

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 strategy changes 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

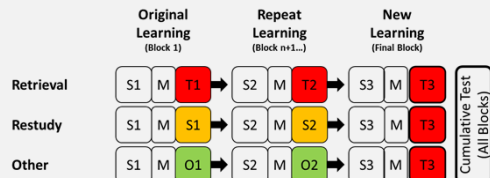
- Replicate the TPNL effect (using a short-lag).
- Evaluate if the magnitude of TPNL is impacted by using tasks promoting different strategy changes (List Discrimination and Category Judgement tasks).
- Assess the importance of conceptual reorganisation of lists.

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:
 - **Experiment 1:** Compared Interval Tasks (Retrieval; List Discrimination; Restudy; Category Judgements)
 - **Experiment 2:** Compared Retrieval and Restudy manipulating word list relation and structure (Randomised; Structured; Mixed Relation)



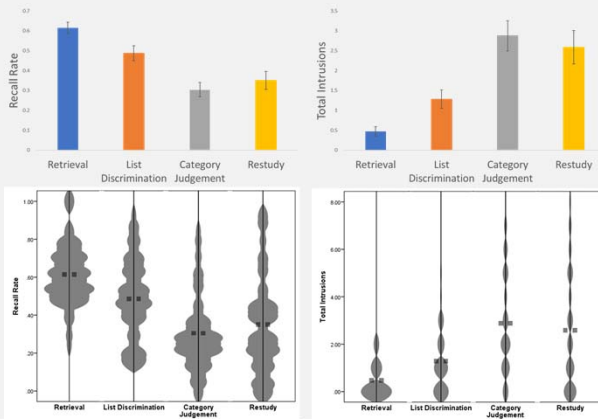
Exp. 1

Category	Structured			Randomised			Mixed Relation		
	List 1	List 2	List 3	List 1	List 2	List 3	List 1	List 2	List 3
Animals	Cow	Dog	Tiger	Trumpet	Monsoon	Tiger	Dog	Diamond	Horse
Fruits	Horse	Lion	Elephant	Violin	Plum	Wind	Uncle	Cat	Hours
Instruments	Bear	Cat	Deer	Tomato	Lion	Peach	Apple	Miles	Blue
Weather	Kiwi	Plum	Orange	Rain	Sleet	Snow	Sunshine	Cloud	Chair
Other	Banana	Grape	Apple	Thunder	Cat	Apple	Nail	Flea	Tiger
	Tomato	Pear	Peach	Tornado	Clarinet	Piano	Grape	Sergeant	Hips
	Violin	Trombone	Tuba	Flute	Pear	Orange	Organ	Muscle	Banjo
	Trumpet	Guitar	Piano	Banana	Guitar	Elephant	Lion	Cymbal	Worm
	Flute	Clarinet	Drum	Horse	Hill	Flood	Magazine	Pear	Brought
	Tornado	Sleet	Wind	Bear	Dog	Deer	Knife	Orange	Peach
	Rain	Hill	Snow	Cow	Grape	Tuba	Window	Church	Banana
	Thunder	Monsoon	Flood	Kiwi	Trombone	Drum	Hornet	Bear	Steel

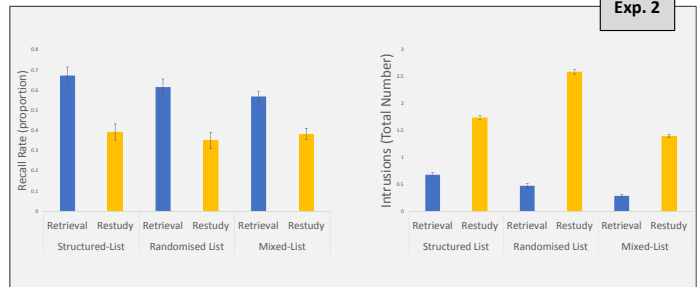
Exp. 2

Results

Exp. 1



Exp. 2



Significance

- **Experiment 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.
- **Experiment 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.

- 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.