Training recognition familiarity is insufficient to improve visual working memory

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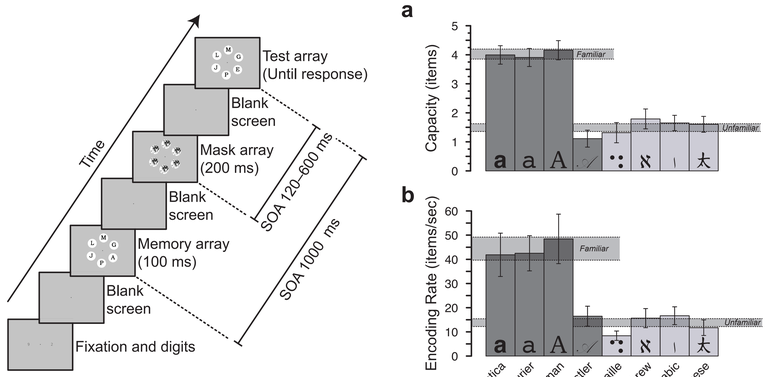
Introduction

Previous studies have found an improvement to visual working memory performance with stimulus familiarity (Xie and Zhang, 2016, 2017).



We observed a higher encoding rate and capacity for familiar English letters over the unfamiliar alphabets.

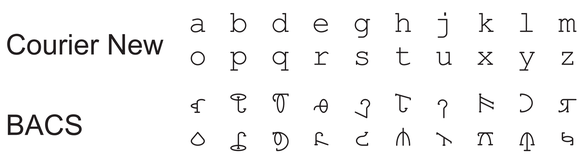
Our aim was to examine whether training familiarity will reproduce the benefit observed with English letters

The results of training on visual working memory have been mixed. Repetition of change-detection displays does not seem to improve performance (Olson and Jiang, 2004) but training recognition of stimuli does (Blalock, 2015).

The Brussels Artificial Character Set (Vidal, Content and Chetail, 2017) match English letters on the number of junctions, terminations, strokes, and item similarity. We also matched the perimetric complexity (Pelli et al., 2006).

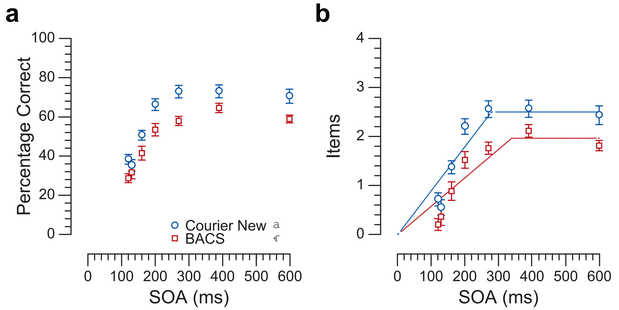
Courier New: a b d e g h j k l m / o p q r s t u x y z

BACS:



Experiment 1

We observed the benefit of familiarity for English letters over the Brussels Artificial Characters.



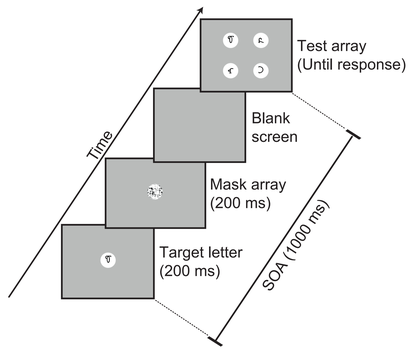
Increase in both encoding rate and capacity despite being matched on similarity and complexity

Training for Experiment 2 and 3

We adopted a training method that has been previously shown to improve visual working memory performance with random polygons (Blalock, 2015)

10 artificial characters were randomly selected to be a training set for each participant.

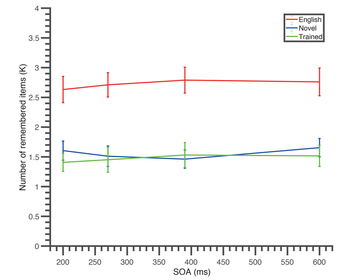
Participants completed 210 trials of this training procedure:



Subjects were near perfect (M = 98%) at identifying the trained item when tested on a 4 alternative forced choice display containing 3 novel items and the trained item.

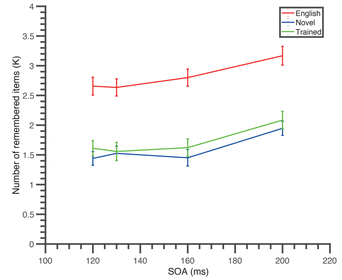
Experiment 2

We tested change-detection performance at the four latest SOAs from Experiment 1 to assess capacity of visual working memory.



Experiment 3

We tested change-detection performance at the four earliest SOAs to assess encoding rate into visual working memory.



Conclusion

We find no significant improvement in change-detection performance with recognition familiarity.

Improved visual working memory performance may require fluency at distinguishing stimuli within a set (e.g. English letters).

References

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