Massed vs. Distributed Practice

CIRTL Learning Community

Distributed Practice is Better!

- Baddeley, A.D. & Longman, D.J.A. (1978). The influence of length and frequency of training session on the rate of learning to type. *Ergonomics, 21(8)*, 627-635.
  - Postmen trained to type alphanumeric post code on typewriter in 3 conditions:
    - 4 hr/day (massed practice)
    - 2 hr/day
    - 1 hr/day (spaced practice)
  - Results: Distributed practice required the fewest hours

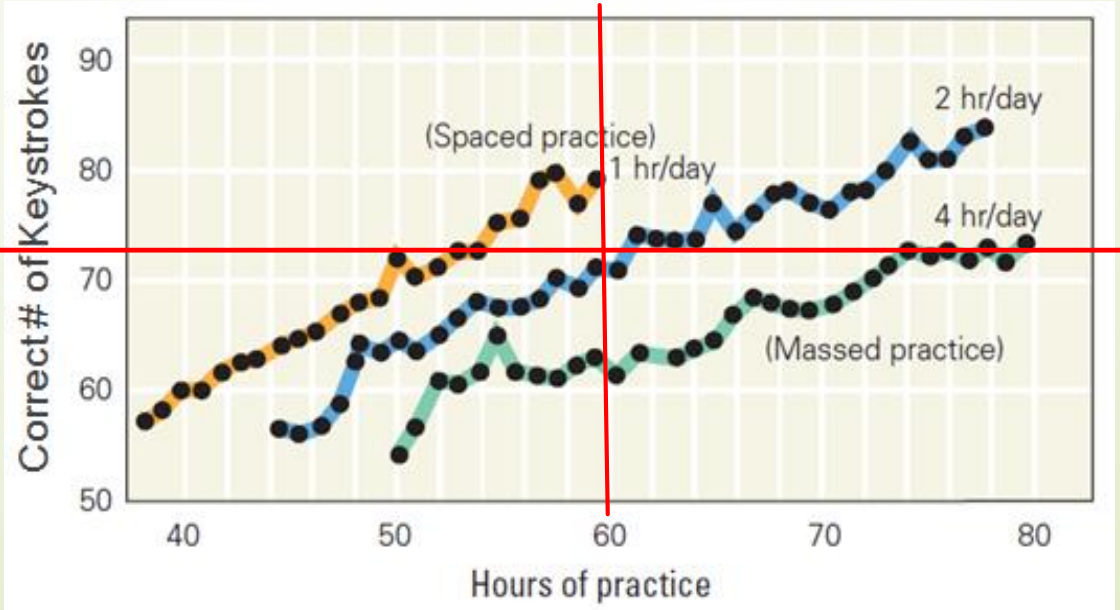


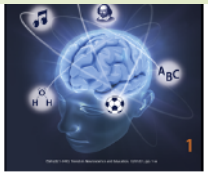
Image: Gluck, M.A., Mercado, E., Myers, C.E. (2014). *Learning and memory: From brain to behavior* (2nd ed.). New York, NY: Worth Publishers.

Why is it better?

ELSEVIER

Trends in Neuroscience and Education

journal homepage: www.elsevier.com/locate/tine



Review article

The effect of distributed practice: Neuroscience, cognition, and education

Emilie Gerbier [a,*], Thomas C. Toppino [b,1]

[a] *Laboratoire d'Etudes des Mécanismes Cognitifs – EA 3082, Université de Lyon , Université Lumière Lyon 2, 5 Avenue Pierre Mendès France, 69500 Bron, France*

[b] *Villanova University, 800 Lancaster Avenue, Villanova, PA 19087, USA*

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ABSTRACT

Education ideally should induce learning that lasts for years and more. A wealth of research indicates that, to achieve long-lasting retention, information must be practiced and/or tested repeatedly, with repeated practice well distributed over time. In this paper we discuss the behavioral, neuroimaging and neurophysiological findings related to the effect of distributed practice and testing as well as the resulting theoretical accounts. Distributed practice and testing appear to be powerful learning tools. We consider implications of these learning principles for educational practice.

Why is it better?

- Deficient processing hypothesis
  - Repeated occurrences of information close in time receive less processing
  - Physiological evidence (pupil dilation, brain imaging)
    - Smaller responses on repeated presentations
- Synaptic plasticity
  - Long lasting changes take time
    - Gene expression, protein synthesis, structural neuronal changes
- Study-phase retrieval hypothesis
  - Reactivation of memories from studying in the past
  - Longer intervals between sessions result in a slower rate of forgetting

Gerbier & Toppino (2015)

Why is it better?

- Memory replay and Sleep
  - Memories are reactivated during sleep
  - Aids in consolidation
  - More sleeps = better memory

Stickgold, R (2005). Sleep-dependent memory consolidation. *Nature, 437(27),* 1272-1278

Katherine Streeter for NPR

In the Classroom?

- Blasiman, R.N. (2017). **Distributed concept reviews improve exam performance**. *Teaching of Psychology, 44(1)*, 46-50.
  - 4 Intro psychology classes (n=98)
    - Group 1: control (no reviews)
    - Group 2: received a 5-10 minute concept review at the beginning of every class

	Control Group		Experimental Group		
Measure	Mean	Standard Deviation	Mean	Standard Deviation	Cohen's *d*
Exam 1	79.73	12.38	81.13	13.92	.07
Exam 2	80.11	11.34	86.66	11.68	.56
Final grade	82.60	14.95	86.45	12.73	.27

Other ideas?