, i.e., that the brain functions just like a computer programme, recalling data by sifting through data in a pre-programmed fashion. Memory, like the computational brain, fits a purely functional mould (sometimes simply called functionalism). In order to justify the claim that the brain’s rigidity serves the function of strict preservation of data (like a wooden container), many understood the brain to operate like a ‘Turing Machine’, in which mental states follow slavishly an innate, formalized language of artificial intelligence, a literal programme or algorithmic computational procedure, or *lingua mentis* of zeros and ones [15]. Memory, on this preservation or computational model, has nothing to do with either the present or the future. Memory is not a source of knowledge for the present or future. Memory does not structure or assist in the narration the present; memory does not condition our inclination toward the future. Hilary Putnam’s important criticism of empirical realism highlights helpfully the metaphysical assumptions built into the computational or Turing model of the brain [16].

Michael Dummett tells us, to reinforce this once-dominant interpretation of memory so popular in the 1970s and 80s, that “Memory is not a *source*, still less a *ground*, of knowledge: it is the maintenance of knowledge formerly

acquired by whatever means” [17, p. 262]. The recent trend in Cognitive science opens up a counternarrative, now an increasingly dominate paradigm of memory: namely, that memory occupies and motivates a subjective, first-person experience which never passively isolates itself as an off-line archive, but actively reconfigures the lived experience of the present and enables prospective and predictive intentions about the future to flourish. Memory, we claim up front on Cognitive science grounds, belongs fundamentally to the dynamic realm of inference, values and autobiography-narrative.

Cognitive scientists usually divide memory into various functional categories, such as episodic memory (the time you hit your first homerun in a professional game, or the time you fell off a trampoline and broke your arm); next is declarative or semantic memory (the storage of facts, which enables you to recall the 50 capitols of the states or recite the Greek alphabet) and finally non-declarative or implicit memory, sometimes called motor memory (the ability to remember how to shoot a basketball or pedal a bicycle) [18, 19]. Often these work in conjunction with each other, to form a holistic interpretation of memory’s multi-levelled achievements. What might this mean, more exactly, from the point of view of Cognitive science? Surprising convergences between Augustine and Cognitive science are plausible here.

For example, with regard to episodic memory, each time the brain recalls a story, the story slightly changes, usually to the benefit of interested parties (values affect memory’s episodic recall). Cognitive scientists and experimental psychologists have demonstrated that our memory is instinctively revisionist in just this way. The memory may even recombine different episodes into a new single episode, called ‘cross-episode binding’, in which (for example) a face from one memory is combined with a scene from another (resulting in blatant memory error) [20]. Memory, in other words, is not principally devoted to the preservation of empirical facts we experience passively. Beyond that primitive exercise in storage and retrieval, the organ of memory assumes (by default) the role of subjective identity. That is: memory appears to grant to the self a sense of itself, what is called autobiographical memory (I remember I am basically the same self as yesterday). Moreover, the memory’s ‘flexible retrieval’ is responsible for the constitution of past events, which can come together in a variety of patterns and moral complexions. The past event(s) becomes a signpost of who I am today, consisting of plot points the memory unifies into a larger narrative scheme. Not simply trapped within the skull, the memory, in other words, uses inference and interpretation as a mode of extension, whereby tight boundaries between past and present and the mind and world become loosened. I shall enumerate a few examples, beginning with the basic examples of inferential dynamism moving to the more complicated narrative tasks memory accomplishes.

Cognitive scientists Mercier and Sperber, first of all, argue memory involves the capacity to revise a basic scene, given memory employs an automatic impulse for inference, and this is on display even on the declarative (or semantic) level of simple recall of a sequence of events. One experiment they

adduce in favour of this claim is the ‘picture’ experiment. The pictures, usually detailed colour photos of familiar scenes such as a grocery store or beach, were shown to the participants. The picture of beach, for example, was doctored and many images were omitted. Half an hour after viewing the photo of the beach, participants insist that they saw item, such as a beach umbrella or life preserver, when in fact those images were omitted: “They misremembered... almost as often as they remembered having seen a beach ball and blankets, which had actually been there” [21]. The reason for this is due to the inferential activity of the memory: the mind had endowed the beach scene on the photo with important and expected plot points and characters, filling out the scene with the appropriate context-specific items, such as beach balls, blankets, people wearing bathing suits, etc. But memory is not always false in its reconstruction of the data. Often the memory extrapolates what should be there, and it is usually right in what it infers to be the case.

Another experiment shows the empirical basis of the inferential power of the memory. The experiment showed participants short videos of someone kicking or throwing a ball. In half of the videos the moment of contact (or release) was deleted from scene. Immediately after, they were shown a series of still pictures and had to decide if the picture was in the video they saw. When the whole sequence of events in the video implied that contact must have taken place, a majority of participants ‘remembered’ having seen the contact event that actually had not been shown in the video. What happened is that the memory inferentially reconstructed the sequence of events that had to have taken place, in spite of the fact they had not actually seen the moment of contact [21, p. 62]. Both experiments offer persuasive evidence that the memory, as Augustine indicated in book X of the *Confessions*, does more than merely recall information, but gathers it together, and makes correct inferences, or what Augustine calls ‘cogitations’.

What of autobiography and the thick narrative quality of memory, known as episodic memory? Alison Gopnik’s recent work on the mind of infants in *Philosophical Baby* suggests that infants do not have a high-functioning episodic memory, which means, among other things, that they have no substantial sense of autobiography. After the zoo, a two-year old will have memories of episodes, usually of discrete events such as the tiger roaring, whereas the five-year old can “produce complicated and original narratives about what had happened to them” at the zoo [22]. It may well be the case, then, that “babies and young children have episodic memory but not autobiographical memory” [22, p. 147]. As we mature, the brain develops a larger working memory (the ability to focus and exercise attention for long periods), as well as the capacity for long-term episodic memory, which is required for the synthesis of data into a meaningful autobiographical narrative.

Narrative memory can change, too, in conjunction with the pressure of the moral narratives we inhabit on a regular basis. To illustrate the point, take two contrasting narratives that are about a similar episode, the theft of fruit consummated in one’s youth drawn from two classics in the history of literature:

one described in uncomfortable detail in Augustine's *Confessions* and the other in a humorous tone in Rousseau's *Confessions*.

Augustine, if we recall that well-known episode, agonized about his childhood misadventures, telling the public that he remains deeply disturbed over the theft of a piece of fruit. The remorse felt over the episode is vivid, intense, even palpable, on the pages of book four of his *Confessions*, narrated as if he were in a literal confession box [5, p. 29]. The episode fits within the broader autobiographical metanarrative of Augustine's life as a genuine turning point, an evident verification of Augustine's sinful and petty soul, as it was before redemption. Rousseau, in stark contrast, appears to celebrate the mischievous side of youth. Stealing fruit? Well, such indiscretions are the 'common faults' of youth, are they not? They reflect nothing more than mere childish infelicities, not sins to be grieved over years later. What about urinating in the kettle of Madam Clot, because she behaved like a 'tedious grumbling old woman'? For Rousseau, that sin is simply humorous, and to this day, the memory of such an episode, 'even now makes me smile'. Augustine would have howled in protest at such renarration; he would have asked Rousseau to take stalk of his Christian virtue and to interpret past events in the light of sin and grace. Rousseau may have retorted that such legalism misses the point, that he never, "took delight in mischievous waste, in accusing others, or tormenting harmless animals" [23]. His thievery, performed in the pride of youthful folly, should be recalled with enlightened grace, not with outmoded Christian legalism.

The lesson we may draw here is that memory enjoys a degree of creative licence that can serve the interest of the public image of the self. Similar events (theft of fruit) evoke two different narrative structures, for the memory infers from the past a particular moral framework in which to emplot those events, transforming them into a moral tale or meaningful story. One way to frame the autobiographical memory is to say that Rousseau may have thought his mischievous past made him appear subversive and transgressive, a positive narrative for his early modern, Enlightenment readership, whereas Augustine arguable conceived of his remorse over the sin of youth because he not only genuinely felt remorse but also because it made him appear reflective and repentant before his overtly Christian audience. Past episodes appear to be revised here in light of present moral concern, and ultimately, differing theologies of sin, grace and redemption.

At a more pedestrian level (but no less unconscious), Steven Pinker indicates that a systematic self-serving bias shapes how past events occur to the mind [24]. Past events, in other words, are recast in a certain positive light, so that they count as noble and moral tales, building up a positive portraiture of 'who I am'. Memory involves brain c-fibres working in plastic collaboration with other c-fibres, but it also involves the expectation of what others think of us when we retell past events, drawn from memory and re-narrated by memory. A simple archive leaves the data it contains untouched and thus unaltered. Constancy across time ensures that the data exists in a state of unrevisability in

content. The memory, however, may well revise data it has stored in light of recent events. Pinker explains how this can be established, in part, by Experimental psychology.

Drawing on the widely-celebrated work Roy Baumeister [25], the study of Pinker highlights the mind's capacity to liberate itself from culpability when it clearly stands in the wrong. The experiment is as follows: Baumeister and collaborators asked a group of people to describe a single event in which someone angered them, and once incident in which they angered someone. In analysing the data, it was found that the perpetrator's narrative generally begins with a harmful or injurious act, but it then indicates that they had good reasons and rationale to commit that act. Perhaps the perpetrator was responding in self-defence to an immediate provocation, he assures himself. The perpetrator feels that he was in the right to act the way he did and the harm was 'minor' and recompense for it was not problematic at all. The victim's narrative, in contrast, begins with a long list of maltreatments that occurred before the harmful act, which was just the most recent in a history of mistreatment. According to the victim, the perpetrator's act was incomprehensible and beyond justification, since the victim is completely innocent. The perpetrator's harm is irreparable and it should never be forgotten.

The experiment reveals that an interpretation of such an episode conforms to the individual's present and future concerns to build up a particular autobiography, one that does not rest on the recollection of a sequence of static facts, but rather to reimagine an episode that may be couched appropriately in one's life narrative. The experiment, according to Pinker, may indicate that neither account (perpetrator's or the victim's) can be right. Neither of them can be right all of the time, at the very least. Does our inner perpetrator 'whitewash our crimes in a campaign to exonerate ourselves? Or does our "inner victim nurse our grievances in a campaign to claim the world's sympathy?" [24, p. 488-492] There was no way to know, in retrospect, whose account should be trusted.

An alternative experiment was run to highlight this more clearly: an ambiguous story was told to a group of participants (students). They were told that one college roommate offers tutorial help to another but reneges for a number of reasons. This leads the student to receive a low mark, to change his or her major, and to switch to another university. The participants (students themselves) simply were required to read the story and retell it as accurately as possible in the first person. Half did so from the perpetrator's point of view, and half from the victim's. A third group was asked to retell it from the third person. The details this third group included or omitted serve as the baseline for ordinary distortions or episodic reconstruction that are unaffected by self-serving biases. The answer to the question 'who should we trust' in retelling the narrative, the perpetrator or the victim? The answer is: neither. Compared to the baseline of the story, and the to the recall of the disinterested third-person narrative, both victims and perpetrators distorted the stories to the same extent, but in the opposite directions, each in a way that served their own cause. The details

embellished or omitted made their own narrative look more reasonable and the other's less reasonable.

A final point of convergence between Augustinian *memoria* and cognitive science lies in memory's capacity to predict future possibilities. Augustine thinks not only do we anticipate new events and words with memory, but that we renarrate our lives, that we lean into the eschatological future God draws us into by grace, so that we can exclaim with Saint Paul: "one thing I do: forgetting what lies behind and straining forward to what lies ahead, I press on toward the goal for the prize of the upward call of God in Christ Jesus" (Philippians 3.13-14, ESV). (Augustine incorporates this quote from Paul at a crucial climatic point in Book XI of the *Confessions*, as if the whole study of time culminates in an eschatological way of life [5, p. 244].)

Augustine's eschatological vision is not simple spiritual flight, but rather builds on what Andy Clark calls the memory's capacity to indulge in 'mental time travel'. Here he argues that the brain (in tandem with its embodied setting in a particular culture) can be depicted "as engaging in a continuous process of sensory prediction in which the target is a kind of rolling present. The line between 'prediction of the present' and 'prediction of the very-near-future' is one that simply vanishes once we see the percept itself as a prediction-driven construct that is always rooted in the past (systematic knowledge) and anticipating, at multiple temporal and spatial scales, the future." [26] In a recent book too rich and detailed to review here, Clark devotes hundreds of pages to the compilation of evidence in favour of prediction-driven learning and processing [26, p. 84-300]. We are fundamentally future-oriented beings, and our memory assumes a primary role in this temporal process of projection and prediction.

For example, he indicates that the role of prediction in memory, as it constructs conscious perceptual experience, facilitates faster comprehensive of future events than if the memory is not actively engaged in perception, and this can be shown by electroencephalographic (EEG) signatures. The experiment that Clark adduces points toward the reality that expectation can speed up conscious awareness. Conscious perception can occur as rapidly as 100ms faster for a well-predicted stimulus. The presence of expectations can literally speed up our apprehension of a phenomenon or object. A predictive coding framework like this can only be rooted in the memory, as it functions to generate new possibilities on a continual or rolling basis, which may utilize at once both semantic and episodic memory [26, p. 105]. If I am expecting a tiger to be in the jungle grass (on my safari), then I will apprehend the orange colour between the grass more quickly as a 'tiger' than if I were not expecting to see a tiger. One team of cognitive scientists say that the constructive episodic simulation hypothesis would describe such an integrated predictive processing. We 'simulate' new situations that might occur in the future precisely on the basis of past experience and expectations formed by those past episodes. There is evidence that even cross-episode bindings that reimagine the past in order to project fresh projects into the future, can actually open up creative and accurate new associations that had hitherto been missed.

The following quote I reproduce in full, given its importance: “As Bridge and Voss (2014b) point out, however, most such studies have focused on binding of elements *within* an episode. Bridge and Voss (2014b) studied *cross-episode* binding processes, and provided evidence that participants sometimes bind elements from distinct episodes (e.g., a face from one episode and a scene from another), resulting in memory error (for additional evidence linking binding processes to memory distortions, see Lew & Howe, 2016). We suggest that such cross-episode binding in our paradigm occurs most often and most extensively for episodes that result in successful, as opposed to unsuccessful, associative inference. That is, when people make a correct inference about the relationship between elements of events that have not been experienced together previously (i.e., AC), they may more fully bind details from the two episodes, such that details from one episode (AB) migrate to and become incorporated in the overlapping (BC) episode.” [20, p. 346]

Celebrated experimental psychologist Roy Baumeister and his colleagues have released a recent book entitled *Homo Prospectus* that takes on the challenge of supporting and documenting the brain’s impulse to use memory “as a dynamic *relational database*, which permits updating records and projecting and evaluating new possibilities in new settings” [27] Memory creates a dynamic future-oriented brain. We are always on our way, unfinished, and yet, we anticipate what is about to arrive on the basis of what happened in the past, even as we recollect the past according to the prejudices of our autobiography. Mental time travel is flexible and dynamic, and we are thus the yet undetermined animal, past or future.

4. Conclusions

“Man is the as yet undetermined animal, the rare exception.” - Nietzsche [28]

This whole matter deserves much further consideration, more than I can give it here. But I am convinced that this further examination would lend even more credibility to the claim that Augustine’s existential reflection on time-consciousness remains relevant for contemporary philosophical and theoretical examination of time. What I propose here amounts to this: What is called the first-person dimension of *memoria* in Augustine should be conceived not primarily as a bulwark against scientific or objective analyses of time, but as a first-person (subjective) complement to third-person (objective) analysis of memory found in Cognitive science and Experimental psychology.

The dialogue between Theology, Philosophy and Science may reimagine the self or the ‘soul’ as dynamic, contingent and incomplete, and therefore, as a theological process, cast on the plane of eschatological pilgrimage. Such a position would challenge basic theological assumptions latent in Cognitive science itself. Thomas Metzinger assumes the soul is to be repudiated because it is manifest as ‘process-independent stuff’ that hovers above the streaming horizon of the temporal world [29]. Philosophers of mind like Patricia

Churchland, too, assert that the soul (conceived in theology and philosophy) invokes an indivisible ‘spooky ghost’ whose nonphysical simplicity contradicts the changeable flow of time ascertainable in the domain of the body [30]. Pinker also succumbs to the logic of what I would call the myth of the soul, namely, that to affirm the existence of the soul is to affirm an “immaterial substance” that is mutually exclusive of the study of “information process in the tissues of the brain”; hence cognitive science undermines the belief that “every person has a soul” [31]. My analysis of Augustinian *distentio animi*, configured under the logic of the temporal plasticity of memory, calls severely into question such a narrative outlined by Metzinger, Churchland, Pinker and others. The soul, wholly temporal and embodied, while not fully reconcilable with third-person analysis of cognitive science, may nonetheless assume that the inner perspective of the experiencing memory frequently may well match the outside perspective of scientific research.

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