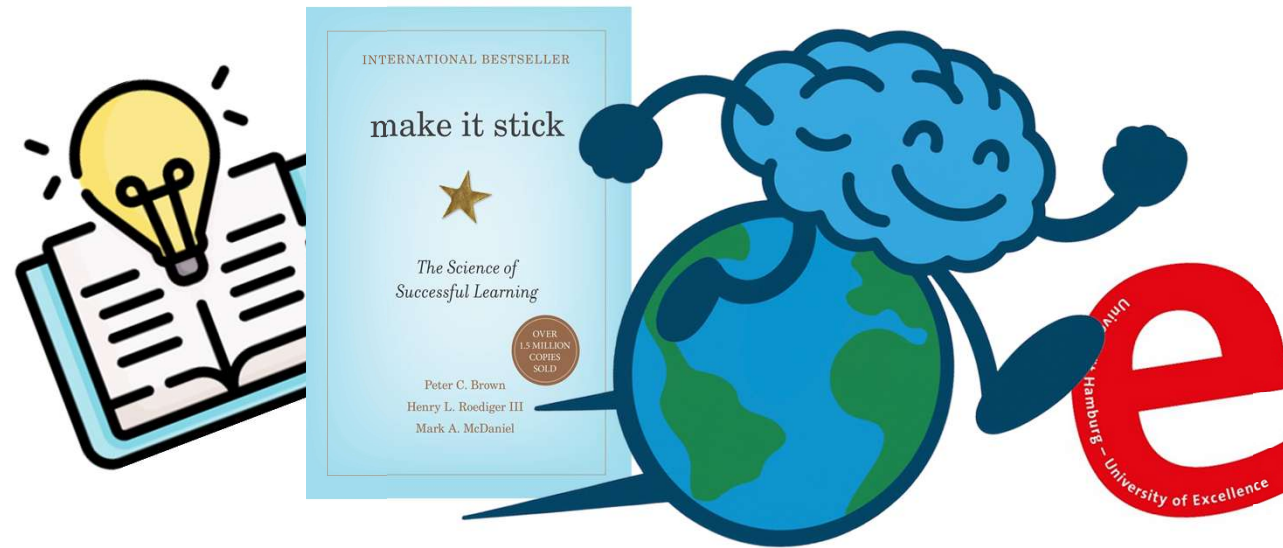




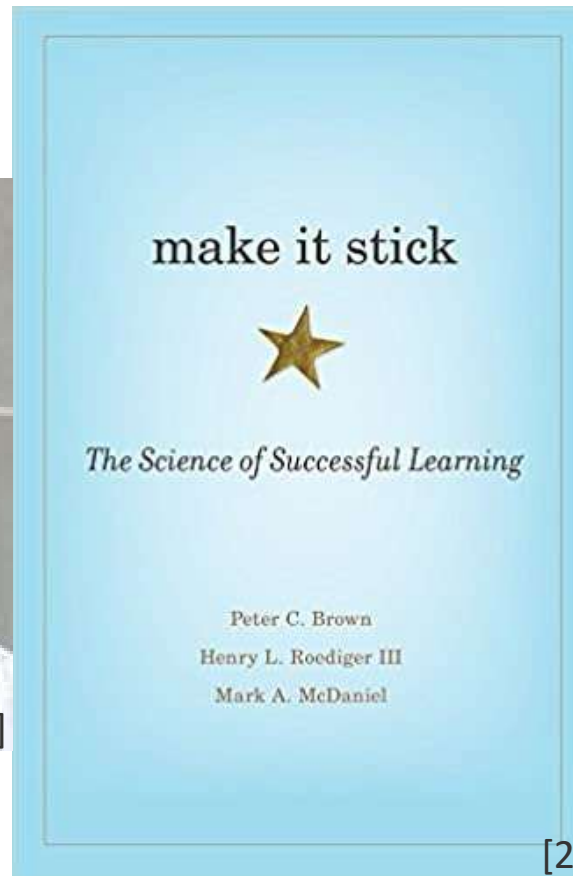
Learn More in Less Time!

(*through science)

Make it stick



Prof. Mark A. McDaniel



[2]



Prof. Henry Roediger III

[3]

Most popular learning strategies



REREADING



HIGHLIGHTING

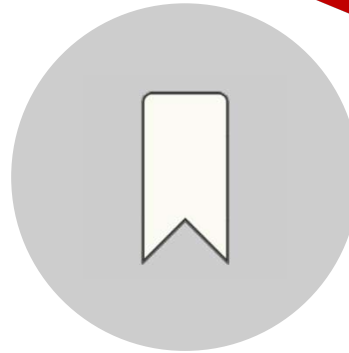


SUMMARIES AND NOTES

INEFFECTIVE learning strategies



REREADING



HIGHLIGHTING

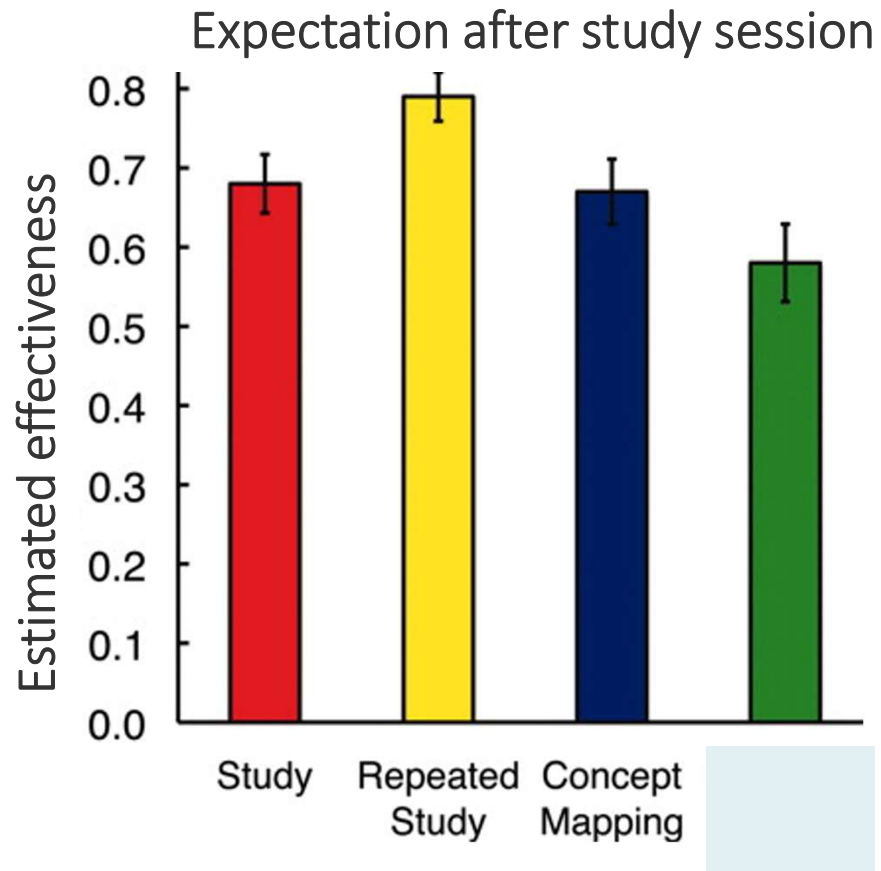


SUMMARIES AND NOTES

Low utility
Dunlosky et al.
2013



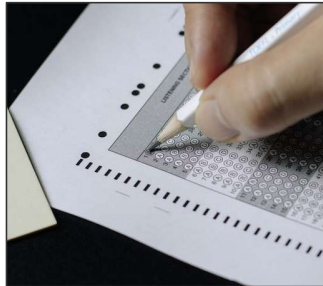
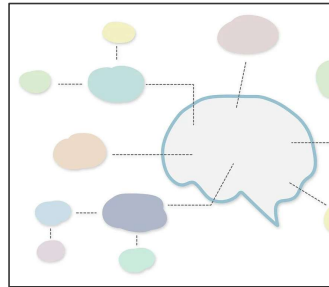
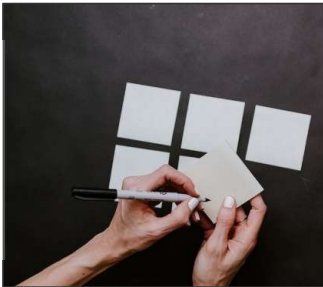
The best learning strategy



Modified from Karpicke & Blunt **Science** 2011

The best learning strategy: Retrieval Practice

Output > Input



Corrective feedback

Corrective feedback!

- Errors
- Knowledge gaps

...through

- Practice exams
- Study groups
- Flashcards / index cards
- Final review

High utility
Dunlosky et al.



Retrieval Practice – Application and Tips



Question system instead of summaries

What is pneumonia?

Which pathogens cause pneumonia? How are they classified?

- What is the most common pathogen?

What is the route of infection?



The more demanding the recall, the stronger the learning effect!



Retrieval Practice

=

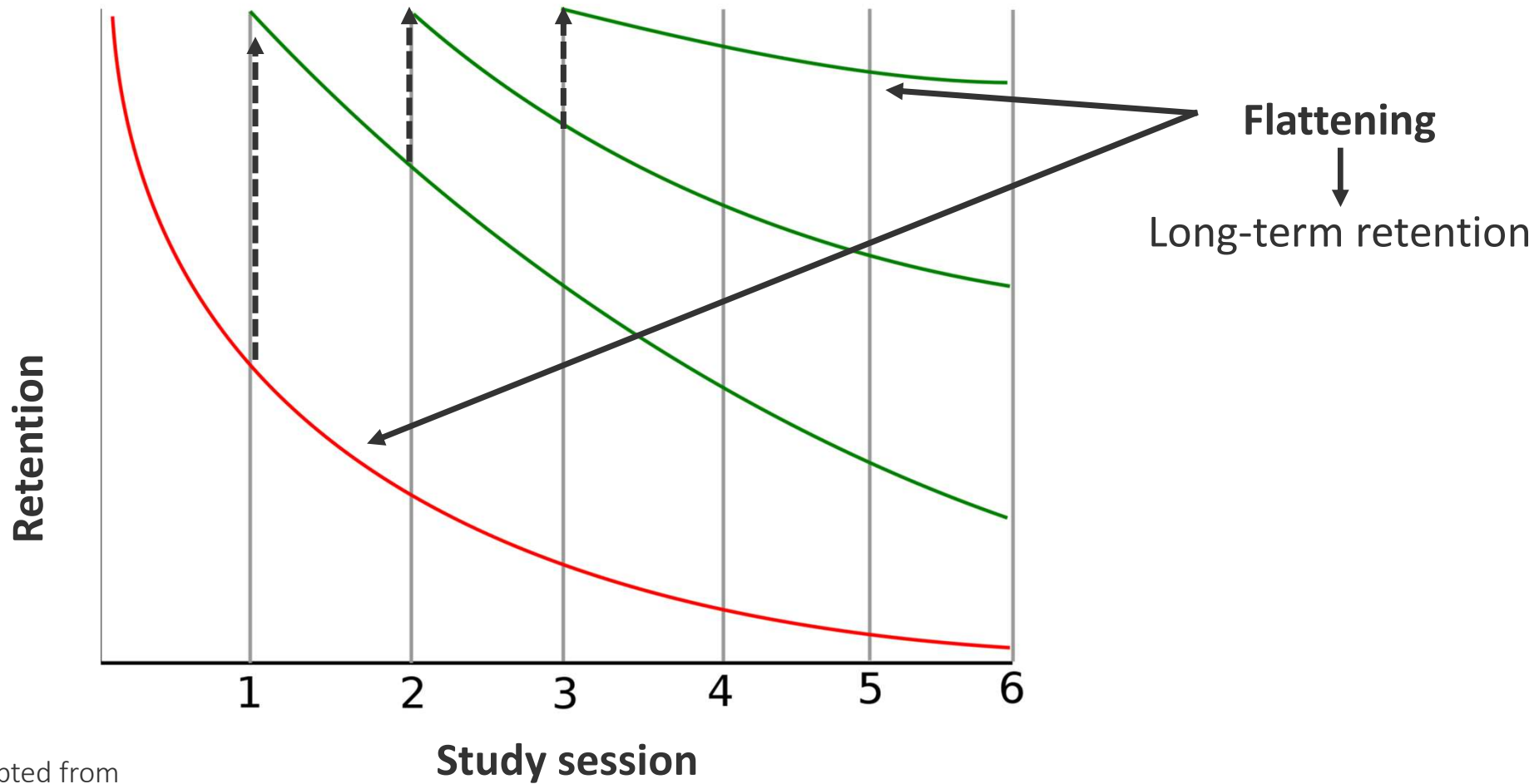
Output > Input

+

Corrective feedback

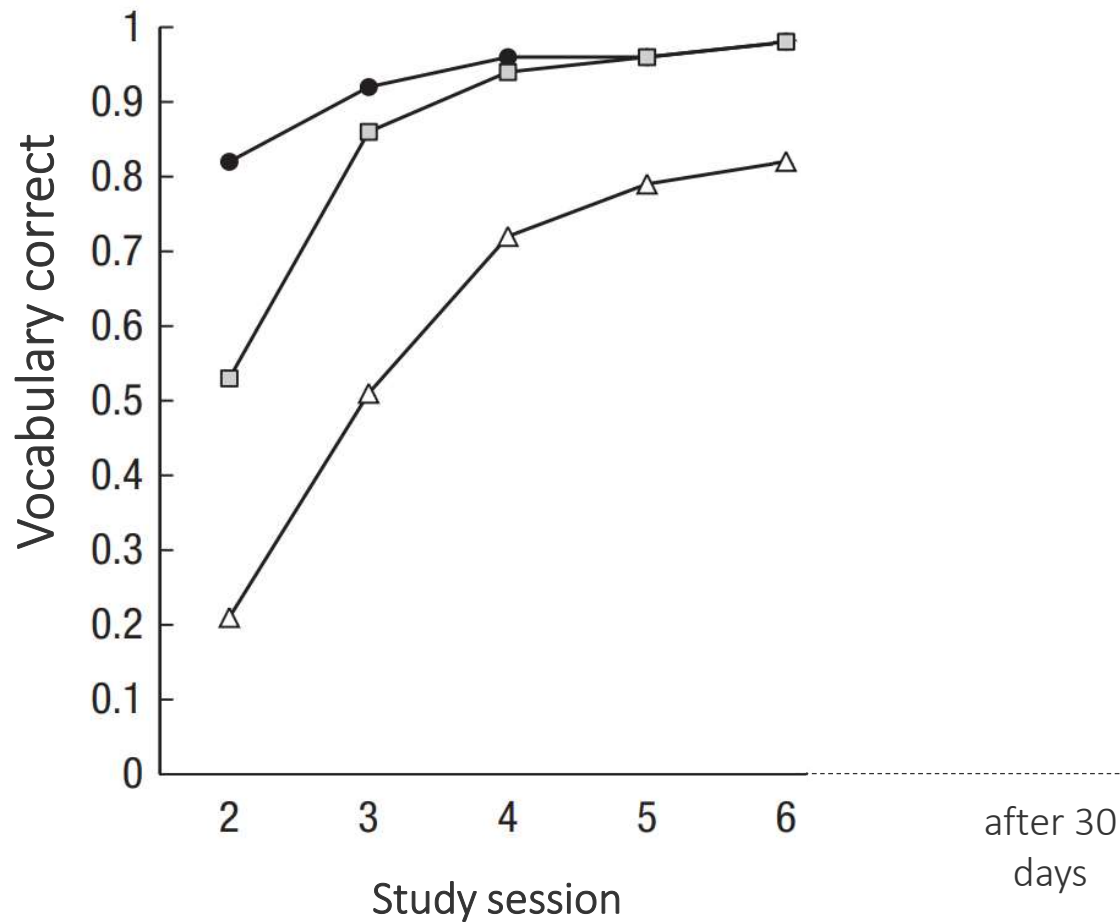


The forgetting curve: how do I structure my learning?





The Spacing Effect



High utility
Dunlosky et al.

- 0 Days Between Sessions
- 1 Day Between Sessions
- △ 30 Days Between Sessions

Bairick, et al. *Journal of Experimental Psychology: Learning, Memory, and Cognition* (1987)



The best way to learn

Retrieval Practice

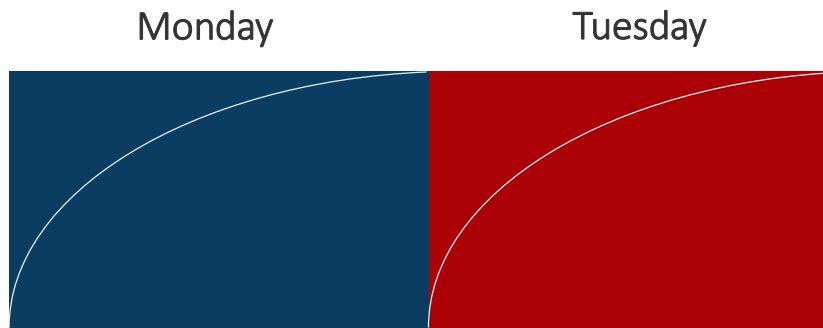
Output > Input

Corrective feedback

+

Spacing

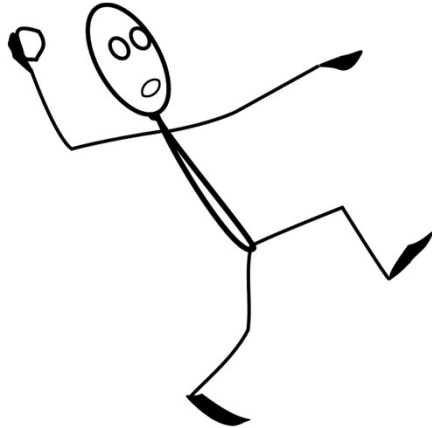
Blocked practice forbidden: Interleaving



Switch topics once improvement is noticeable
(relearning-override effect)

Greater long-term learning
success

More versatile and more
readily applicable



Kerr R, Booth B. Specific and varied practice of motor skill. Percept Mot Skills. 1978



Variation

Vary retrieval practice			
Audience	Type	Place	
Advantages			
Knowledge transferable	Knowledge/motor repertoire more flexible	Transfer of learning	Rule formation
Movements/procedures/manual skills: good evidence			



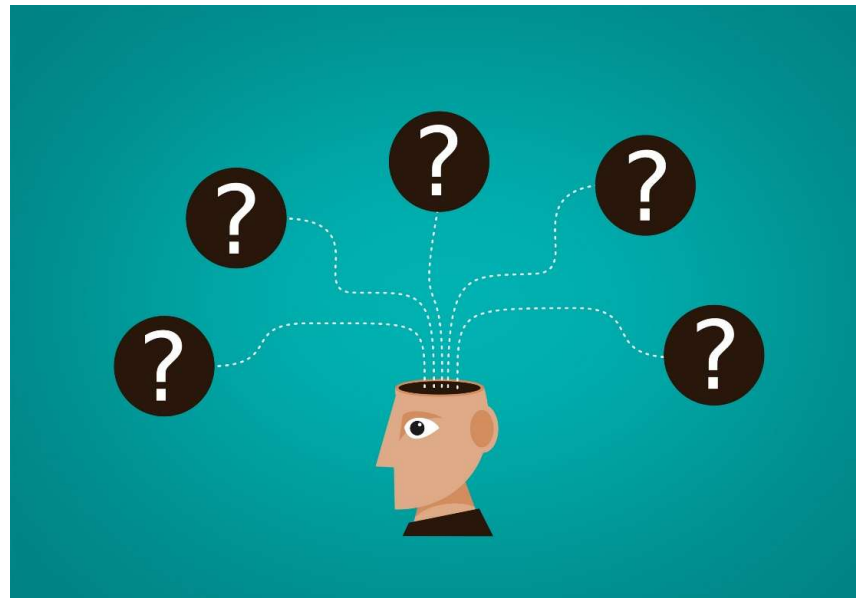
Generation effect

What could this mean?

Generation effect

Solving problems before the solution has been learned

- Brain more receptive
- Remembers the solution better





Better understanding

Overview		Structure building	
Lecture context		Connecting with existing knowledge	Reusing what has already been learned → Analogies

Improving structure building			
Active Recall	Interleaving	Variation	Difficulties

Basic conditions





Have a good start to your studies!

Contact: *melearn@uke.de*