Editorial: Memory as mental time travel

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Abstract: Originally understood as memory for the "what", the "when", and the "where" of experienced past events, episodic memory has, in recent years, been redefined as a form of past-oriented mental time travel. Following a brief review of empirical research on memory as mental time travel, this introduction provides an overview of the contributions to the special issue, which explore the theoretical implications of that research.

1 Episodic memory revisited[1]

The idea that episodic memory is a form of mental time travel has had an enormous impact on research in psychology and is becoming increasingly influential in philosophy. The idea, however, is relatively recent. When Tulving (1972) first introduced the term "episodic memory", he defined it essentially as a specialized store devoted to information about the "what", the "when", and the "where" of experienced past events. This definition was meant to differentiate episodic memory both from nondeclarative memory, devoted in part to skills and habits, and, within the category of declarative memory, from semantic memory, devoted to general facts. While the "WWW" definition was broadly compatible with traditional analyses of what philosophers had referred to as recollective, experiential, or personal memory (Brewer 1996), including the popular causal theory (Martin and Deutscher 1966; Bernecker 2010), it was unable to distinguish between episodic memory and semantic memory, simply because semantic memory, too, is capable of storing information about the what, the when, and the where of events.

This problem for the WWW definition, together with accumulating evidence of a tight relationship between the ability to remember the past and the ability to imagine the future, subsequently led most psychologists, again following Tulving's (1985, 1993, 2002) lead, to redefine episodic memory as a form of mental time travel (MTT) in which the subject imaginatively re-experiences past events, just as, in episodic future thought, he or she imaginatively "pre-experiences" future events (Michaelian et al. 2016; De Brigard 2017). This definition, which emphasizes the subjective experience of remembering, departs in important ways from traditional philosophical analyses, which assume that there is a deep difference between remembering the past and imagining the future, and motivates new postcausal analyses, such as the simulation theory (Shanton & Goldman 2010; De Brigard 2014; Michaelian 2016b).

[1] This section relies in part on material published in Perrin & Michaelian 2017.

Two competing views of the relationship between episodic memory and episodic future thought have emerged in reaction to the tension between traditional theories and the MTT definition: continuism and discontinuism.

Continuism is the view that, though there may be differences of degree between episodic memory and episodic future thought, they are fundamentally processes or states of the same kind. This view is directly inspired by recent empirical findings. Perhaps the most impressive evidence in support of continuism comes from imaging studies, which have demonstrated that strongly overlapping regions of the brain are involved in episodic memory and episodic future thought, supporting the claim that a core (or default) network constitutes the neural basis for both forms of MTT (Addis et al. 2007; Schacter et al. 2007; Addis 2018; see also Addis's paper in this issue). In addition to imaging evidence, continuism finds support in evidence coming from a variety of other sources. Studies of MTT in memory-impaired patients have found that deficits in the ability to remember one's past are strongly correlated with deficits in the ability to imagine one's future (e.g. Klein et al. 2002; Rosenbaum et al. 2005; Hassabis et al. 2007). Similarly, patients suffering from depression display parallel tendencies to remember the past and to imagine the future in overly general ways (Williams et al. 1996), and the capacities to remember past episodes and to imagine future episodes emerge in development at roughly the same age (Suddendorf and Busby 2005; Atance 2008; Perner et al. 2010; Suddendorf 2010; Viard et al. 2012). Further support for continuism comes from studies of phenomenological similarities between episodic memory and episodic future thought. Level of detail and intensity of experience vary with temporal distance in a similar manner in both forms of MTT (D'Argembeau and Van der Linden 2004, 2006; D'Argembeau et al. 2011; Addis et al. 2011; Schacter et al. 2012), in line with Tulving's (1985) claim that the same phenomenology—autonoetic consciousness, or consciousness of the self in subjective time—is involved in both remembering the past and imagining the

future. And studies of autobiographical memory have found that episodic memory and episodic future thought are organized in a similar fashion, in the sense that autobiographical memories and autobiographical future events are embedded in the same narrative structures (Rathbone et al. 2011).

The empirical evidence is not, however, unambiguous. Discontinuism is the view that, though there may be certain similarities between episodic memory and episodic future thought, they are fundamentally processes or states of different kinds. This view has also received some empirical support. It has been shown, for instance, that remembered past events are associated with richer and more vivid sensory and contextual detail than imagined future events (D'Argembeau and Van der Linden 2004, 2006; Addis et al. 2010) or imagined past events (Addis et al. 2010; De Brigard and Giovanello 2012), and the emotional valence of remembered and imagined episodes displays a similar discrepancy, with imagined future events being characterized by a greater positivity bias than remembered past events (Berntsen and Bohn 2010; Rasmussen and Berntsen 2013). This evidence may only suggest a difference of degree between episodic memory and episodic future thought, but other evidence seems to suggest a difference in kind. Imaging studies have revealed that imagining is more cognitively demanding than remembering and in fact draws on brain regions that are not solicited by remembering (D'Argembeau and Van der Linden 2004; Schacter and Addis 2007a; Addis et al. 2007; Szpunar et al. 2007; McDonough and Gallo 2010; Martin et al. 2011), and there is evidence that impairments of certain brain regions affect episodic future thought but not episodic memory (Berryhill et al. 2010). Indeed, some researchers have even argued that two subsystems can be distinguished within the core network, with only episodic memory requiring reactivation of regions involved in the original processing of remembered information (Addis et al. 2009), and others have argued that imagining future events, in contrast to remembering past events, relies on conceptual knowledge to provide a scaffolding for the

integration of episodic details (Irish et al. 2012; Duval et al. 2012); consequently, episodic future thought may be more schema-driven than episodic memory (Szpunar 2010; Irish et al. 2012; Duval et al. 2012; Rasmussen and Berntsen 2013; Klein and Steindam 2016).

Given that the empirical evidence does not unequivocally support continuism, the philosophy of memory may have a role to play in resolving the (dis)continuism debate. Recent philosophical research has begun to address questions pertaining to memory as MTT (see Michaelian et. al., forthcoming for a review; see also Perrin 2016, Michaelian 2016a, 2016b, Perrin and Michaelian 2017, Sant'Anna 2018), but there is a need for more work to be done. The goal of this special issue is to bring together current work and to encourage further research on the implications of the MTT definition of memory.

The special issue results from a workshop on *Mental Time Travel: Origins and Function* organized by André Sant'Anna and Kourken Michaelian at the University of Otago in 2018 thanks to a grant from the Australasian Association of Philosophy's Postgraduate Conference Fund to Sant'Anna. The papers contributed by the invited authors—Donna Rose Addis, Carl Craver, Jordi Fernández, and Markus Werning—result from their talks at the workshop.

2 Contents of the issue

The papers making up the special issue cluster around five distinctive themes regarding the relationship between memory and MTT. (1) Craver, Schwartz, and Werning address questions related to **the nature of remembering**, including the distinct perspectives adopted by psychologists and philosophers when investigating memory, the function of memory, and the nature of memory traces. (2) Andonovski, Aranyosi, and Fernández tackle issues pertaining to **the content of remembering**, including the singularity of memory, the intentional objects of memory, and the phenomenology of memory and future thought. (3) Addis and Robins

focus on **the (dis)continuity of memory and imagination**, showing, respectively, how continuist and discontinuist perspectives can be defended on the basis of recent empirical research. (4) Lin, and McCarroll & Consentino, explore **the relationship between MTT and the self** by focusing on issues raised by observer-perspective representations in memory and imagination. Finally, (5) Grünbaum & Kyllingsbæk, and Mac Cumhaill, argue for novel **forms of MTT**, focusing on types of memory that they refer to, respectively, as memory for intentions and phasic memory.

2.1 The nature of remembering

Craver calls our attention to two different perspectives from which episodic memory might be investigated. From an "epistemic" perspective, he argues, remembering appears to be a capacity for keeping track of one's own and others' claims about the past. From an "empirical" perspective, in contrast, it appears to be a neurocognitive process analyzable in terms of the its underlying brain mechanisms. Craver challenges the assumption that the epistemic perspective, which has traditionally guided the work of philosophers, and the empirical perspective, which characterizes the work of psychologists, are in competition with each other. Rather than being in competition, he argues, they may represent complementary approaches, each of which has a distinctive contribution to make to our overall understanding of memory. Craver's contribution thus appears to call into question a background assumption of the (dis)continuism debate: continuists typically argue from an empirical perspective, while many defences of discontinuism seem to adopt an epistemic perspective; if the two perspectives are equally legitimate, then the (dis)continuism debate may ultimately turn out to be misguided.

Schwartz takes up a question that has only recently begun to receive sustained attention, that of the function of memory. He contrasts the traditional storehouse view of memory,

on which the function of memory is to enable remembering, with the recent simulationist view, on which the function of memory is to enable MTT. Pointing out that different concepts of function may have different consequences for the debate between advocates of the traditional view and advocates of simulationism and adopting a form of function pluralism, Schwartz argues that the strength of the case both for simulationism's negative component (the claim that memory is not for remembering) and for its positive component (the claim that memory is for MTT) has been overstated. Simulationists will undoubtedly want to push back against this argument, but they will have to concede, at minimum, that Schwartz has shown that they must be more careful than they have been so far with respect to the function of memory.

Werning is likewise concerned with simulationism, proposing an account of remembering that departs in important ways both from the simulation theory and from the causal theory. On the one hand, he rejects standard formulations of the causal theory on the ground that they are empirically inadequate. On the other hand, he rejects the simulation theory on the ground that the reliability of memory cannot be explained unless remembering is assumed to require causal connection with the remembered event. He then develops his own view, "trace minimalism", on which a causal connection is required for remembering but on which traces do not transmit representational content but merely store non-categorial and sequential hippocampal information which, when combined with semantic information, serve to regulate the production of contentful memories. This minimal conception of traces, Werning argues, supports the view that episodic memory is a natural kind distinct from episodic imagination, thus favouring discontinuism.

2.2 The content of remembering

Andonovski challenges the assumption that memory is a form of singular thought—an assumption that, he points out, is taken for granted in a number of current debates, including the causalist-simulationist controversy, in the philosophy of memory—arguing that several bodies of empirical evidence suggest that the representational contents of memory in fact vary along a continuum of specificity extending from particular events, through temporally extended events, to general events. He invokes three main bodies of evidence. First, a significant number of memories concern general rather than specific events, with memories at both ends of the continuum sharing numerous phenomenological and representational features. Second, consolidation and reconsolidation increase the overlap among the traces left by experienced events, which consequently end up representing only their commonalities. Third, the brain network associated with remembering is active not only when one attempts to remember a particular event but also when one attempts to remember an extended or a general event. Overall, then, he suggests that there are good reasons to reject the assumption that singular episodic memory constitutes a distinct natural kind.

Aranyosi argues against radical constructivism (or simulationism) and in favour of direct realism as an alternative approach to memory. Radical constructivists deny the disjunctivist claim that genuine memories and confabulatory memories cannot—appearances to the contrary notwithstanding—have the same content and therefore reject direct realism about memory. Direct realists, because they see the relationship between memories and their objects as being one of constitution, maintain that there is a deep difference between genuine memories and confabulatory memories and therefore endorse disjunctivism. Aranyosi points to a number of problems for radical constructivism, including the fact that the neural and phenomenological similarities between memory and imagination that are invoked in support of the view concern the psychological processes involved in remembering, not the concept of remembering, from the point of view of which the difference between genuine memories and

confabulatory memories holds good. He also points to a number of positive arguments in favour of disjunctivism, including the fact that it fits better with the asymmetry of time than does radical constructivism, which makes possible a relationship of constitution between episodic memories and their objects, while ruling out such a relationship between episodic future thoughts and their objects.

Fernández argues that the phenomenology of remembering is explained by its self-referential content: on his view, a memory represents itself as being caused by a past perceptual experience, and it is because it includes this content that remembering involves the experience of travelling back in subjective time. The experience of travelling forward in subjective time characteristic of episodic future thinking, of course, cannot be explained in the same way. Fernández takes the phenomenology of episodic future thinking to be explained, instead, by the self-referential content of an intention that may accompany a future thought, an intention that represents itself as being the cause of a future perceptual experience. If Fernández is right, there is an important discontinuity between episodic memory and episodic future thought: while memory and future thought may involve the same phenomenology, the mechanism that underlies that phenomenology in the case of memory is importantly different from the mechanism that underlies it in the case of future thought.

2. 3 The (dis)continuity of memory and imagination

Addis defends a continuist approach based on recent empirical results from psychology and neuroscience. She argues that a single cognitive system—which she refers to as the "simulation system"—is responsible for constructing episodic simulations and that episodic memory and episodic imagination are both products of this system. She also argues that the simulation system underlies not only memory and imagination but also perception. This, she adds, calls into question the idea that memory and imagination are best understood as forms of MTT: if

the simulation system is also responsible for perception, it may be that "time" and "travel" are not essential features of memory and imagination after all. While Addis's claims regarding perception will be controversial, they may contribute to reviving interest in the question, once prominent in philosophy, of the relationships among memory, imagination, and perception.

Robins intervenes in the (dis)continuism debate on the side of discontinuism. Continuists have argued that their position fits better with the available empirical evidence than does discontinuism, with the latter being supported primarily by conceptual or a priori considerations. Robins argues that this way of framing the debate is a mistake: in fact, she maintains, it is possible to develop an empirically-based case for discontinuism and against continuism by appealing to the role in empirical research of the distinction between the attitude of seeming to remember and the attitude of imagining. While Robins' case for discontinuism may not persuade continuists to abandon their position, they will be bound to admit, at the very least, that she articulates an important challenge that they will have to address in future work.

2.4 The relationship between MTT and the self

Lin focuses on the relationship between episodic memory and the self, asking how the sense of identity between the present self and the past self is secured. This question is particularly pressing in the case of observer perspective memories, since, when one remembers from an observer perspective, the self with which one identifies does not occupy the perspective that one adopts in the memory. Lin rejects the "inheritance" view, on which the content of a perception includes the perceiving subject as one of its components, so that, when a subject remembers a past perception, part of what he remembers is the past perceiving subject. This view implies that the features of the past subject—his body and perspective—play no role in

securing the sense of identity between the present self and the past self. She defends an alternative "self-simulation" view, on which identification depends on the observing and embodied dimensions and results from the projection of the present self into the past, rather than being inherited from the past.

McCarroll[2] and Cosentino focus on the relationship between episodic future thought and the self. Empirical findings suggest that episodic future thought increases the psychological connectedness of the present self with the future self, thus enabling the subject to reduce temporal discounting. In many cases of episodic future thought, however, the subject adopts an observer perspective. This generates a puzzle: if the subject often sees himself from the outside when he engages in episodic future thought, then it seems that we ought to expect episodic future thought to reduce psychological connectedness, rather than increasing it, and therefore to increase temporal discounting. McCarroll and Cosentino argue that this puzzle can be solved by noting that observer perspective episodic future thought allows the subject to consider events in a more abstract manner, with the consequence that the information contained in future thoughts is more easily integrated with his self-knowledge. They thus conclude that, rather than reducing psychological connectedness, observer perspective episodic future thought provides a means of increasing it and, consequently, of enabling subjects to overcome temporal discounting.

2.5 Forms of MTT

The ability to make decisions about what to do in the future appears to presuppose the ability to remember intentions. **Grünbaum and Kyllingsbæk** consider the nature of memory for intentions. Their core claim is that memory for intentions should be understood as a kind of

[2] McCarroll is a postdoctoral researcher at the Centre for Philosophy of Memory, where the three guest editors are likewise based. We would therefore like to note that McCarroll and Cosentino's paper was selected through the usual double-blind peer review process.

long-term declarative memory distinct from both semantic and episodic memory. In support of this understanding, they argue that, while episodically or semantically remembering an intention may enable one to retrieve the information that one formed the intention, it does not ensure that the intention retains its motivational character; yet remembered intentions very often have motivational force without requiring any reendorsement at retrieval. Grünbaum and Kyllingsbæk also defend a set of computational principles that, they argue, explain a number of core features of intentions, including the capacity to select the right intention at the right moment, the automatic character of the retrieval of intentions, and the preservation of the motivational force of intentions.

Mac Cumhaill describes what she takes to be a novel form of memory, phasic memory. Whereas episodic memory concerns particular events, phasic memory concerns whole phases of the personal past. Focusing on the role of artworks of a specific kind—what she refers to as "still lives"—in triggering phasic remembering, she argues that phasic memory differs from episodic memory in metaphysical, phenomenological, and descriptive terms. While differentiating phasic memory from episodic memory, however, Mac Cumhaill argues that phasic memory, like episodic memory, may be understood as a form of MTT. Making a case for the adoption of a concept of a form of memory that cannot be smoothly accommodated by existing taxonomies is always a hard row to hoe, but Mac Cumhaill succeeds, at minimum, in calling our attention to aspects of MTT that have tended, without justification, to be downplayed.

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