Retrieval practice transfer effects for multielement event triplets

Jade S Pickering [a,b], Lisa M Henderson [b], Aidan J Horner [b]
[a] University of Southampton, UK; [b] University of York, UK

UNIVERSITY *of York*

1. INTRO

- Retrieval Practice (RP) **actively contributes to long-term learning relative to re-exposure** (restudy) [1].
- **Does RP allow for transfer to untested but related information?**
- Pattern completion[2] could be one mechanism that allows for transfer to associated information.
- Registered Report assessed RP for both directly tested and associated but untested material for multielement triplets[3].

2. METHOD

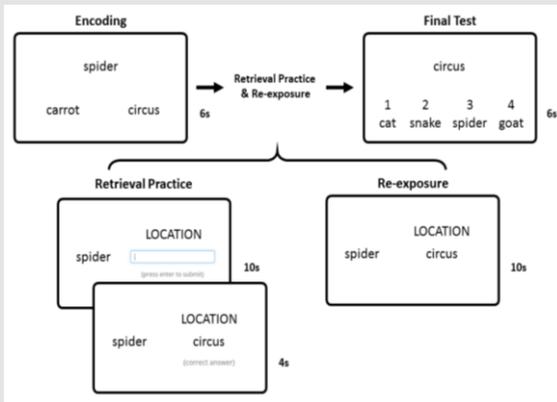- 113 participants aged 18-35 (mean age 26.56) recruited via Prolific.

Fig 1. Participants viewed 54 event triplets during an encoding phase, immediately followed by retrieval practice and re-exposure to one pairwise association (presented in both directions) from 1/3 of the triplets each e.g. *animal – location* and *location – animal*. 2 days later they returned for a final multiple-choice test on all pairwise associations from all 54 triplets in both directions.
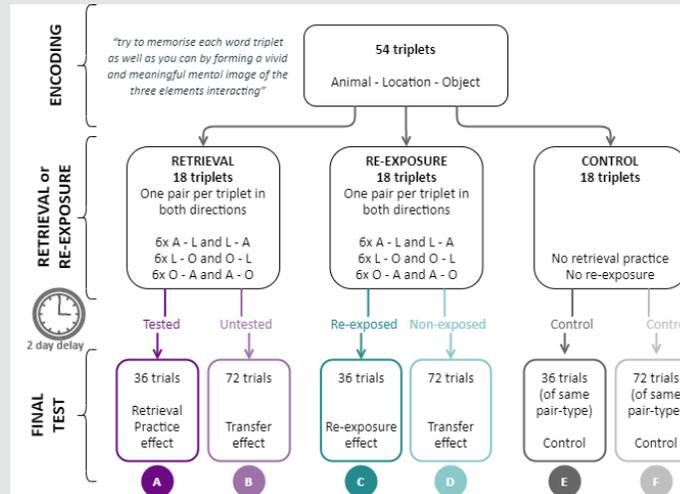

Fig 2. Participants were only tested on, or re-exposed to, one pairwise association from each triplet, leaving one element and two pairwise associations untested-/non-exposed, in order to assess **transfer from tested to untested material**.
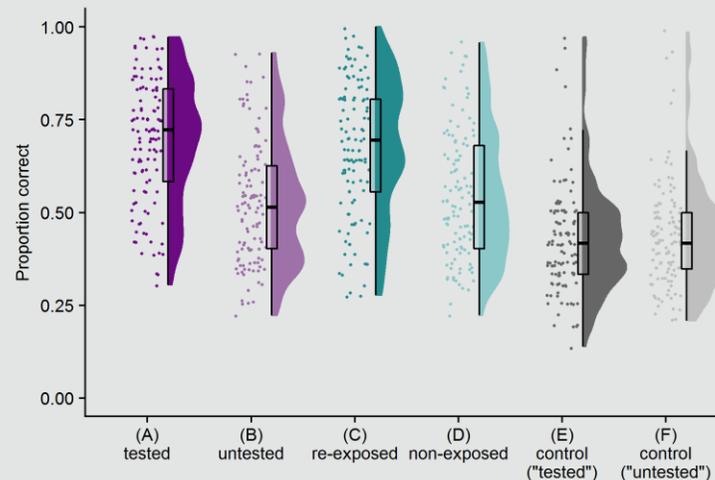

Fig 3. Raincloud plots show each participants' raw data (horizontally jittered), a boxplot, and split half violin of the density for each pair-type at final test.

3. RESULTS

Retrieval practice effect:

- Tested retrieval practice associations > control associations ($t(112)$ = 17.04, $p < 0.001$, BF_{10} = 4.25 x 1029, d = 1.65). *See (A) and (E) on Fig 3*.
- No difference between tested retrieval practice associations and re-exposed associations ($t(112)$ = 1.48, p = 0.07, BF_{10} = 0.30, d = 0.10). *See (A) and (C) on Fig 3*.

Transfer from tested to untested material:

- Untested retrieval practice associations > control associations ($t(112)$ = 8.72, $p < 0.001$, BF_{10} = 2.37 × 1011, d = 0.57). *See (B) and (F) on Fig 3*.
- No difference between untested retrieval practice associations and non-exposed associations ($t(112)$ = 1.63, p = 0.94, BF_{10} = 0.38, d = -0.11). *See (B) and (D) on Fig 3*.

4. DISCUSSION

- **Retrieval practice offered no additional benefit over re-exposure.** This may be because re-exposure elicits some automatic retrieval when the information is highly-integrated, and thus the two conditions were not as distinct as anticipated.
- **Transfer does occur for related but untested material.** If retention of untested related material can be boosted, this enhances the pedagogical value of retrieval practice.
- **Future research** should examine boundary conditions for RP versus re-exposure and conditions of transfer to untested but related material.

References: [1] Roediger, Putnam, & Smith (2011) doi: 10.1016/B978-0-12-387691-1.00001-6; [2] Marr (1971) doi: 10.1098/rstb.1971.0078 ; [3] Horner & Burgess (2014) doi: 10.1016/j.cub.2014.03.012