

Does testing potentiate new learning that is equal to, or greater than, initial learning? Evidence for Resource Depletion Accounts

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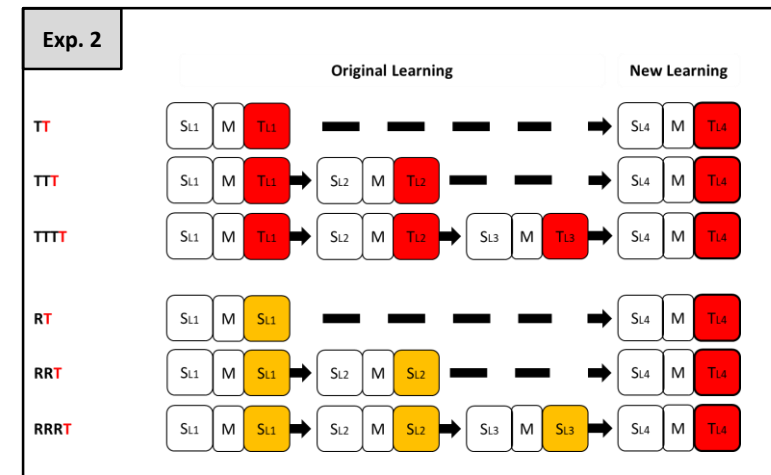
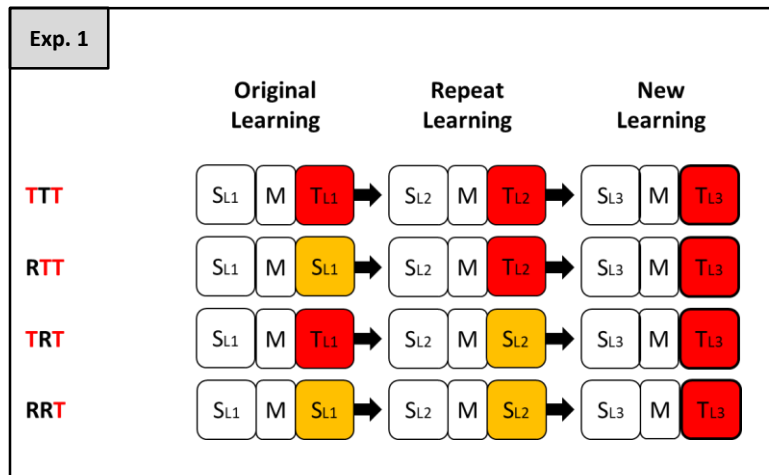
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Background and Aims

- **Test-potentiated new learning (TPNL)** is the finding that previous testing facilitates learning of subsequently studied materials, relative to restudy (Szpunar et al. 2008). Several theories have been proposed to explain TPNL, however few have been evaluated (Chan et al. 2018).
- Whether testing potentiates new learning which is equal to or greater than original learning, the impact of restudy on new learning, and whether the TPNL effect grows when more lists are used, are theoretically relevant questions for two reasons:
 1. It allows us to broadly compare metacognitive theories and resource theories of TPNL.
 - **Metacognitive theories** argue that TPNL is caused by testing facilitating a shift to more efficient encoding strategies. These predict that the magnitude of new learning will be larger than original learning.
 - **Resource theories** argue that TPNL is caused by either a reduction in proactive interference (PI account), or the reset of encoding resources (ROE account). These predict that new and original learning will be identical. They also predict that previous restudy will negatively impact new learning.
 2. It also allows to compare the PI and the ROE accounts.
 - The PI account predicts that a greater number of lists means a larger build-up of interference, and therefore larger TPNL magnitude.
 - The ROE account argues that resource depletion occurs early and TPNL magnitude is consistent.

Design and Methods

- Two experiments using word lists compared recall rate and intrusions. In both experiments a ‘blocked’ TPNL procedure was used (participants study a list of words, take a test or restudy those words, and then study a new list of words).
 - Experiment 1 (2x4):** Compared Interval Tasks (Testing; Restudy) by Schedule (TTT; RTT; TRT; RRT)*
 - Experiment 2 (2x3):** Compared Interval Tasks (Testing; Restudy) by Number of Interval Tasks (One; Two; Three; Four).**

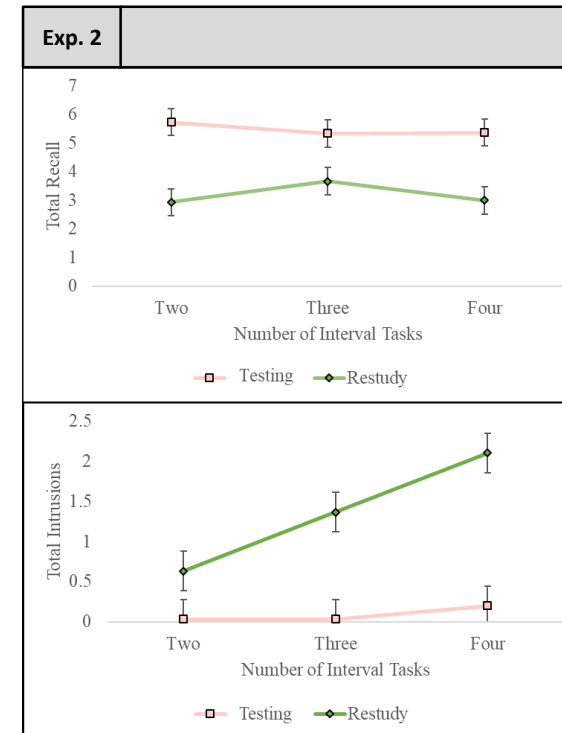
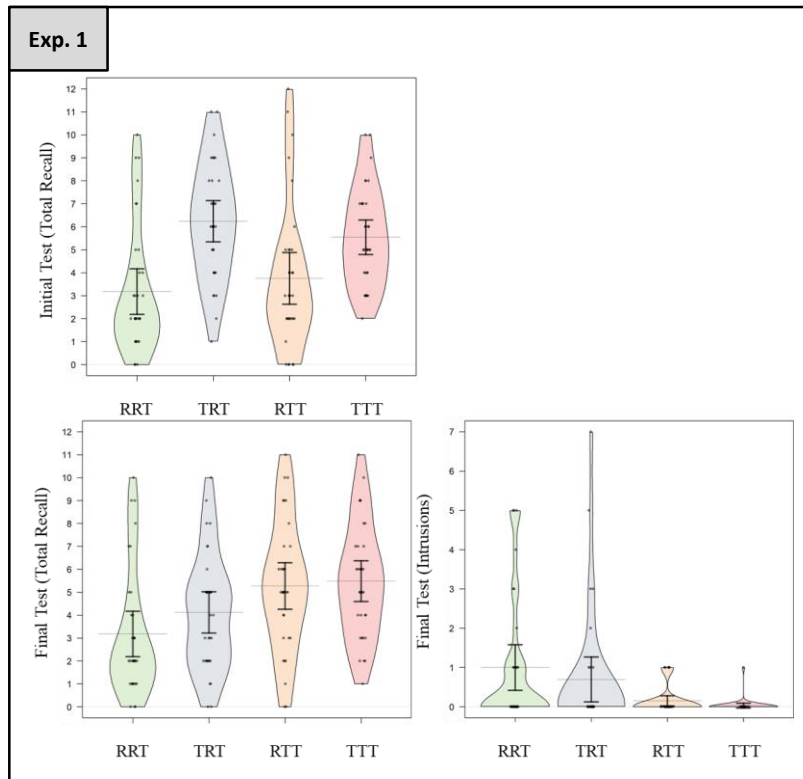


*T stands for a testing interval task. R stands for a restudy interval task. Recall rate for the initial and final test were compared, previous list intrusions in the final list were compared.

**In Experiment 2, Final list recall rate and previous list intrusions were compared.

Results

- **Experiment 1:** In the testing only condition (TTT) recall rate was identical in the initial and final tests, indicating equal original and new learning. A proceeding restudy task resulted in worse recall on the subsequent test, this reduction was in proportion with the number of intrusions.
- **Experiment 2:** TPNL magnitude was consistent across trials, this was despite a steady increase in the number of previous list intrusions in the restudy condition.



Significance

- TPNL was replicated using a new set of materials.
- The new learning potentiated by testing was equivalent to original learning, meaning that the **results supported resource theories.**
- Previous restudy tasks resulted in worse learning of the following list. This negative impact was reversed by testing which reset new learning to original levels. This is consistent with both resource theories.
- However, despite an increase in intrusions in the restudy condition, TPNL magnitude was consistent as the number of lists increased. This indicates **support for ROE over PI accounts.**