

Is the pre-testing effect driven by curiosity?

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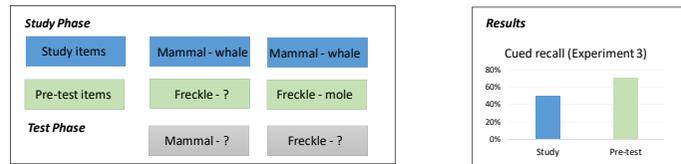
Introduction

According to *Forbes* magazine, in the 12 months up May 2021, who was the highest earning sportsperson in the world?

If you don't know the answer to this question, then you may have made a **guess** about who it is, and you may be **curious** to know the answer. In separate lines of research, both guessing and curiosity have recently been linked with long-term memory benefits.

The effects of guessing (the pre-testing effect)

Kornell, Hays and Bjork (2009) pioneered a paradigm to explore the effects of guessing the answer that a participant could not know.

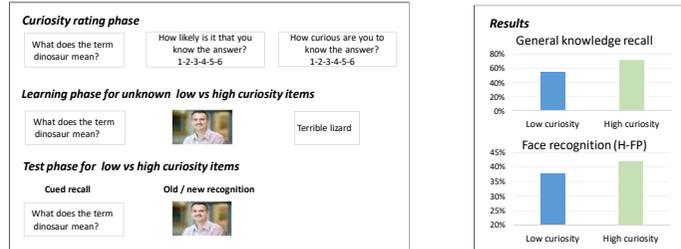


Across a series of experiments, they found that guessing followed by feedback boosted memory, relative to study-alone, a finding that has been repeatedly replicated (e.g. Potts & Shanks, 2014, Seabrooke et al, 2019a, Seabrooke et al, 2021).

Of particular relevance here, as well boosting memory for the target material, guessing has been shown to elicit higher ratings of curiosity about the answer (Potts, Davies & Shanks, 2019), and motivation to learn the answer (Seabrooke et al, 2019b).

The effects of curiosity

Gruber, Gelman and Ranganath (2014) developed a paradigm to investigate the direct effects of curiosity on subsequent learning of general knowledge materials.



The key finding was that curiosity boosted memory for both the target, and incidental material encountered while curious. This was taken as evidence for a generalised state of curiosity that drives learning

Experimental hypothesis

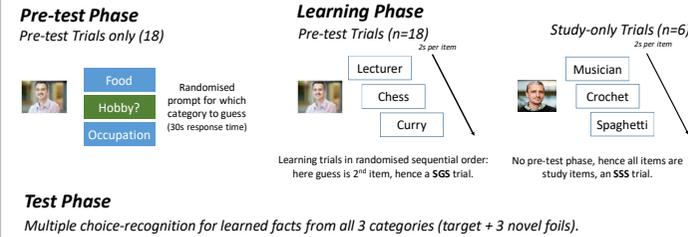
If guessing boosts curiosity, does this mean that the pre-testing effect is *driven by* the same mechanism as the curiosity?

If so, then one might expect to see incidental memory benefits for material encountered between a guess, and revelation of the final answer. We tested this idea in two studies.

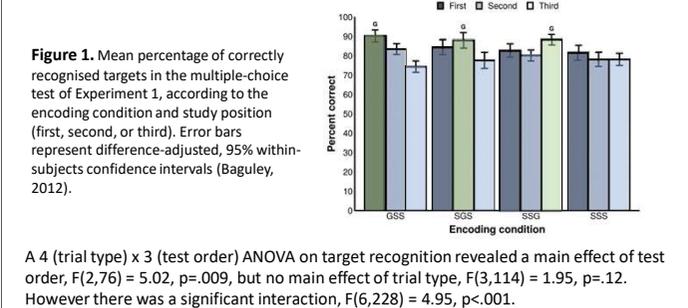
Experiment 1

This experiment used a modified version of the procedure used by Seabrooke et al (2019b), in which novel faces were paired with 3 facts, one of which was guessed. Participants then saw the 3 to-be-learned facts in sequential order, meaning that the study-only facts could be presented prior to the guessed fact (in a high curiosity state) or after the guessed fact (in a low-curiosity state).

Method (n=40)



Results



A 4 (trial type) x 3 (test order) ANOVA on target recognition revealed a main effect of test order, $F(2,76) = 5.02, p=.009$, but no main effect of trial type, $F(3,114) = 1.95, p=.12$. However there was a significant interaction, $F(6,228) = 4.95, p<.001$.

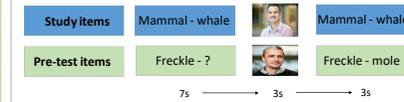
Comparison of guessed items, and studied items from guess trials, to the equivalent trials from the study only (SSS) condition revealed a **reliable guessing benefit for the guessed items (88.9% vs 79.3%)**, but no benefit for the studied items associated with guesses, regardless of whether they appeared before or after the guess.

Experiment 2

This experiment used a modified version of the Kornell, Hays and Bjork (2009) procedure, with an incidental face presented either mid-trial (for Study items) or just prior to the presentation of the corrective feedback for Pre-test items:

Method (n=44)

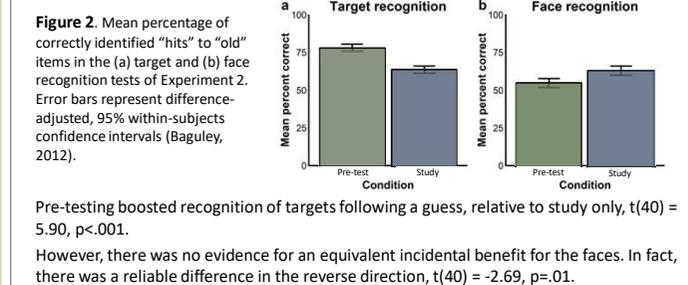
Study Phase



Test Phase

Old / new recognition tests for target words, and for faces.

Results



General Discussion

In two experiments, we ran pre-testing experiments with the addition of incidental learning material between the guess and the final corrective feedback. **Both experiments demonstrated a pre-testing effect for target recognition.** Thus the pre-testing effect can survive the interpolation of up to 2 irrelevant items before feedback (Experiment 2, SSG condition).

In contrast, **neither experiment demonstrated a benefit for items incidentally presented while participants were waiting for their guess to be resolved.** Experiment 1 found a null effect, and Experiment 2 found the reverse effect.

Thus, neither experiment provided support for the idea that pre-testing induces a generalised state of curiosity, but rather suggest that the pre-testing effect has a highly specific benefit to memory for the corrective feedback related to the original error.

Acknowledgements

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Answer: Conor McGregor, MMA, earning \$180Million