WORKING MEMORY DISTRACTION RESISTANCE DEPENDS ON PRIORITIZATION

Remington Mallett & Jarrod A. Lewis-Peacock
Department of Psychology, University of Texas at Austin

INTRODUCTION

Neural representations of working memory depend on task priority

Directing attention to a subset of working memory results in a divergence of neural representations between the attended memory item (AMI) and unattended memory item (UMI). The "altered" representation of the UMI has been suggested to take a variety of formats:
- neurally silent
- relocation
- transformation

Recent proposals suggest that working memory actively maintained in perceptual areas might suffer distracting effects preferentially, due to overlapping resources.

Neural consequences of distraction

Recent proposals suggest that working memories actively maintained in perceptual areas might suffer distracting effects preferentially, due to overlapping resources.

Experimental work supports this notion, showing perceptual distraction influences parietal representations less than occipital representations.

Does distraction impact attended and unattended WM representations differently?

TASK

3 sec

8

1 2

STAY (25%)

SWITCH (25%)

Distraction

The retro-cue produces neural separation into AMI and UMI states before distraction, thus allowing us to assess the recovery of memory items from each state.

RESULTS - Perceptual decoder

Neural representations diverge before entering distraction period

The retro-cue produces neural separation into AMI and UMI states before distraction, thus allowing us to assess the recovery of memory items from each state.

After distraction, UMIs show better recovery than AMIs in sensory cortex

Following distraction, the recovery of a UMI was cleaner (i.e., greater separation between relevant and irrelevant items) than the recovery of an AMI. This indicates that higher-priority items (AMIs) are more vulnerable to distraction than UMIs.

RESULTS - Mnemonic decoder

Unlike WM representations in occipitotemporal regions, those in parietal regions might not mimic perceptual experience.

Therefore we built a classifier based on memory representations only and evaluated performance in occipitotemporal (VTC) and parietal (IPS) regions.

CONCLUSION

- WM prioritization impacts resistance to distraction.
- Memory for both AMIs and UMIs survived distraction, although neural representations of UMs seem more resistant to the negative effects.
- Our results show consistency with a model of WM where representations in sensory cortex have higher precision at the cost of heightened vulnerability.

REFERENCES


FUNDING

BIC Pilot Grant 0022016A
NIH/NEI ROI EY028746 (JLP)