Retrieval practice based on recognition memory: testing the retrieval effort hypothesis

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To cite this version:

Pierre-Yves Jonin, Audrey Noël, Gabriel Besson, Sophie Muratot, Serge Belliard, et al.. Retrieval practice based on recognition memory: testing the retrieval effort hypothesis. UC Irvine International Conference on Learning and Memory, Apr 2018, Irvine, United States. 2018. inserm-01939069

HAL Id: inserm-01939069
https://www.hal.inserm.fr/inserm-01939069

Submitted on 29 Nov 2018

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The finding that taking memory tests improves long-term memory and overcomes repeated studying is called retrieval practice effect or α testing effect (1,2). While it has been much replicated within recall paradigms, a mechanistic account is still lacking. One way to move forward is to test predictions derived from current accounts.

The « Retrieval Effort Hypothesis » states that controlled (effortful) retrieval (e.g recall) supports more elaborate and integrative processing than passive restudying; thus increasing the available retrieval cues (3,4).

Since recognition memory involves much less controlled retrieval than recall, repeated recognition should not yield a retrieval practice effect, especially if familiarity alone supports recognition.

**Aim**

Can recognition memory support a retrieval practice effect?

### 1. Experiment 1: recognition practice vs. restudying

- **Between-subjects design, N = 76**
- **Recognition memory vs. typical Old/New task**
- **Matching for Age, Education, FSIQ, Verbal Memory**
- **Manipulation of the intervening tasks:**
  - 2 successive study trials - Group S
  - 2 successive test trials - Group T
- **Main outcome:** Performance at final test (25 min. delay)

### 2. Results

**Before final test, study duration was on average 11 minutes in the « Study-Test » group, 7.4 minutes in the « Study » group and only 6.3 minutes in the « Test » group.**

- Still, « Study-Test » & « Test » conditions yielded better long-term memory (A,B), without increase in False Alarms (C), and « Test » condition led to better 25 minutes – retention (D).

### 3. Experiment 2: familiarity practice vs. restudying

- **Subjects in the « Study » group spent twice as much time studying AND had up to three times more opportunities to encode the stimuli.**
- **Similar minimal reaction times (msec) were achieved in both groups, well below 400ms, strongly constraining responses to familiarity-based recognition memory (5).**
- **Repeated retrieval was therefore based on automatic & fast processing, rather than slow, effortful, recollection.**

### 4. Results

- **Still, repeated testing proved as beneficial as restudying for short-(A) and long-term(B) retention.**
- **This did not come with an extra false alarms cost (C&D).**

**Time spent studying does not drive learning efficiency.** Instead, Experiment 2 provides unique evidence that learning occurs through repeated familiarity-based retrieval, i.e. even when retrieval is automatic.

### Discussion

- **Experiment 1 shows that the retrieval practice effect can be observed when retrieval is based on recognition memory rather than recall.** Thus, learning does occur during recognition testing.

- Importanty, both experiments show that the benefits of memory retrieval based on recognition memory are immune to negative side effects like extra false alarms.

- When retrieval is constrained to fast and automatic processes (around 320 ms), thus being mostly familiarity-based, the generation of elaborative retrieval cues and or effortful (controlled) processing are quite unlikely. Even then, extensive restudying does not outreach retrieval practice.

- Repeated automatic retrieval yields similar learning levels than extensive restudying, up to a 6 months delay.

- Familiarity-based recognition memory can support a retrieval practice effect, and resists to a 6 months delay similarly to restudying, thus challenging a core prediction of the « Retrieval Effort Hypothesis »

### References