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## The Influence of Prediction Error Strength on Recognition Memory

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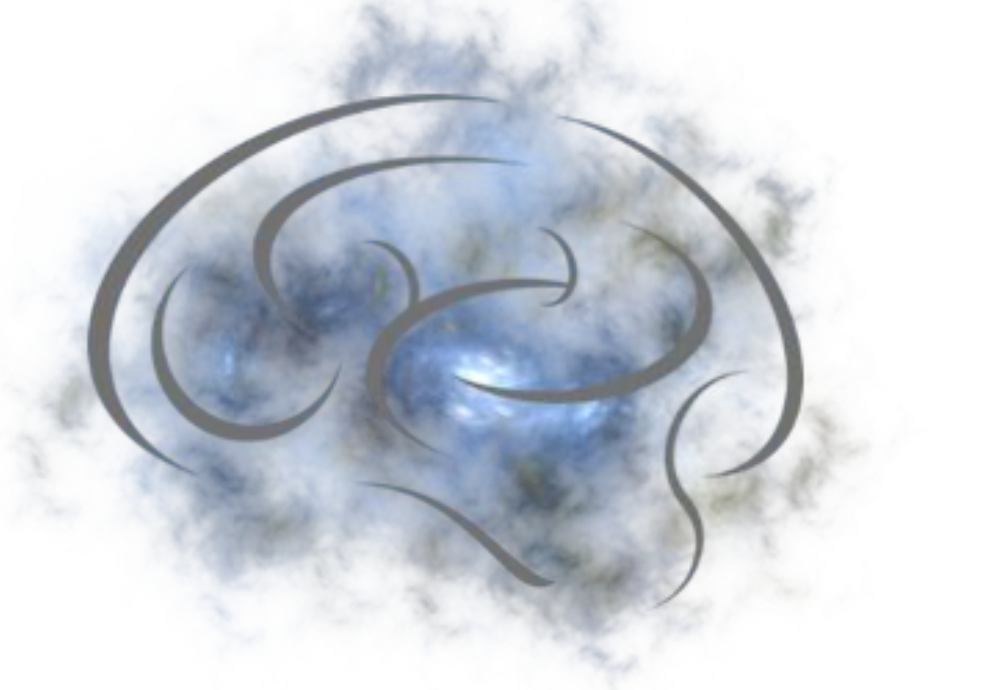
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## Introduction

- An important feature of learning and memory is being able to make predictions about our environments based on past experiences
- However, our predictions are not always accurate. We may experience a prediction error (a mismatch between what was predicted and what actually occurred).
- Research has found that PE enhances learning and memory
- The Predictive Interactive Multiple Memory Signals (PIMMS) suggests that PE facilitates learning and memory because it triggers a need to update our representation to reduce errors in the future
- This study aims to replicate Greve et al., (2017), who found that PE enhances declarative memory of learned associations
- A successful replication would result in better memory for items associated with PE compared to items consistent with expectations

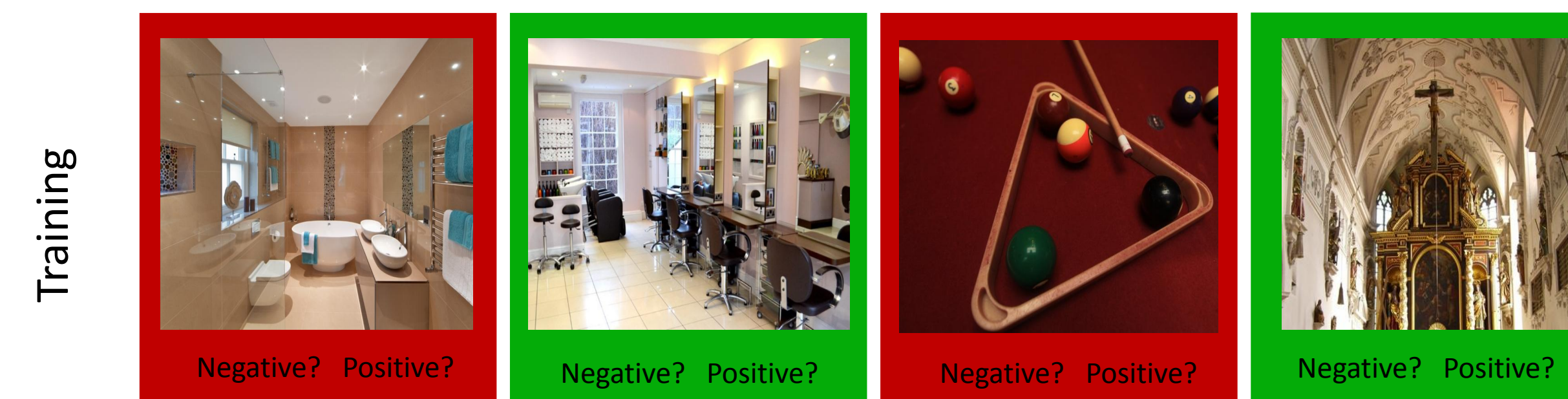
## Method

The procedure consisted of 4 phases:

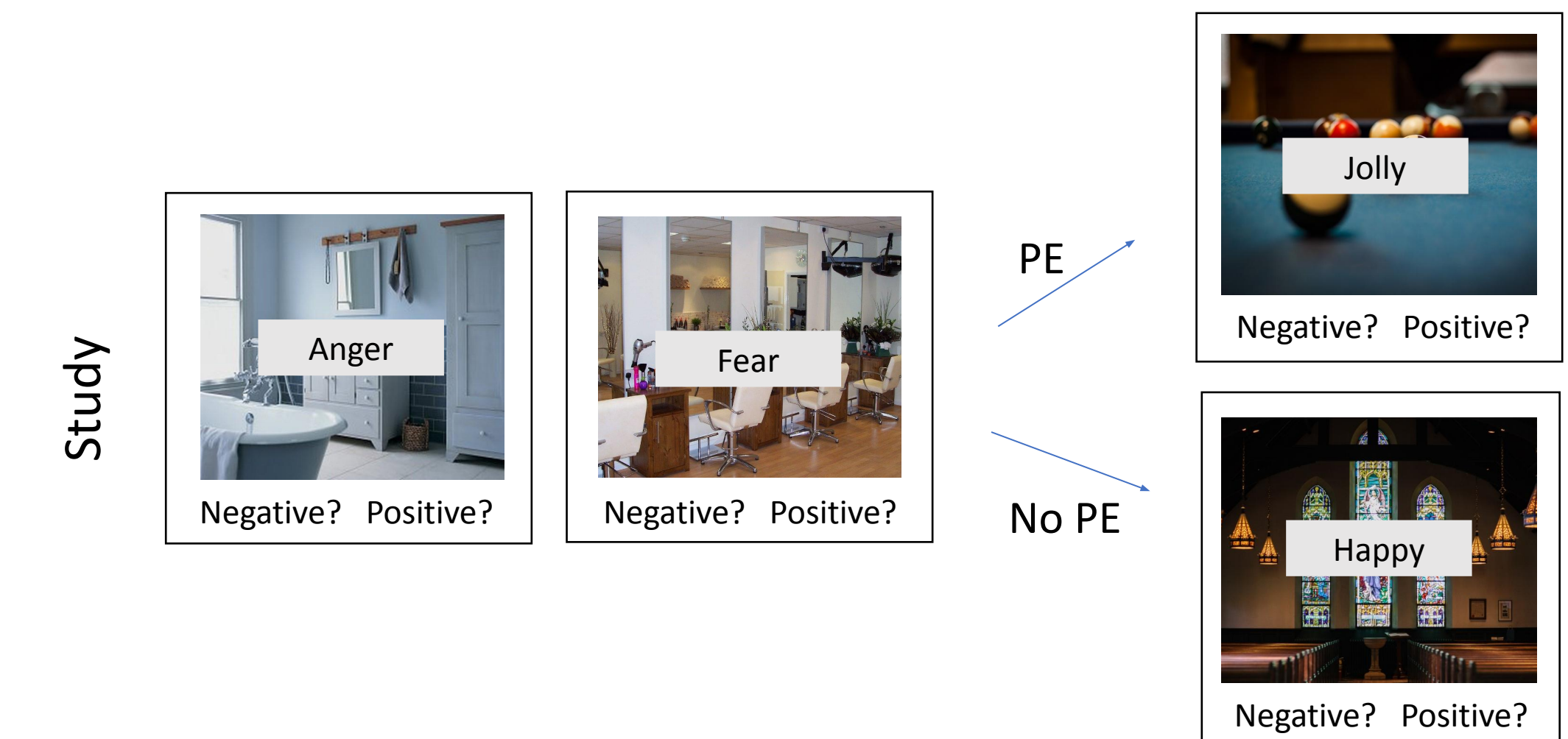
In the familiarization phase participants learned associations between types of scenes (e.g. beaches, playgrounds, etc.) and one of two emotional categories (positive or negative)



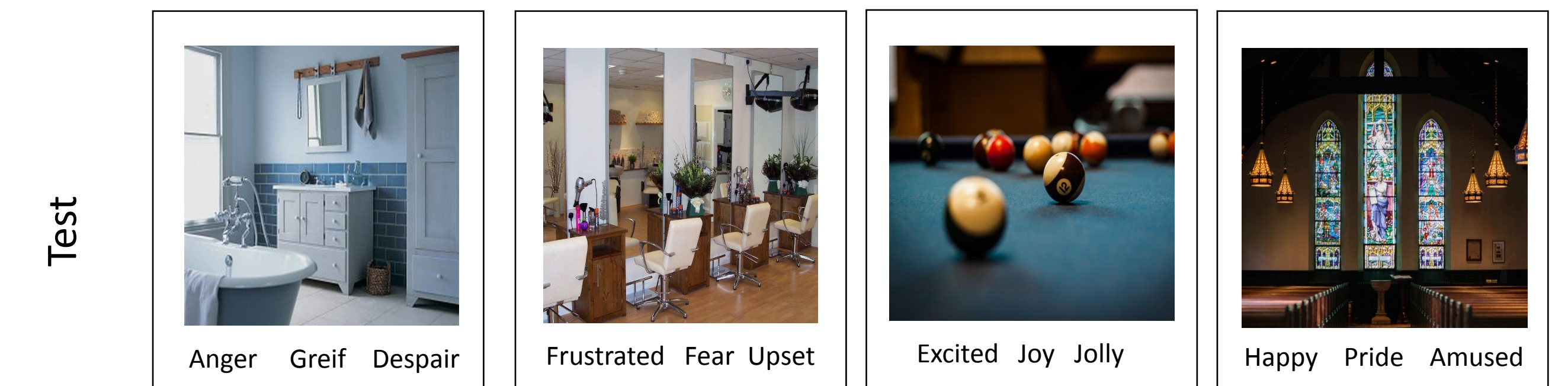
In the training phase participants were tested on the scene-category associations and were given feedback



In the study phase the scenes were paired with a specific word from the learned category (beach scene with "calm") or with a word inconsistent with the learned pairing (e.g., playground with "fatigue"), creating no-PE and PE conditions



In the test phase participants then completed an associative memory test and rated their confidence

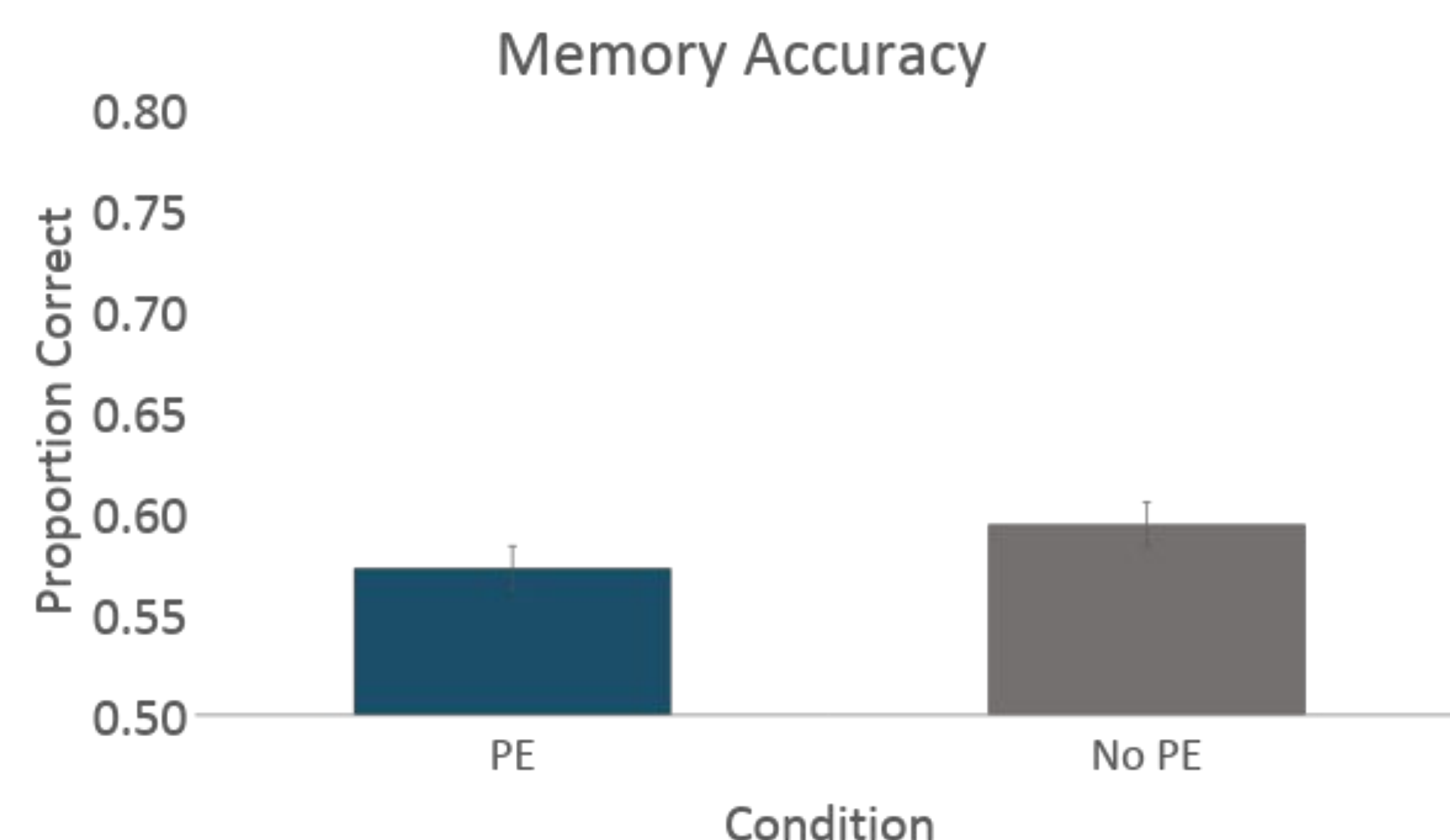


## Results

### Participants

N = 48 (mean age = 20.02; SD = 4.06)

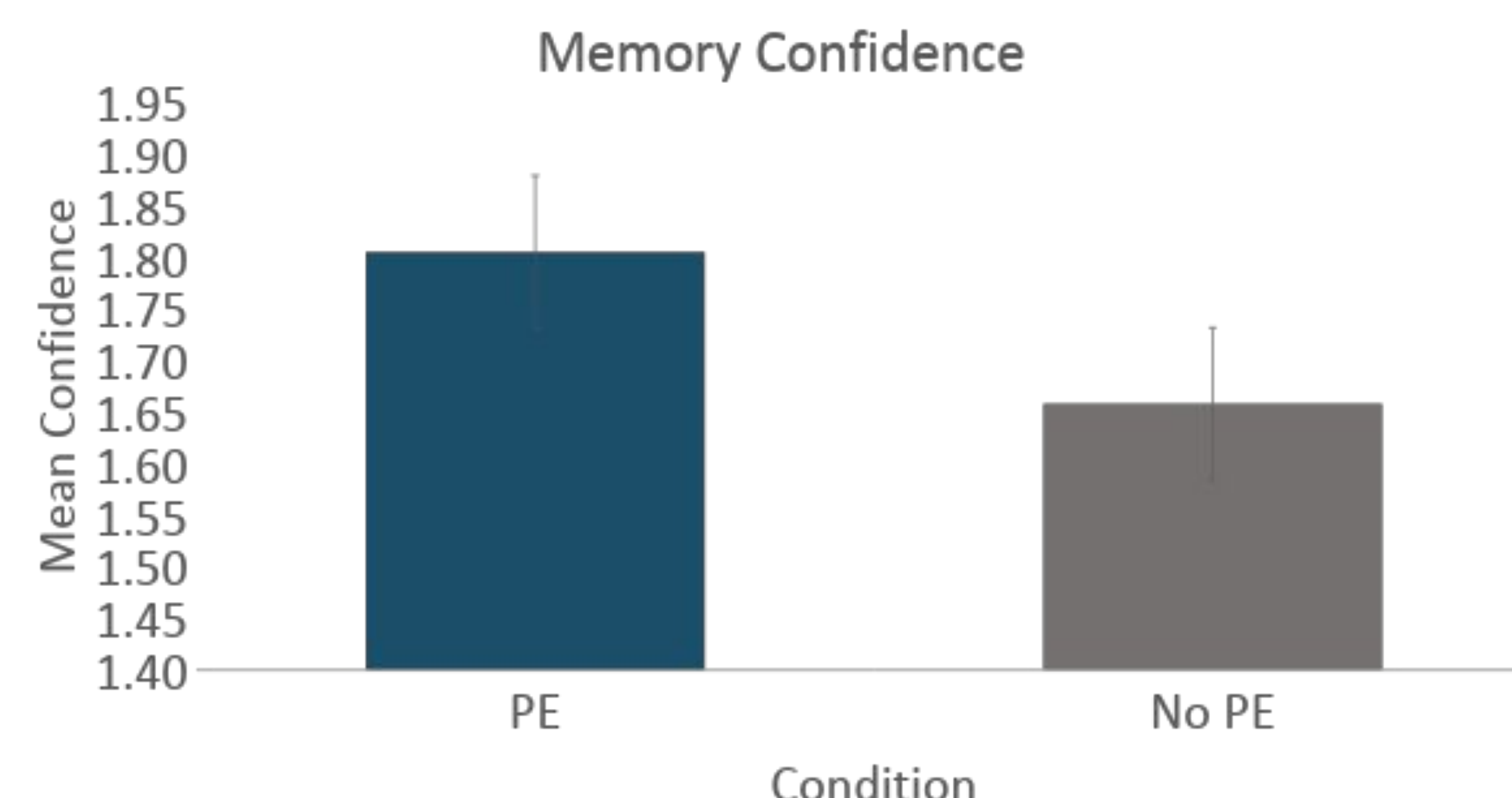
There was no significant difference in memory accuracy for items associated with PE and items consistent with expectations ( $t(47) = .90, p = .33, d = .14$ )



Confidence scale:

1 = High 2 = Low 3 = Guess

Participants were significantly more confident in their memory judgement for items consistent with expectations compared to items associated with PE ( $t(47) = 4.42, p < .001, d = .64$ )



## Discussion

- The results of this study indicated that PE did not enhance memory which contradicts Greve et al. (2017)
- Our failure to replicate could mean it is possible, then, that PE does not facilitate "single-shot" learning of new associations.
- However, we suspect that PE is important, but that this paradigm is not well suited for showing a benefit of PE. It is possible that participants overlearned associations and ignored PE as noted in participants strategy sheets.
- Nonetheless, this failure to replicate using an identical procedure and materials suggests that the effect may be somewhat fragile.

References

Greve, A., Cooper, E., Kaula, A., Anderson, M. C., & Henson, R. (2017). Does prediction error drive one-shot declarative learning? *Journal of Memory and Language, 94*, 149-165.

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