Active and Visually-Guided Navigation Benefit Route Memory

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Active and Visually-guided Navigation in Virtual Reality (VR) Benefit Route Memory

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- Spatial memory is enhanced when encoding is active rather than passive[1]
- Active encoding consists of physical movement and cognitive components such as attention, mental manipulation of maps, and decision-making [2]
- Recent findings suggests that spatial memory suffers when we rely on an AI device[3,4], like a GPS, to make decisions about our path of travel

We compared memory for spatial routes, encoded using navigation strategies that differentially engaged decision-making about the path of travel

Procedure: Participants (***n*=50**) explored 12 VR maps for 40 secs each. Encoding was either done Passively (observed a video), using visual guidance similar to GPS, or Actively (making own decisions about where to turn). Maps were created using MapBox, and were based on real-world map layouts of cities (e.g., Tokyo, Manhattan).

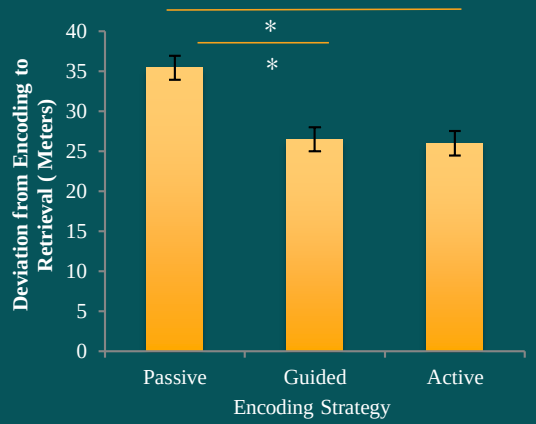
Encoding

Passive: Watched a 360 video in VR of someone else's travel to gold-star – did not initiate movement

Guided: Followed a visual cue to the gold-star

Active: Decided the path of travel to find gold-star

Retrieval: Participants re-entered each map, and "re-traced" the exact route they had travelled, for 40 secs each.



DISCUSSION

- Active and Guided navigation led to less deviation in memory for the route travelled, from encoding to retrieval, suggesting better memory when movements during exploration are self-generated
- Critically, time stopped at intersections (B = -5.13, p = *.010*) and the number of intersections (B = -1.87, p = .007) traversed, predicted performance following Active encoding only
- Removing decision-making during visually Guided navigation did not negatively impact route memory

1. Chrastin & Warren, 2012. *Journal of Expt Psych.* **2.** Meade et al., 2019. *Brain Sci.* **3.** Dahmani & Bohbot, 2020. *Nat Research.* **4.** Gardony et al., 2013. *Spatial Cog & Comp*