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Retrieval Based On Recognition Memory: Testing the Retrieval Effort Hypothesis

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1 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.

2 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).

3 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.

4 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 test trials=
    - Study + group
  - 2 successive test trials=
    - Test + group
- 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).

- 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.

3 Experiment 2: familiarity 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

- 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 (minRTs) were achieved in both groups, well below 400ms, strongly constraining responses to familiarity-based recognition memory (S).

- Repeated retrieval was therefore based on automatic & fast processing, rather than slow, effortful, recollection.

- 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