

Memory at the center of our life: a review of *Current Issues in Memory: Memory Research in the Public Interest*, edited by Jan Rummel. Review by Valérie Camos, email:

valerie.camos@unifr.ch

Memory is, among the human cognitive functions, probably one of the first that have been cherished by human beings, have attracted interest in layman and philosophers, and have been scientifically studied. The long-lasting human interest in this function is testified by the existence of a goddess of memory in the Greek mythology, Mnemosyne (see her fabulous representation in Dante Gabriel Rossetti's painting). In Hesiod's poem *Theogony* (8th century BC), Mnemosyne is the daughter of Uranus (sky) and Gaia (earth). Such a legendary parenthood clearly highlights the importance given to memory. Mnemosyne is the mother of the nine Muses, fathered by Zeus, goddesses and inspirations of the arts (e.g., music, poetry, literature, theatre, song, dance). Memory can thus be seen as the origin of human artistic creativity. The cult of Mnemosyne was said to be widespread in the region of Olympia and consisted of a kind of cure with different waters, waters for memory and waters for oblivion and forgetfulness. Memory and forgetting are still considered as two indissociable aspects of human cognitive system. Mnemosyne is also thought of having created all the words and language, the tools to share knowledge. This mythology tells us that for the ancient Greeks, and it will be so until the Renaissance, memory is not considered as a mere store for traces of past events but is often synonymous of knowledge and meaning. All the words related to memory we are using nowadays like mnemonic or amnesia are issued from the same Greek word from which Mnemosyne's name came from. With such mythological roots, it does not come as a surprise that inquiries about human memory can be traced back to antiquity with philosophers like Plato and Aristotle. Plato emphasized the power of memory to preserve knowledge using a metaphor to wax tablet. As said by Socrates in Plato's *Theaetetus*, "*this is the gift of Memory, the mother of the Muses, and that whenever we wish to remember anything we see or hear or think of in our own minds, we hold this wax under the perceptions and thoughts and imprint them upon it, just as we make impressions from seal rings; and whatever is imprinted we remember and know as long as its image lasts, but whatever is rubbed out or cannot be imprinted we forget and do not know*". Aristotle stressed the difference between memory and recollection, as two kinds of memory. This distinction raised from his idea that only man can recollect while

several animals are able to remember (in the sense of storing past events). The interest of philosophers on memory is still vivid and recent years have seen the birth of philosophy of memory as a distinct field (see, Michaelian, Debus, & Perrin, 2020). The study of memory in psychological science is as old as this science itself. Wilhelm Wundt and William James were pioneers in this field, and Herman Ebbinghaus developed the first scientific approach to studying memory with his experiments using lists of nonsense syllables, and then associating them with meaningful words (Ebbinghaus, 1885). Some of his findings such as the concepts of the learning and forgetting curves, or the distinction between sensory, short-term and long-term memory, remain relevant today. This history shows that memory has aroused interest for a very long time and is still keen as shown by the publication of this new book on the topic.

The book "*Current Issues in Memory: Memory Research in the Public Interest*", edited by Jan Rummel, is celebrating the tenth anniversary of a very successful series on *Current Issues on Memory* published by Routledge for which Robert Logie serves as series editor. This book marks also the passing of the baton to Jan Hummel who is becoming the new editor of this series. Formally, the book is a collection of 16 chapters, a compilation of chapters issued from the seven previously published books of the series. To direct the editorial choice of the chapters, the editor proposed to bring together chapters showing the interest of memory research for the general public. For few years now, there is an increasingly concern on whether psychological science can provide applications, which will be practical and meaningful to the general public. This raises in a context in which part of the general public expresses more and more overly its suspicions on the ability of scientific research to provide helpful and trusty advices. As the COVID crisis is giving ample examples, this part of the general public entertains negative opinions on scientific results, practice, and recommendations. Within psychological science, it is probably more difficult for those of us who work on experimental cognitive psychology to gain the compliance of the general public. Questions about clinical populations or the impact of ageing on wellbeing are often better understood as their direct impact on people's life is more obvious. This is why several initiatives have been taken to more efficiently communicate to the public results of the scientific work. In the field of memory research, the creation in 2012 by the SARMAC – the Society for Applied Research in Memory and Cognition - of a journal dedicated to the applied

memory research, the *Journal of Applied Research in Memory and Cognition*, is one example of the efforts made by the scientific community. The inclusion in each paper of a summary for the general audience should facilitate the contact with the general public. In such a context, the present book makes a further step in the direction to enlighten how research can have concrete impact on society and people's life. Showing the concrete impact of research also provides a way to increase the external validity of memory research. However, the book editor explains that the aim of the book is not to address applied aspects of research on memory, but to exemplify how it can speak and be informative to the general public.

The book is organized around four sections of balanced size, including 4-5 chapters each, and contains a well-rounded collection of chapters covering a large range of topics in memory research. The framing of these chapters is rather unusual but clever, as it constitutes a very nice way to organize the field of memory research, the successive sections being dedicated to memory representations, memory adaptations, memory limitations, and memory augmentations.

The first part of the volume is titled "Memory Representation: From (visual) perception to stored information". This part focuses on how visual inputs from the environment become mental representations and how the ability to store visual representations in working memory is crucial for everyday functioning. The first chapter by Cesare Cornoldi and Irene Mammarella focuses on visuospatial working memory. In this domain, the dominant model is the one proposed by Baddeley (1986, see Baddeley, Allen and Hitch, 2021, for a review of the different versions of this model). Contrary to the segregation between verbal and visuospatial domains introduced by Baddeley, the original contribution of Vecchi and Cornoldi's model, named the continuity model, is to suggest a continuity along two dimensions: the type of material and the type of processes. For the visuo-spatial domain, this approach leads to a continuity across the different visuospatial abilities often depicted in the literature. This framework predicts memory weaknesses and strengths of specific atypically developing populations (e.g., learning disabled children, individuals with genetic syndromes, such as Down syndrome, spina bifida, and fragile X syndrome). Regarding on how this chapter can speak to the general audience, the report of

studies on genetic syndrome or learning difficulties may easily find echo in the general public, often interested in knowing more about pathologies or difficulties.

The second chapter by Amy Shelton and Naohide Yamamoto presents the relationships between visual and spatial memory by examining the role of visual information, visual coding, and visual memory in various aspects of spatial cognition. After a first part more theoretically driven, this chapter develops a second part on the role spatial memory has on navigation (e.g., across the kitchen or to go our favorite bookshop), which can speak outside the memory community.

The two last chapters of this section are clearly targeting topics that would speak to the general audience. The third chapter authored by Vicky Bruce focuses on remembering faces. The title in itself brings back in anyone memories of some misrecognition of friends or colleagues in a conference. Our modern social life leads us to be daily bombarded with faces, old and new, and some misrecognitions can have dramatic consequences in the legal context (flaws in memory is also largely discussed in the third section of the book dedicated to false memories). Vicky Bruce gives a clear summary of the factors affecting face memory based on experimental, neuropsychological and neuroscientific evidence. The chapter ends on some considerations in the context of eyewitnesses.

The final chapter by Andrew Hollingworth summarizes in a very didactical way what is known about the very complex interactions between perception, attention, and memory in the processing of real-world scenes. Overall, the first section of this book browses the cognitive system from perception to working and long-term memory. It is a bit unfortunate that this section is restricted to visuospatial information, drastically narrowing the type of memory representations considered. On the one hand, this reflects a general tendency with more memory research on the visual and spatial information than on verbal and auditory for example. Searching on the Web of Science showed that the former represents more than the two third of the published papers in 2020-2021, which was already the case in 1990-1991; a tendency that can be traced back to 1960-1961, while in the 60 last years the number of papers published on this field increased from 8 to over 1110 (Web of Science, 2021). On the other hand, one can be surprised by the absence of any chapter on other aspects of human memory. Without denying the important role of visuo-spatial information in our them, human beings are manipulating and storing other types of information, some of

which we are probably the ones to process, like verbal-linguistic or symbolic representations.

The second section of the book is entitled “Memory adaptations: Forgetting the past, remembering the future”. The section wittily combines two areas that are considered here as the two sides of the same coin: the forgetting of previously stored information and the remembering of intentions for the future. It frames research around two time periods: the past that we tend to forget and the future that we try to envision. Chapters 5 by John Wixted and 6 by Celia Harris, John Sutton, and Amanda Barnie are interested in forgetting. After tracing back forgetting from its original study by Ebbinghaus, Wixted presents the different theories of interference that account for forgetting in long-term memory, and the role of consolidation to counteract it. This is achieved with the concern of returning to the origins of this field of research, which is sufficiently rare to be praised. The historical perspective is also well integrated with the current literature. In a second part of the chapter, cellular and molecular evidence are presented to elucidate the biological mechanisms of the forgetting/consolidation processes, a particular emphasis being placed on the role of sleep and some drugs on these processes. Although this chapter provides a wide panorama, readers from the general public may experience difficulties in seeing the direct impact on every-day life, except for the effects of sleep.

The next chapter by Harris et al. presents research on forgetting browsing from the individual (autobiographic forgetting) to individuals in groups (social forgetting), and finally to groups themselves (situated forgetting). The autobiographic memory can be studied through laboratory analogue (i.e., retrieval-induced forgetting, direct forgetting and think/no-think paradigms) to the everyday forgetting on personal events. The social influence that may cause forgetting or conversely can provide support for memory (what is called social forgetting) is detailed, and it leads to the integration in a situated-cognition approach. The chapter clearly shows the challenge to find adequate paradigms to study forgetting at the scale of a community or a nation. Despite the fact that understanding the paradigms may require some knowledge in experimental psychology, the introductory example on war veteran anchors efficiently the scientific studies on societal questions to arouse interest of a general audience.

The focus of Chapters 7 and 8 is prospective memory, that is the memory for remembering something to do in the future. Jan Rummel and Lia Kvavilashvili's chapter urges the study of prospective memory to go back to naturalistic and real-life settings. The well-established laboratory paradigms by Einstein and McDaniel have boosted the exploration of the prospective memory by establishing controlled conditions. However, the authors plead for a reconnection to real life to generalize laboratory findings. The final chapter of this section by Shayne Loft, Key Dismukes, and Tobias Grundgeiger responds to this wish by showing how research on prospective memory is particularly important in risky contexts with exceptionally high safety issues (e.g., air traffic or submarine control, emergency or intensive healthcare). Akin to the examples used in Chapter 6 to explain forgetting, the examples and the different situations described would speak to anyone, and it is rather easy to understand from them why lapses on prospective memory can lead to dramatic accidents, or on the contrary why experts (pilots or surgeons) benefit from the automaticity of procedures and from the prioritization they are able to implement among the various tasks at hand.

As clearly shown in the second section dedicated to prospective memory, our memory suffers from limitations and flaws. The third section of the book focuses exclusively on a particular limitation, the generation of false memories, probably because it is among the most frequently investigated issue. It is also the most intriguing phenomenon for the general audience. How can our precious memories be so unfaithful to us? How can they betray us and disguise themselves with all the appearance of truth and truthful events? This phenomenon has also tremendous and sometimes dramatic consequences. But it can also lead human beings to relativize their intellectual supremacy. The introductory chapter of this section by Cara Laney and Elizabeth Loftus shows through astonishing examples how false memories like any memories have real consequences on behavior. Kimberley Wade, Sophie Nightingale, and Melissa Colloff's chapter discusses how photos affect our memories, both our childhood memories and those of less personal events (like Hurricane Sandy in 2012). In our modern life, in which most people have a mobile phone which is mostly a camera, photos are a major tool of communications. Based on Beth Loftus's work, Maria Zaragoza, Patrick Rich, Eric Rindal, and Rachel DeFranco's chapter reports the work on forced fabrication, that is the fabrication of false memories in real-world forensic investigations

through suggestive interviews. The case of children as eyewitness in legal proceedings is evoked in the following chapter by Henry Otgaar, Mark Howe, Nathalie Brackmann, and Jianqin Wang, while Kamala London, Sarah Kulkofsky, and Christina Perez review the factors that affect the reliability of children's reports.

The last section questions how can memory be improved, augmented, especially in the ageing population and in educational settings. The current topic is certainly of public interest, as testified the numerous products advertised for improving memory performance. The recent lengthening of our lifespan has brought concerns on how we can keep our cognitive performance at their best. Tim Salthouse's chapter summarizes his research on cognitive ageing, especially on individual differences in working memory capacity. Despite the fact that ageing effect on memory is popular, the reading of this chapter requires in-depth knowledge in psychology, in particular psychometry, which would restrict its readership.

The following chapter by Anna Stigsdotter Neely and Lars Nyberg directly targets what is a very popular topic, the training of memory to preserve declining cognitive abilities. Taking both a behavioral and brain perspective, the authors expose studies on working memory training, and its potential transfer effects. This chapter was originally published in 2014, and since then the field of working memory training has faced hot debates, and nowadays the general view tends to be less optimistic than at the time of writing of this chapter (see Novick, Bunting, Dougherty and Engle, 2020, for the latest review of this field). The two last chapters evoke educational settings. Darren Levin, Kenneth Thurman, and Marissa Kiepert give us a recapitulation of the different tools used to assess working memory after having briefly summarized three working memory models (Baddeley, Cowan, and Ericsson & Kintsch). They also provide some discussion on the ecological validity of these tools. Finally, Henry Roediger, Pooja Agarwal, Sean Kang, and Elizabeth Marsh make the inflammatory claim (as they said) that education in schools would benefit from more testing. Their claim is a direct consequence of the famous testing effect evidenced by Roediger and Karpicke (2006), and this chapter reviews findings from their lab on the critical importance of testing (or retrieval) for future remembering.

To conclude, it is probably not fully fair for me, a memory researcher, to say memory is actually a fascinating topic of research, but information about this function of our cognitive system is also highly appreciated by the general public. Listen to the concerns most people express on their fear to lose their memory, which can relate just as much as to their most beloved memories than the retrieval of first names. The choice to collect previously published chapters can be a disappointment for memory researchers, who may expect to find original and new contributions in a new book. Alternatively, this book can provide in a single item an overview across the field of memory research, which could be useful for new comers like students. It will be useful for professionals looking for some information without having to read the entire series of books.

As the editor himself noted, while some of the chapters have been updated, “*no major changes were made regarding the chapter contents*”. This is the pitfall of such a book based on previously published material. It is questionable to see them all as targeting current issues as they were first published between 2009 and 2019. In addition, some references are made to the other chapters in the book from which a given chapter has been taken, something that can partially perturb the reading. More importantly, none of the authors wrote their chapters in the perspective of reaching the public interest, but on the scope of the respective previously published books that had their own focus.

Finally, as the editor said, the field of memory research can be envisioned as a monster, due to the variety of distinct memory systems (e.g., sensory, short-term, working, long-term, episodic, prospective, declarative, procedural, autobiographical). Across the different chapters, different memory systems are described (e.g., working memory in Chapters 1, 14 and 15; prospective memory in chapters 7 and 8; long-term memory in chapters 12, 13, and 17). On the one hand, finding, in a single book, contributions targeting the different memory systems is extremely rare and can be applauded. On the other hand, reading this book can be a challenge for students or new comers in the field. How can they conceive the differences and the relationships between these distinct memory systems? Some preliminary knowledge or the reading of a textbook (e.g., Baddeley, Eysenck, and Anderson, 2020) is essential. Alternatively, an introductory chapter could have provided a map to navigate through the different contributions.

This book might be better served if the reader approaches it as a wine tasting experience or, I should better say, a whisky tasting experience to pay tribute to Robert Logie.

The reader will have samples of the research done in memory and also of the book series, but the book won't make the reader's head spin. For this, he or she should join the large community of memory researchers who are continuing exploring one of the most fascinating topics in human cognition since antiquity. Let's hope that this book will attract among the neophytes the next generation of researchers.

Word count (main text) = 3320

Valérie Camos

valerie.camos@unifr.ch

Orcid : 0000-0002-4230-2766

Université de Fribourg

Dpt of Psychology

Fribourg, Switzerland

References

- Baddeley, A.D., Eysenck, M. W., & Anderson, M. C. (2020). *Memory - 3rd Edition*. Abingdon, UK: Routledge.
- Ebbinghaus, H. (1885). *Memory: A contribution to experimental psychology*. Dover.
- Hesiod. *Theogony*. English translation by Athanassakis, A. (2004). Hesiod. *Theogony, Works and Days*, Shield. The John Hopkins University Press.
- Michaelian, K., Debus, D., & Perrin, D. (2020). *New Directions in the Philosophy of Memory*. Hove, UK: Routledge.
- Novick, J.M., Bunting, M.F., Dougherty, M.R., & Engle, R.W. (2020). *Cognitive and working memory training: Perspectives from psychology, neuroscience, and human development*. New York, NY: Oxford University Press.
- Plato. *Theaetetus, Sophist*. Greek with English translation by Harold N. Fowler. Loeb Classical Library 123. Harvard Univ. Press (originally published 1921)
- Roediger, H. L., & Karpicke, J. D. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1, 181–210.
- Rummel, J. (2021). *Current Issues in Memory: Memory Research in the Public Interest*. Abingdon, UK: Routledge.
- Web of Science (2021, July 26th). Search made on webofknowledge.com with “memory” and the words “visual”, “spatial”, “verbal” and “auditory”, respectively, in Title.