

chapters, Haselgrove summarizes some of the criticisms of associative learning theory and evaluates alternative learning systems. This theme is explored in more detail in the book's final chapter, in which the evidence for dual associative and propositional learning systems is discussed.

If I had to make one criticism of this book, it would be that its focus is somewhat limited. It deals largely with those aspects of behaviour which are most often linked with associative learning. I would have liked to see some discussion of how these simple principles have permeated other areas of psychology, such as cognition, social interaction, and language acquisition. If I were forced to make a second criticism, it would be the lack of proper referencing and of a complete reference list. This is certainly a feature of the series style, but it does limit the books' usefulness for teaching. We are told who conducted each experiment, but dates are rarely given, and at most only a single reference is provided for each chapter.

The *Very Short Introduction* books are intended to be accessible to a reader with no background

knowledge of the subject, while still being informative. This volume meets these criteria, and, stretching to only 114 pages, it is small and thin enough to slip into a back pocket and be carried anywhere—always on hand to relieve a moment's boredom. It is not a textbook and has neither the depth nor the breadth of coverage to allow it to be adopted as the central text in a learning course. It should, however, serve as a useful primer and revision aid to undergraduate students or to anyone who has not studied learning in great detail. At only £7.99, you can afford to order a copy for yourself and a few for the library.

David George

*Department of Psychology, University of Hull,  
Cottingham Road, Hull HU67RX, UK*

*School of Psychology, UNSW Australia, Sydney 2052,  
NSW, Australia*

 D.George@hull.ac.uk

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## A timely dose of theory in future thinking research

**Seeing the future: theoretical perspectives on future-oriented mental time travel**, edited by K. Michaelian, S. B. Klein & K. K. Szpunar, New York, Oxford University Press, 2016, 464 pp., £55.00 (hardback), ISBN-10: 0190241535, ISBN-13: 978-0190241537.

Within a short timeframe, the scientific study of future-directed cognition—or Future-oriented Mental Time Travel (FMTT)—has grown with great pace. Indeed, the first months of this year alone have witnessed two Special Issues related to this topic, one in the *British Journal of Clinical Psychology* (Volume 55, Issues 1 and 2) and one in this journal (Volume 69, Issue 2). Researchers from diverse fields, such as comparative, developmental, cognitive, clinical, and developmental psychology, have taken a keen interest. Since the breakthrough finding of a core network of brain regions that respond similarly to the ability to remember the past and to imagine the future (Addis, Wong, & Schacter, 2007; Hassabis, Kumaran, & Maguire, 2007), the empirical investigation of FMTT has turned into a “thriving research industry” (Klein & Steindam, chapter 7). However, as the cogs of research keep whirring, discussion of theoretical,

methodological, and conceptual issues has noticeably lagged behind. To date, no edited book has provided the opportunity to consider what FMTT is, what we know, and how we should move forward.

The editors of this book attempt to do exactly this by bringing together key FMTT researchers from diverse disciplines. It arises, in part, from dissatisfaction with the amassing of research focused on empirical findings. As they state in their opening chapter, “the history of psychological science suggests that the mere accumulation of data, often in support of very local theories, has sometimes stood in for the development of more global understanding of the phenomena in question” (p. 15). Across eight sections, it covers: types of FMTT, differences between remembering and FMTT, subjective temporality, the self, functions, evolution, development, and clinical perspectives. Szpunar, Spreng, and Schacter (chapter 2)

do a good job of setting out the varieties of FMTT: within their new taxonomy, referred to throughout the book, FMTT is split into four subtypes—simulation, prediction, intention, and planning—each of which can vary to the extent it relies upon episodic or semantic memory. Due to being linked with, and a precursor to, many of the investigations into FMTT, memory was a theme never far away. However, in contrast to other edited books that also discuss FMTT (e.g., Berntsen & Rubin, 2012), memory per se never becomes the focus.

My personal highlight was a philosophical cut-and-thrust dialogue on a question critical to the field: Is FMTT different from remembering? Perrin challenges the commonly accepted thesis: that remembering and FMTT vary in degree, not in kind (the Continuity Thesis). In chapter 3, he proposes that differences in the epistemological and causal nature of episodic memory and FMTT must lead to the conclusion that they differ qualitatively (the Discontinuity Thesis). Klein and Steindam (chapter 7) are sympathetic to this view and recapitulate a feature of FMTT: unlike memory, FMTT can only ever be “probable” until the imagined event comes to fruition (or not). Michaelian (chapter 7), on the other hand, considers a mass of psychological research questioning the foundations of the Discontinuity Thesis (e.g., that episodic memory is a “factive” account of experience) and defends the status quo admirably and with rigour. Devitt and Addis (chapter 5) provide further evidence in support of the Continuity Thesis by explaining how imagining the future and remembering the past interact. Intense interrogation of its theoretical foundations is the mark of a healthy field, and this book should be commended for showcasing a more critical approach.

Another central debate within the book, albeit more intertwined throughout the chapters, is whether FMTT is uniquely human. Suddendorf, Brinums, and Imuta (chapter 17) put forward the view that flexible and long-term foresight is possible only in the human species. This is challenged by behavioural acts of foresight in non-human animals, presented by Corballis (chapter 16), Thom and Clayton (chapter 14), and Martin-Ordas (chapter 15). Interestingly, Thom and Clayton indicate that possibly the very behavioural criterion used for determining foresight in animals (displaying anticipation of a future need that is dissociable from present drive states—i.e., the Bishof-Köhler hypothesis) is misguided and due for revision. Due to the challenges of assessing FMTT verbally in preschool children, behavioural methods of measuring FMTT are also

explored in chapter 18, by Atance and Mahy. Several paradigms are described, with the most impressive example being able to pull apart the relative contribution of memory and FMTT in task performance. Specifically, even when all participants are able to remember relevant information, deficits were shown in how participants used that information to make a future-oriented decision. Atance and Mahy also point to an intriguing and perhaps uncomfortable fact: that some measures of FMTT do not correlate. The book also made important links to fundamentally related topics, such as temporality (Dalla Barba; Klein and Steindam; Brigard and Gessell, chapters 6–8), function (Debus, Hoerl and McCormack, Pezzulo, chapters 11–13), the self (Manning, D’Argembeau, chapters 9 and 10), and self-improvement (Ernst and Manning, chapter 20).

This edited book reflects the value of novel future directions of a nascent and lively area of research. This should be especially valuable to empirical researchers and students wanting to move beyond comparisons between episodic memory and FMTT. The taxonomy (Szpunar, Spreng, & Schacter, chapter 2) and the novel perspectives combine to provide a “springboard” for interesting future developments. The core readership would likely be graduate-level and above, due to the technical and topic-specific knowledge required to comprehend these chapters. However, to get a full picture of the empirical research, one would need to also engage with the ongoing literature. For postgraduates, the benefit may be in helping generate novel ideas and perhaps develop new lines of inquiry. For experienced researchers, the benefits may be less obvious: identifying a new experimental paradigm, or—much better—changing perceptions about FMTT (e.g., appreciating the contribution of semantic memory—see Irish, chapter 19). Such a book is a timely contribution to psychology and has undoubtedly set the scene for developing truly novel theoretical and empirical trajectories within the field. I suspect that FMTT researchers in the future will, ironically, be forced to look back and reflect on the book’s significance.

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Scott Cole  
*Psychology, York St. John University, York, UK*

 cole.s.n80@gmail.com

 <http://orcid.org/0000-0001-8176-283X>

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