Testing Potentiates New Learning, The Role of Strategy Change and List Segregation

Shaun Boustani, Caleb Owens
School of Psychology, University of Sydney

Address Correspondence to: Shaun.Boustani@Sydney.edu.au

Background

- Test potentiated new learning (TPNL) is the finding that previous retrieval tasks facilitate better learning of subsequently studied materials than restudy tasks (Chan, Meissner, & Davis, 2018).
- Recent reviews highlight that although this is a robust and reliable effect the mechanisms proposed to explain TPNL are narrow in scope and specific to adopted methods and materials (Chan, Meissner, & Davis, 2018, Yang, Potts, & Shanks, 2014).
- One theoretical account which has received some support is that retrieval attempts promote metacognitive strategies which enhance subsequent encoding and retrieval of new materials (Chan, Manley, Davis, Szpunar, 2018). However, what types of strategies are adopted and how they improve learning is still largely unknown.

Aims

- Replicate the TPNL effect (using a short-lag).
- Evaluate if the magnitude of TPNL is impacted by using tasks promoting different strategy changes (List Discrimination and Category Judgement tasks).
- Assess the importance of conceptual reorganisation of list items.

Hypotheses

- We expected that a robust TPNL effect would be observed, and that retrieval aids in the ability to discriminate between sources of information (Karpicke, Lehman, & Aue, 2014) and promotes adoption of qualitatively different strategies (Finley & Benjamin, 2012).
- Therefore, we hypothesised retrieval would potentiate new learning to a greater extent than restudy, and that list discrimination, known to promote source distinction, would produce greater new learning than category judgements, known to promote conceptual reorganisation.

Design and Method

- Two experiments using word lists comparing recall rate and intrusions:
  - **Exp. 1**: Compared Interval Tasks (Retrieval; List Discrimination; Restudy; Category Judgement)
  - **Exp. 2**: Compared Retrieval and Restudy manipulating word list relation and structure (Randomised; Structured; Mixed Relation)

<table>
<thead>
<tr>
<th>Category</th>
<th>Original Learning (List 1)</th>
<th>Repeat Learning (List 2)</th>
<th>New Learning (List 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrieval</td>
<td>S1 M S2</td>
<td>S2 M S3</td>
<td>S3 M T3</td>
</tr>
<tr>
<td>Restudy</td>
<td>S1 M S1</td>
<td>S2 M S2</td>
<td>S3 M T3</td>
</tr>
<tr>
<td>Other</td>
<td>S1 M O1</td>
<td>S2 M O2</td>
<td>S3 M T3</td>
</tr>
</tbody>
</table>

Results

- **Exp. 1**: A One-Way ANOVA found significant differences between interval tasks on recall rate and intrusions. Follow-up analyses revealed retrieval and list discrimination promoted new learning to the largest extent, with no significant difference between category judgements and restudy.
- **Exp. 2**: A Two-Way ANOVA (Interval Task by List Structure) found a significant main effect of interval task, with retrieval promoting greater new learning. There were no significant differences between list structures and no significant interactions.

Significance

- Replicated TPNL with a short-lag (1-minute).
- Demonstrated significant differences in new learning dependent on interval tasks with retrieval producing the largest TPNL followed by list discrimination. Interestingly, category judgements did not produce TPNL.
- Found no evidence for a role of conceptual reorganisation.
- Collectively, these results suggest that retrieval promotes new learning by increasing the ability to discriminate between sources of information.