Introduction

• Visual working memory (VWM) has a severely limited capacity of about 3-4 items at any one moment
• Individuals tend to overestimate the accuracy of their VWM representations, leading to confident-and-inaccurate responses (e.g., Adam & Vogel, 2017)
• It is critical to improve correspondence between highly confident and accurate responses (metacognitive accuracy) because non-correspondence may lead to erroneous behaviours (e.g., car accident due to confident misremembering of vehicle position)
• Can we improve metacognitive accuracy in younger and older adults through feedback training?

Methods

Whole Report Task (pre- and post-test) ‘Remember as many stimuli as possible’
Coloured squares (Expt. 1 & 2), line orientations (Expt. 2)

‘Then, report the stimuli in each location along with your confidence in each choice with one of the following:
1: high confidence, 2: low confidence, or 3: guessing’

Performance Feedback (only during 10 Training blocks)
Points rewarded encouraged confident-and-accurate but discouraged confident-and-inaccurate responses

Experiment 1: Metacognitive Training for Colour VWM

Younger Adults (n = 29, M\text{age} = 19.3)
Does metacognitive training improve VWM capacity?

No, VWM capacity remains stable over training and is unaffected by performance feedback.

Does training improve metacognitive accuracy?

Yes, and the training effect remains even after feedback is removed!

Is the increase in accuracy due to a decrease in confident-and-inaccurate responses?

Yes, response proportions for high confident-and-inaccurate responses decreased with a simultaneously increase in observed guessing.

Older Adults (n = 24, in progress, M\text{age} = 71.4)
Does metacognitive training improve VWM capacity in older adults?

Yes, VWM capacity increases in post-test (vs. pre-test) by about half an item.

Does training improve metacognitive accuracy?

Yes, training greatly improves the proportion of high confident-and-correct responses.

Is the increase in accuracy due to a decrease in confident-and-inaccurate responses?

Yes, similar to younger adults, there was a decrease in high confident-and-inaccurate responses and an increase in guessing.

Experiment 2: Examining the Generalizability of Metacognitive Training

Younger Adults (n = 60, M\text{age} = 18.8)
Will VWM capacity improve when trained on one stimulus (e.g., colour) and generalize to another untrained stimulus (e.g., orientation), or is the effect stimuli specific?

No, regardless of training, VWM capacity for colour did not improve however, VWM capacity for orientation did improve.

Will metacognitive accuracy improvement for trained stimulus generalize to untrained stimulus?

Yes, training one stimulus improves metacognitive accuracy for that stimulus, and generalizes to the untrained stimulus as well. This improvement also remains when feedback is removed.

Discussion

• Metacognitive training: Modestly but inconsistently improves VWM capacity
• Improves metacognitive accuracy immediately and is sustained upon feedback removal
• Improves both VWM capacity and metacognitive accuracy for older adults
• Improvements in metacognitive accuracy can be generalized to an untrained stimulus
• Future studies will:
  • Further examine the immediate benefit to accuracy from training and determine the necessity of multiple training blocks (in progress)
  • Examine the persistence of the metacognitive training effect after training is completed

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