

# Touching memories

A reminder of the joy and sorrow of reminiscence.

## Why Life Speeds Up As You Get Older: How Memory Shapes Our Past

by Douwe Draaisma

(translated by Arnold & Erica Pomerans)

Cambridge University Press: 2004. 288 pp.

£19.99, \$28.99

Yadin Dudai

The science of memory has so far been particularly successful when it has neglected actual memories. The reasons for this have changed over time, yet the paradox remains. Hermann Ebbinghaus, the influential founding father of systematic research into human memory, selected nonsense syllables as study material. This is partly because he wanted to use quantifiable, reproducible stimuli, but also because he was keen to get rid of semantics and to eliminate confounds of associativity in encoding and reconstruction in recall. But real-life memories are all about content — take it away and you are left with mental oblivion.

Animal research didn't fare much better, although it had a more excusable reason: it is inherently more difficult to know what it is like to recollect like a bat than to identify with a recollecting human. The development of simple conditioning paradigms provided an effective way to study performance without having to rely on what the behavioural act means to the brain that commands it. Not surprisingly, it took generations, and thousands of publications, before mainstream animal learning research agreed to consider conditioned animals as knowledge systems, rather than as contentless automata.

On top of all this came the remarkable success of molecular and cellular neurobiology, which often confused plasticity with memory. Memory is specific information about past events, whereas plasticity is believed to be the neuronal property that allows information to be retained over time. Many impressive research articles that claim to deal with memory actually deal with plasticity; their authors seem to have forgotten the distinction.

Some students of human memory prefer to use the term 'memory' only for mental time travel to the personal past, usually involving some re-experienced emotion: I recall, therefore I re-enact. This is bona fide 'episodic' memory. Others take memory to include every type of acquired information that is transparent to conscious awareness, even if this information does not stem from a unique personal experience and there is no mental time travel. This is 'semantic' memory. The textbook adjective for all types

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Can it be that it was all so simple then? Or has time rewritten every line?

of conscious memory, including both episodic and semantic memory, is 'declarative'; 'non-declarative' refers to all forms of bodily memory, such as habits and modified reflexes, in the performance of which we often behave like zombies.

Humans fear most losing their declarative memories, especially their episodic memory. There is, however, an inverse correlation between the importance we assign to this type of memory in our own brain and our ability to study it in the brains of others. Episodic memory has proved rather resistant to objective investigation. I am not referring here to the current 'neophrenological' wave, in which beautiful false-colour images of brains in action may entice us to believe that we really understand the computational goal of the memory system and the algorithms used to achieve it.

It is refreshing, then, to encounter Douwe Draaisma's book, which reminds us that an interest in memory is primarily synonymous with a wish to understand the joy and sorrow of personal memory. By this we mostly mean memory of personal episodes, which cohere while continuously undergoing both implicit and explicit processing, to yield an autobiographical narrative for the rememberer.

No two brains have identical episodic recollections and autobiographical narratives. These are our unique mental 'brain-prints'. How are these memories formed? Why are some episodes easily recalled, whereas others are forgotten, some only to be recalled later, out of the blue? How can we retrieve complex scenes within a fraction of a second — and why can't we be sure they recapitulate reality faithfully? (They don't.) And why does memory at an advanced age display a bias for recollections from adolescence

(the reminiscence effect or 'bump')?

Draaisma, a historian of psychology at the University of Groningen in the Netherlands, addresses these and other marvels of personal memory in his charming collection of essays. Combining impressive scholarship in the history of psychology and contemporary research with a poetic touch, he discusses the questions outlined above. But he also considers a range of phenomena from exceptional memory and déjà vu to near-death experiences — are we really granted a fast panoramic view of our life seconds before we depart from this world?

The reader should not expect to find here a systematic account of the field of episodic memory, nor extensive coverage of the literature. Rather, this is a fine collection for memory lovers who will appreciate the facts it contains as well as the rich metaphors, which were to be expected in the light of Draaisma's previous book, *Metaphors of Memory* (Cambridge University Press, 2000).

Having said that, even memory researchers might find it a useful reminder of phenomena that have drifted away from the mainstream of the collective scientific memory. The chapter 'Why do we remember forwards and not backwards?' is just one example. I found myself going to the original paper (Bradley, F. H. *Mind* 12, 579–82; 1887) and was soon discussing it at a research seminar. Introspection — a research methodology that seems to have recently regained some of its former glory — tells us that we do indeed recall forwards and not backwards, but this holds only for short episodes. Can time's arrow be the defining attribute of a core episodic item, or 'episodic quantum'? Is there a dedicated brain circuit that subserves this temporal tagging? If so, how is it done

and are there pathologies that scramble it?

But you don't have to contemplate enigmatic research questions to enjoy this book. Some essays are touching indeed. In 'Why life speeds up as you get older' (which gives the book its title), Draaisma cites a letter from a patient suffering from Alzheimer's disease who no longer remembers that her husband died eight years ago, and keeps writing him heartbreaking letters. Reading this left me not only with a semantic trace, but also with an episodic one. I suspect it will do the same to other readers as well. ■

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## Down to business

### University, Inc: The Corporate Corruption of Higher Education

by Jennifer Washburn

Basic Books: 2005. 384 pp. \$26, £19.99

Graham Richards

Money corrupts. It was ever thus, but the thesis of this important book is that the universities' current dependency on industrial links has reached a moral crisis point. Academic freedom, the book contends, has been severely compromised, with damage being done to the public and to the values of higher-education institutions. Here I must declare a conflict of interest, as I have been closely involved in creating spin-off companies and in a multimillion-pound deal to finance a state-of-the-art laboratory. Despite my possible bias in favour of technology transfer, *University Inc.* shakes one's confidence and provokes the realization that some things may have to change.

It is a scholarly book, with almost 700 references and footnotes. However, the author, journalist Jennifer Washburn, cannot resist irritating portraits of many of the major players, for example describing Clark Kerr as "a balding man with bushy white eyebrows and alert blue eyes". It is written exclusively from the United States point of view, where for a long time there has been tension between a utilitarian view of universities, as expressed by Thomas Jefferson, who favoured "a useful American education", and the elitist attitude more prevalent in older European-style institutions, such as Harvard University. Nevertheless, as colleges across the world try to emulate the success of their top US competitors, they are faced with the same dilemmas, encouraged by governments espousing the 'knowledge economy'. Commercial values have been stamped on academic life.

Universities routinely run patenting and licensing operations, invest in risky start-ups, run their own industrial parks and

### Exhibition

## Passing thoughts



Naglaa Walker, herself a trained physicist, explores the exact world of science from an inexact, intuitive perspective. This photograph captures the image of a passing thought chalked on a blackboard, which is as temporary as the writer wants it to be. It is one of a series in her exhibition *On Physics*, which runs until 7 May at the Hug Gallery for International Photography in Amsterdam.

venture-capital funds, and encourage their faculty to set up companies. But sponsorship brings the risk of ceding control, changing the direction of research and altering the priorities of universities, even to the extent of marginalizing the humanities.

Washburn examines in detail several well-publicized case histories, including an agreement between the University of California, Berkeley, and Novartis. The company gave the university \$25 million over five years for first right to negotiate licences on roughly one-third of the discoveries in the Department of Plant and Microbial Biology. Washburn also takes a rather jaundiced view of the Institute for Bioengineering, Biotechnology and Quantitative Biomedicine (QB3) at Mission Bay, San Francisco — a cooperative effort among three campuses of the University of California and private industry.

The rise of the market-model university dates from the discovery of recombinant DNA technology by Stanley Cohen and Herbert Boyer in 1973 and its subsequent patenting. Washburn provides detailed scrutiny of what she considers the villain of the piece, the Bayh–Dole Act, signed into law by President Carter in December 1980. The bill seems to have been crafted originally to grant

automatic patent rights to just universities and small businesses. It contained safeguards, such as a 'march-in' provision to enable the federal government to terminate licences, and time limits on exclusivity, but few of these survived to the final legislation. Major corporations did not lobby to oppose the act, which the Reagan administration soon extended to include them.

Since the 1980s, the desire to maximize entrepreneurial gains has grown, and they have become significant sources of university funds. DuPont gave \$6 million to Harvard, and the German chemical company Hoechst provided \$50 million for Massachusetts General Hospital — this was targeted money with expected tangible returns in terms of exclusive rights.

The most worrying questions, though, relate to clinical trials. Washburn recounts in detail the problems faced by James Kahn of the University of California, San Francisco, with a trial of the AIDS drug Remune, which was funded by the Immune Response Corporation, and the genetic-engineering trial at the University of Pennsylvania that resulted in the death of Jesse Gelsinger. No one can read these and other case histories in the book without considerable disquiet.

But what is to be done? Pandora's box is already open. We cannot turn back the clock and return to a community of lone scholars, each seeking truth. Modern research in most areas needs massive funding — more than even the richest governments can afford. It is totally unrealistic to place walls between academic institutions and private industry. Universities can, and must, contribute to scientific and technological innovation for wealth creation without compromising their core scholarly principles, academic freedom or essential autonomy. In my opinion, this is becoming even more important as industrial innovations are increasingly the product of small companies, often spun out from universities, while larger corporations concentrate on marketing and selling.

Washburn suggests four fundamental changes. First, she calls for the creation of an independent, third-party licensing body that would assume control over technology-transfer activities in the United States, perhaps allowing some of the more successful campuses to opt out. Second, she has the Bayh–Dole act firmly in her sights, and would have Congress revisit and revise it. In particular, she would change the language so exclusive licensing was the exception and not the norm. Furthermore, she wants the federal government to be able to intercede more easily to provide access to all taxpayer-funded research. The third reform, which would certainly be welcomed in most academic departments, would be to introduce strict conflict-of-interest laws, although the problems in laboratories at the US National Institutes of Health shows how even this might