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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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Retrieval Based On Recognition Memory: Testing the Retrieval Effort Hypothesis

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The finding that taking memory tests improves long-term memory and overcomes repeated studying is called retrieval practice effect or 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 control over 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 memory 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—Study Group
- 2 successive test trials—Test Group

Main outcome: Performance at final test (25 min. delay)

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 «Study» condition led to better 25 minutes – retention (D)

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), then being mostly familiarity-based, the generation of elaborative retrieval cues and/or effortful (controlled) processing are quite unlikely. Even there, extensive restudying does not outweigh retrieval practice. Repeated automatic retrieval yields similar learning levels than extensive restudying, up to 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».

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

Results 2

Still, repeated testing proved as beneficial as restudying for short- and long-term retention.
This did not came 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.

References

(3) Pye & Besson (2002). Testing the retrieval effect hypothesis: Does greater difficulty correctly recalling information lead to higher levels of memory? Journal of Memory and Language, 45, 437-447.

(6) Experiment 1 provides the first evidence for a retrieval practice effect based on recognition memory. However, a contribution of controlled recollective processes cannot be ruled out, which is addressed in Experiment 2.