The multiple encoding benefit: Encoding specificity does not hinder the generalizability of visual long-term memory

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Introduction

- Visual long-term memory (VLTM) retrieval is enhanced following multiple encoding opportunities
- This may result from the multiple encoding benefit (MEB)
- The encoding specificity principle (Tulving & Thompson, 1973) suggests best memory performance when encoding and retrieval contexts match
- In typical MEB experiments, this may reduce retrieval success in **new** contexts (limited generalizability)

Does encoding specificity over multiple encoding opportunities hinder generalization of VLTM to new contexts?

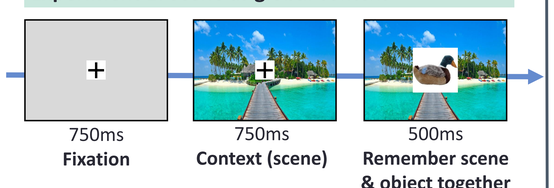
Methods

Encoding

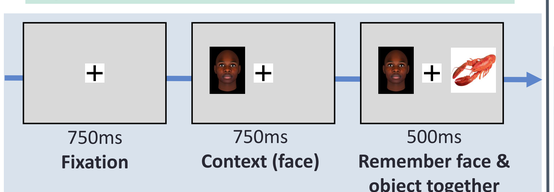
- Contexts can be global (comprised of multiple features) or local (less complex), each affecting context reinstatement differently (Eich, 1985; Smith, 1986; Smith & Manzano, 2010)

Total 630 trials of 270 unique objects

Experiment 1: Scene as **global** context



Experiment 2: Item (face) as **local** context

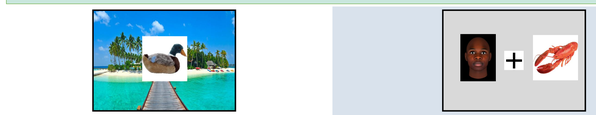


Encoding conditions:

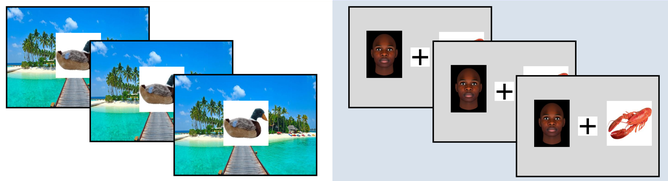
Randomized presentation of objects once (baseline) or three times throughout encoding in one of **three contexts** at a time

Experiment 1 | **Experiment 2**

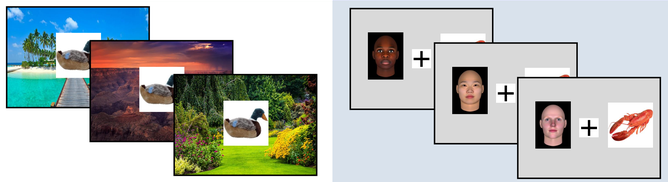
Baseline



Consistent encoding context



Variable encoding context

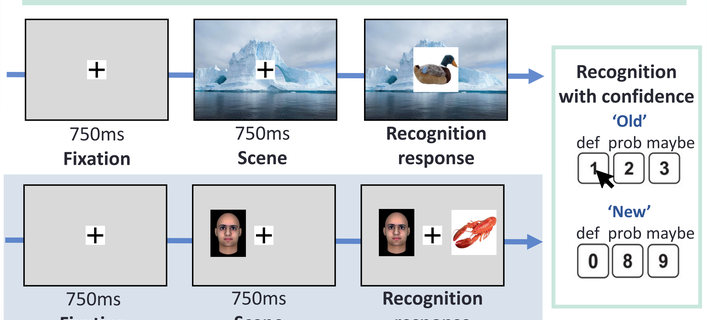


Test

Objects tested in original encoding context **(same)**, old but not directly associated context **(different),** or **new** fourth context

Disregarding scene/face, indicate whether object ONLY is 'old' or 'new' along with recognition confidence

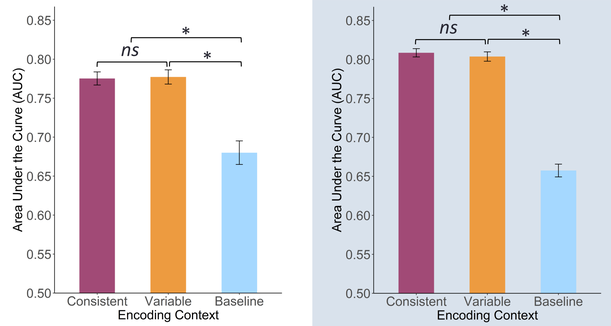
New test context



Results

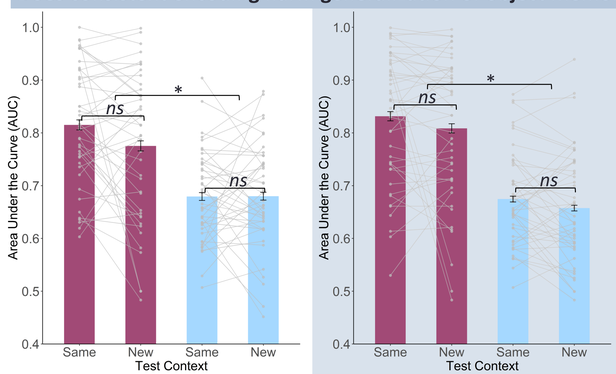
Is variable encoding better than consistent for generalization of object memory?

Experiment 1 (Scenes) | **Experiment 2 (Faces)**

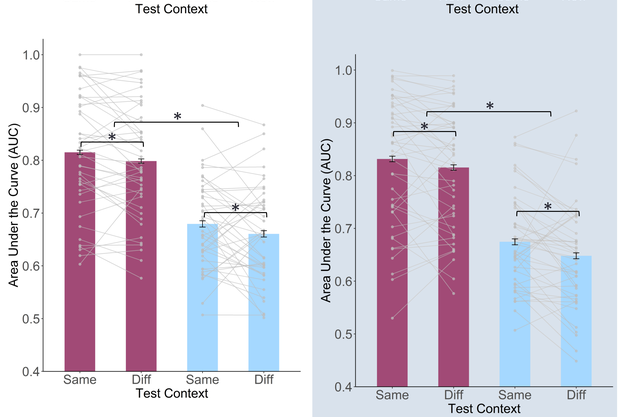


- **Neither encoding method is more beneficial for generalization**
- Both (multiple opportunities) are more effective than one opportunity (baseline)

Does consistent encoding harm generalization of object memory?



- **No,** objects retrieved no better in **same** context vs. **new** context
- Multiple encoding opportunities improves VLTM retrieval (MEB)

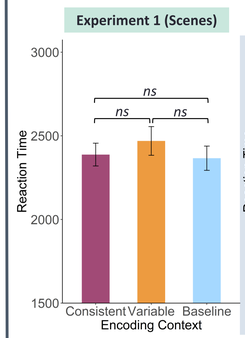


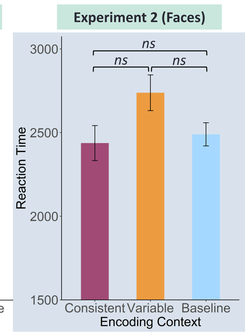
Encoding Condition
Consistent
Baseline

- Reinstating **same** encoding context improves VLTM retrieval more than in **different** context
- MEB observed again

Is lack of difference also in reaction time?

Experiment 1 (Scenes) | **Experiment 2 (Faces)**





- **Yes,** neither consistent nor variable encoding facilitate retrieval in a new context

Discussion

- Encoding variability is no more effective for VLTM generalization to a new context than encoding specificity
- Encoding specificity due to multiple consistent contexts does not hinder generalization
- Reinstatement of a learned context can hinder accessibility of information learned in a different context
- The MEB is independent of context

Future Directions

- How will reducing the fan effect (e.g., increasing number of encoding contexts) affect generalization?
- Expand upon AUC measures by examining retrieved object precision and probability

Acknowledgements

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