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

HAL Id: inserm-01939069
https://www.hal.inserm.fr/inserm-01939069
Submitted on 29 Nov 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.
Retrieval Based On Recognition Memory: Testing the Retrieval Effort Hypothesis

Jonin Pierre-Yves (1,2,3), Noël Audrey (4), Besson Gabriel (4), Muratot Sophie (2), Belliard Serge (4), Barillot Christian (4), Barbeau Emmanuel (4),

(1) Centre de Recherche Cerveau et Cognition, CNRS UMR 5149, Toulouse, France; (2) Inria, Unité-Projet VisAGeS, Université de Rennes 1, INSERM, CNRS, IRISA, U. 1228, Rennes, France; (3) CHU Pontchaillou, Service de Neurologie, Rennes, France; (4) Laboratoire de Psychologie: Cognition, Comportement et Communication, EA1185 LP3C, Université de Rennes 2, Rennes, France

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

4. Results

- Between-subjects design, N = 76
- 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

- « 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)

- « Study » group spent twice as much time studying, AND had up to three times more opportunities to encode the stimuli

- Similar minimal reaction times (minRTs) 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

- 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

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 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

- « Study » vs. « Test » group
- Manipulation of the learning schedules: 1, 2 or 3 repetitions of study trials – Test group
- Matching for Age, Education, FSIQ, Verbal Memory
- Main outcomes: Performance at short- and long-term final tests

1. Experiment 1: recognition practice vs. restudying

- Between-subjects design, N = 76
- Recognition memory= 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)

- 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?

References

(3) Pyke & Bannigan (2000) Testing the retrieval effort hypothesis: Does greater difficulty correctly recalling information lead to higher levels of memory? Journal of Memory and Language, 45, 437-447
(6) Reference 4 is a key study in the field of memory retrieval and its effects on subsequent memory.