Does Memory Enhancement Training Alter Perceptual Representations?

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Background

Working Memory:
Introduce regularities into working memory displays:

When pairs of colors frequently occurred together, observers could learn these regularities and remember more colors from the display.

Brady, Konkle, & Alvarez (2009)

Does this form of statistical learning transfer to early stages of perceptual processing?

Perception:
Test this question using a perceptual grouping paradigm:

Finding the repeated color is faster when it appears within a shape group. Perceptual groups can be learned through associative cues.


Methods

Part I. WM Training Phase

Pair Types:
High Probability
Low Probability

Untrained Trained

Part II. Repetition Detection

Pair Types:
Trained Untrained

Within-pair repetition:

Between-pair repetition:

Repetition Types:
Trained Pair

Results

Experiment 1 (n=18)

Part I: Observers learn.

Part II: Learning induces perceptual grouping

Stark color contrast, no color variance

Trained Pairs

Untrained Pairs

Overall

Experiment 2 (n=46)

Part I: Observers learn.

Part II: Learning induces perceptual grouping

Stark color contrast, trial-to-trial color variance

Trained Pairs

Untrained Pairs

Overall

Conclusions

Observers learn regularities and use them to store more content in working memory.

Working memory training enables observers to form more efficient representations of relevant information.

This training alters perceptual representations, even when the trained information is no longer task-relevant.

The advantage of training is strongest in the first test block and decreases over subsequent blocks.

References

