

# 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<sup>1</sup>
- Active encoding consists of physical movement and cognitive components such as attention, mental manipulation of maps, and decision-making<sup>2</sup>
- Recent findings suggests that spatial memory suffers when we rely on an AI device<sup>3,4</sup>, 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



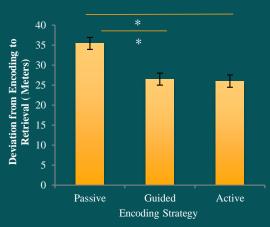
Guided: Followed a visual cue to the gold-star



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.





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#### 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