Retrieval practice based on recognition memory: testing the retrieval effort hypothesis
Pierre-Yves Jonin, Audrey Noël, Gabriel Besson, Sophie Muratot, Serge Belliard, Christian Barillot, Emmanuel Barbeau

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
The finding that taking memory tests improves long-term memory and overcomes repeated studying is called retrieval practice effect or in retrieval practice 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 elaborative 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 - Memory group - 2 successive study trials - Probing group - 2 successive test trials - Test group
- Main outcome: Performance at final test (25 min. delay)

**2. Results 1**

- 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 a Test condition led to better 25 minutes retention (D)

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

- Probing familiarity-based recognition memory:
  - The Speed and Accuracy Boosting procedure (SAB) is a speeded Old/New memory test providing a direct estimate of familiarity-based recognition memory (S).
  - Use of the SAB procedure for all test phases
- Between-subjects design, N = 30
- Manipulation of the learning schedules: 1, 2 or 3 repetitions of study trials
- Matching for Age, Education, FSIQ, Verbal Memory
- Main outcomes: Performance at short- and long-term final tests

**4. Results 2**

- Subjects in the Study group spent twice as much time studying AND had up to three times more opportunities to encode the stimuli
- Still, repeated testing proved as beneficial as restudying for short-term (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
- Importantly, 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**