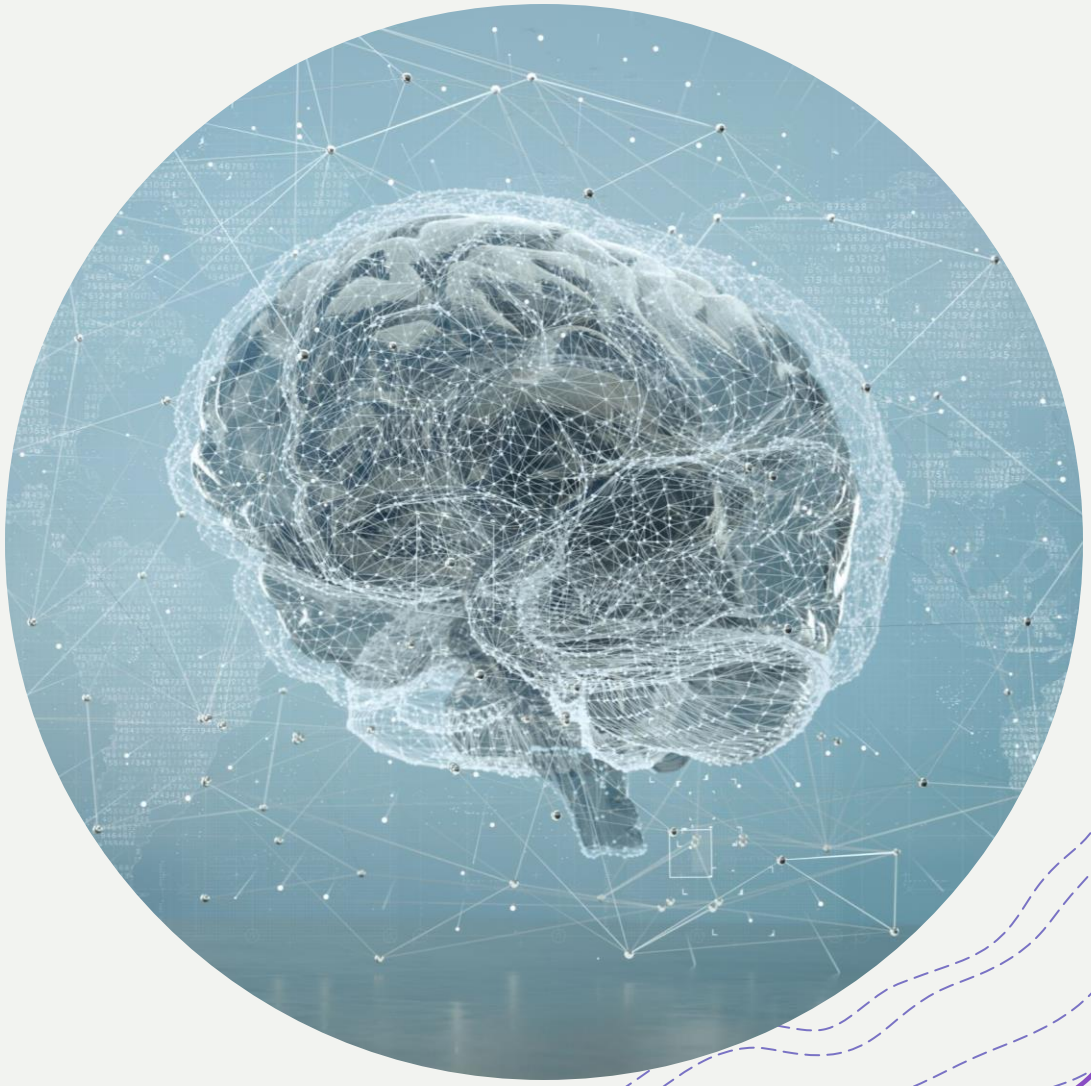
Intelligent Minds and Machines

PSYC 3043

Week 11: Memories, Dreams, and Plans



schedule

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16	Sunday, December 21, 2024	**Final Assignment (Project Milestone #5) Due**

first draft + annotated reference list

+due Nov 17

Annotated Reference List

1. **Smith, J. D., & Brown, L. R. (2019).** *Understanding Cognitive Flexibility in Adolescents*. *Journal of Educational Psychology*, 111(3), 456-472.
   This article provided the foundational framework for my discussion on cognitive flexibility. Smith and Brown's research helped me articulate the concept as a critical skill in adolescence and shaped my argument that cognitive flexibility can improve learning outcomes when properly nurtured. I incorporated their findings on developmental and environmental influences into my first draft's literature review to explain how cognitive flexibility is influenced by external factors, which became essential for building my argument for flexible, adaptive learning environments.
2. **Gardner, H. (2011).** *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.
   Gardner's theory of multiple intelligences influenced my approach to discussing diverse cognitive abilities in adolescents. His framework allowed me to explain how flexibility in thinking may vary among students depending on their dominant intelligence. I used this idea to support my argument for personalized learning strategies in the classroom, mentioning that recognizing multiple intelligences can help educators tailor activities that enhance cognitive flexibility across different student profiles.

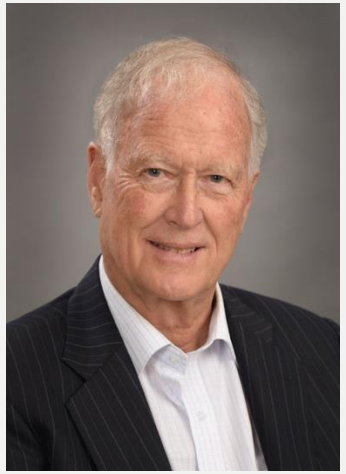
an activity

- everyone gets an event + a time card
- describe the key themes, objects, persons etc. associated with that event at that time
- do not write full sentences
- do not use any kind of tense/time words

an activity

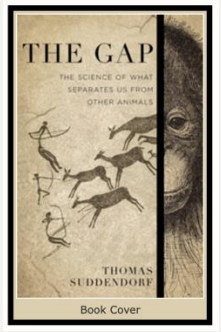
+now try to guess if this is a past or future event

foresight / mental time travel

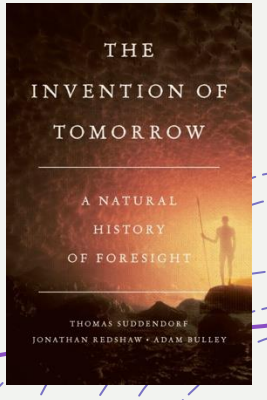


1936-2021
Emeritus Professor
University of Auckland

Professor
University of Queensland



Advisor
The Behavioural Insights Team



why have episodic memory?

- “mental time travel provides increased behavioral flexibility to act in the present to increase future survival chances” (p. 302)
- “our ability to revisit the past may be only a design feature of our ability to conceive of the future” (p. 303)
- “we may be the only species capable of mental time travel because the others competing in our niche have become (or have been made) extinct” (p. 313)

concept check

+learning

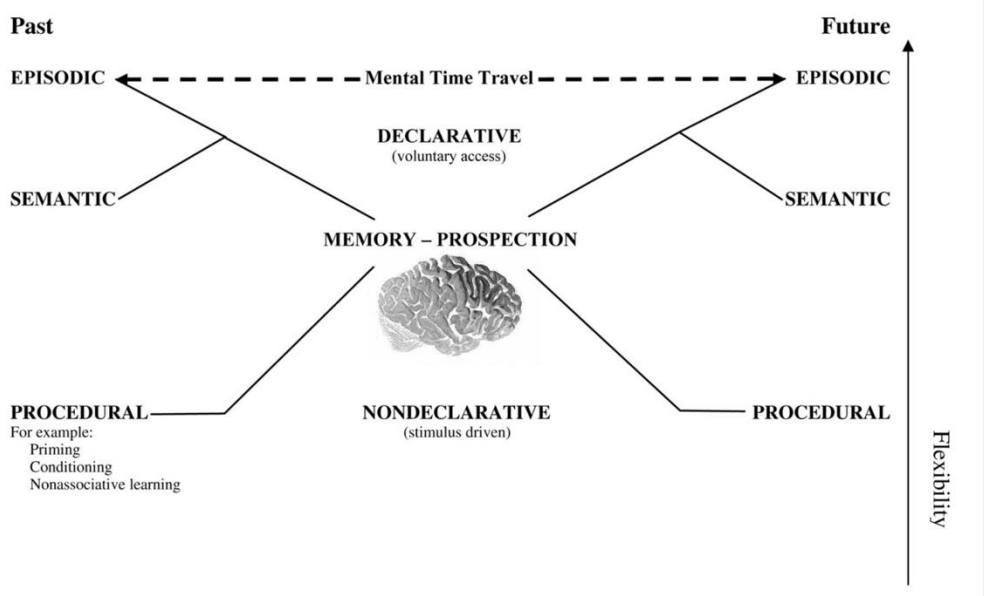
+episodic vs. semantic memory

+prospective memory

+foresight

+mental time travel

+Bischoff-Köhler hypothesis



evaluating the evidence

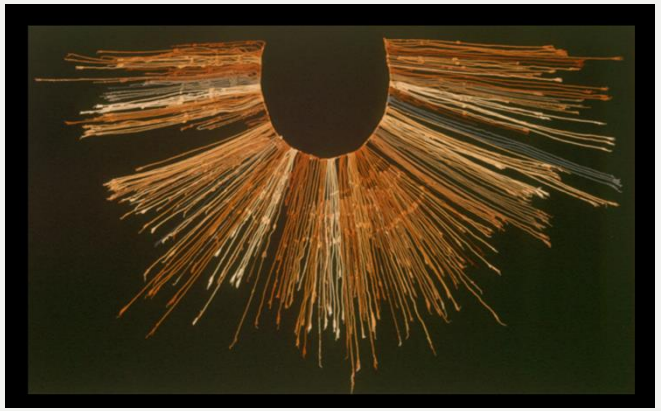
- what is the idea/evidence? why are we (not) convinced?
- human evidence: Jennifer, Emely, Rachel
  - brain imaging: past and future thinking
  - amnesic patients
  - encephalization quotient (EQ): brain vs. body weight
  - practice
- nonhuman evidence: May, Haley, and Ocean
  - rat studies of maze navigation
  - Pavlovian conditioning
  - scrub jays and squirrels (caching food)
  - bonobos and gorillas (grapes and tools, theory of mind, social hierarchies)
  - crows (future use)
  - AI / LLMs

Mulcahy and Call (2006) recently came closest to implementing such a test. They trained bonobos and orangutans to obtain grapes from an apparatus using a tool. Access to the apparatus was then blocked and the animals were presented with a selection of two suitable and six unsuitable tools which they could take into a waiting room from where the apparatus was still visible. An hour later, they were allowed back into the testing room and given access to the apparatus. In 7 out of 16 trials, on average, the apes carried a suitable tool into the waiting room and returned with it to obtain grapes an hour later. There were strong individual differences in performance, with one orangutan achieving 15 out of 16 correct. This orangutan and the best performing bonobo were then tested again, but with an overnight delay between tool selection and return. They still returned with a suitable tool in more cases than expected by chance. A third experiment showed that the apes could pass the task even when they could not see the apparatus during tool selection. The final control study investigated whether the animals merely associated the tool with the reward. Subjects again received a grape reward if they returned with the right tool, but were not actually given an opportunity to use the tool. Performance in this condition was poorer, suggesting that they did plan ahead in the other studies (Mulcahy & Call 2006).

Nevertheless, there are some concerns about this conclusion (Suddendorf 2006). The same tools were appropriate over trials, so apes could have just learned to always return with these same tools. This highlights the importance of the final control condition designed to rule out explanations based on associations. However, this control condition was not given to the successful animals of Experiments 1 to 3, but to a new group of four animals. Two of these never brought the tool back and hence could never have experienced the reward that may have facilitated performance in the previous studies. Thus, their data do not inform us about the power of the reward. The other two performed identically to two animals in Experiment 1. Thus, contrary to what the authors claimed, association cannot be ruled out (Suddendorf 2006).

But even if subsequent studies confirm that great apes can select and keep a different tool for a specific future use, it does not show anticipation of future needs as proposed by the Bischof-Köhler hypothesis. The "future need" potentially anticipated in these studies refers to the "need" for a tool to satisfy a current desire for the treat, not anticipation of a different internal drive or need state (e.g., such as a future desire that is different from present). The studies did not control or manipulate the drive or need state of the subjects, and it is not unreasonable to assume that they all had a desire for grape rewards throughout testing (Suddendorf 2006). Animals that are not capable of conceiving of future drive and need states would have little reason to concern themselves with a remote future, as all they would care about is satisfaction of current needs. More research is required to determine the extent of animal foresight, but at present the limit proposed by the Bischof-Köhler hypothesis has not been falsified.

evolutionary clues and feedback loop



is each object/invention
evidence for foresight? Why or why not?

how does each object/invention
produce selective pressure and feed
back into foresight?

pair – share – think!

a constellation of human-ness?

+what contributes to intelligence? some / all / none?

+stage: primary and secondary representations / memory

+playwright: recursion (imagining infinite futures)

+actors: theory of mind

+the set: physical simulation + notion of time

+the director: metacognition, practice

+the producer: prospective memory

+the broadcaster: communication / language (timescales?)

Does Language Shape Thought?: Mandarin and English Speakers' Conceptions of Time

Lera Boroditsky

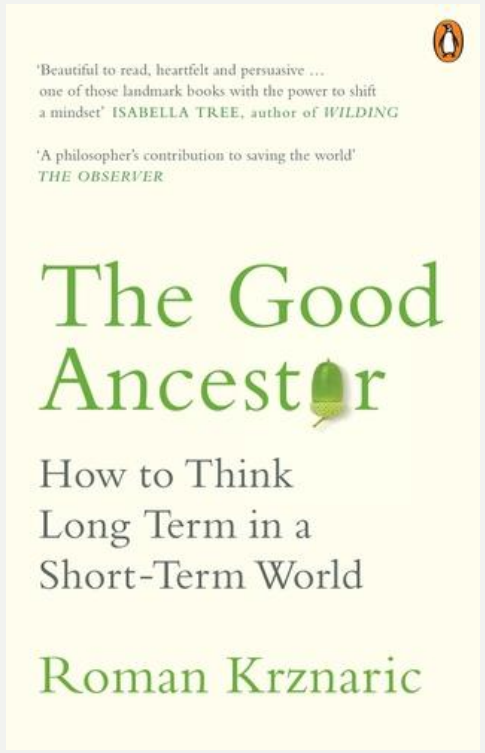
Stanford University

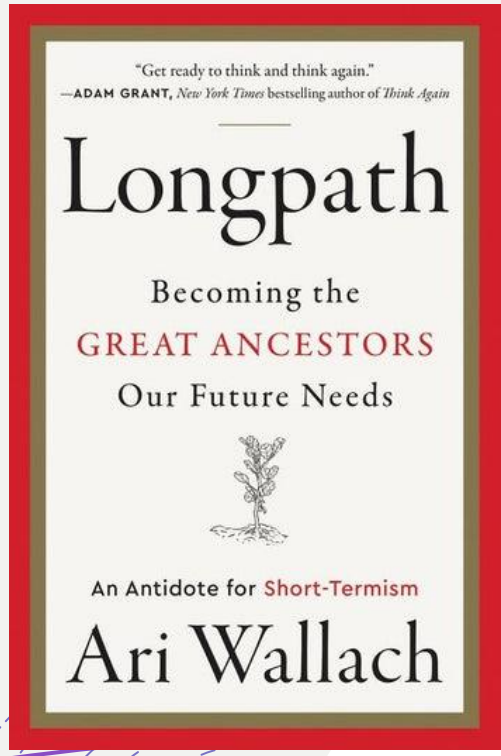
Does the language you speak affect how you think about the world? This question is taken up in three experiments. English and Mandarin talk about time differently—English predominantly talks about time as if it were horizontal, while Mandarin also commonly describes time as vertical. This difference between the two languages is reflected in the way their speakers think about time. In one study, Mandarin speakers tended to think about time vertically even when they were thinking for English (Mandarin speakers were faster to confirm that March comes earlier than April if they had just seen a vertical array of objects than if they had just seen a horizontal array, and the reverse was true for English speakers). Another study showed that the extent to which Mandarin–English bilinguals think about time vertically is related to how old they were when they first began to learn English. In another experiment native English speakers were taught to talk about time using vertical spatial terms in a way similar to Mandarin. On a subsequent test, this group of English speakers showed the same bias to think about time vertically as was observed with Mandarin speakers. It is concluded that (1) language is a powerful tool in shaping thought about abstract domains and (2) one's native language plays an important role in shaping habitual thought (e.g., how one tends to think about time) but does not entirely determine one's thinking in the strong Whorfian sense.

Key Words: Whorf; time; language; metaphor; Mandarin.

why is this important?

- what happens if we find out mental time travel is or is not unique to humans?
- longtermism





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