

Effects of tool use and perturbation during motor adaptation on hand localization in immersive virtual reality

Maryum Khan, Shanaathanan Modchalingam, Andrew King, Bernard Marius 't Hart, Denise YP Henriques
Centre of Vision Research, York University, Toronto, Ontario, Canada



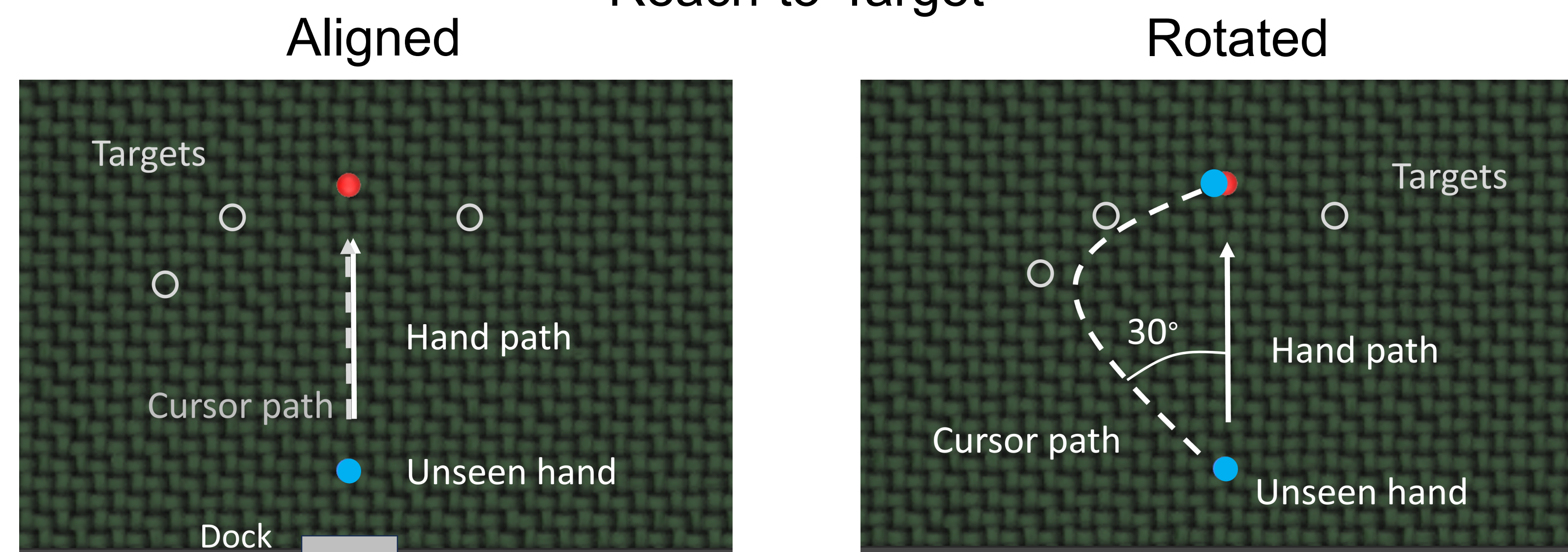
Are end-effector shifts also observed in virtual reality environments?

- Our brain has a remarkable capacity for learning movements and adapting them to accomplish a motor goal.
- When visual feedback of hand position is misaligned, people can compensate for this perturbation, show persistent reach aftereffects, and even misestimate the location of the unseen hand in the direction of the previous visual training.

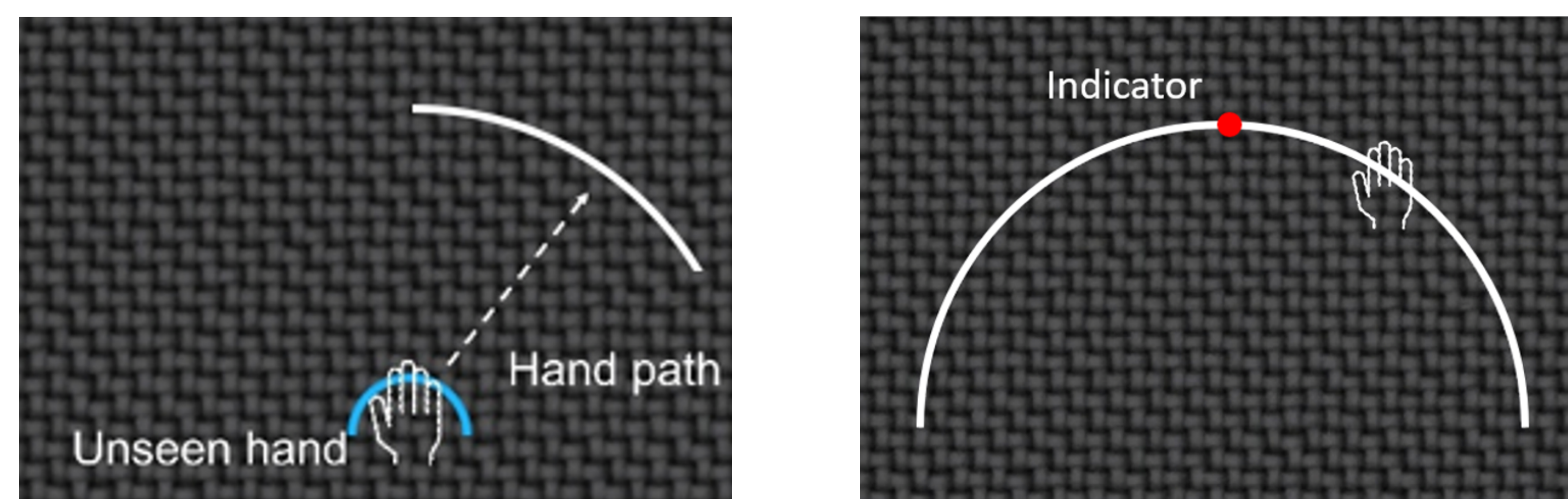
Participants reached to targets and indicated hand/pen

Part 1 - Hand Localization

Reach-to-Target

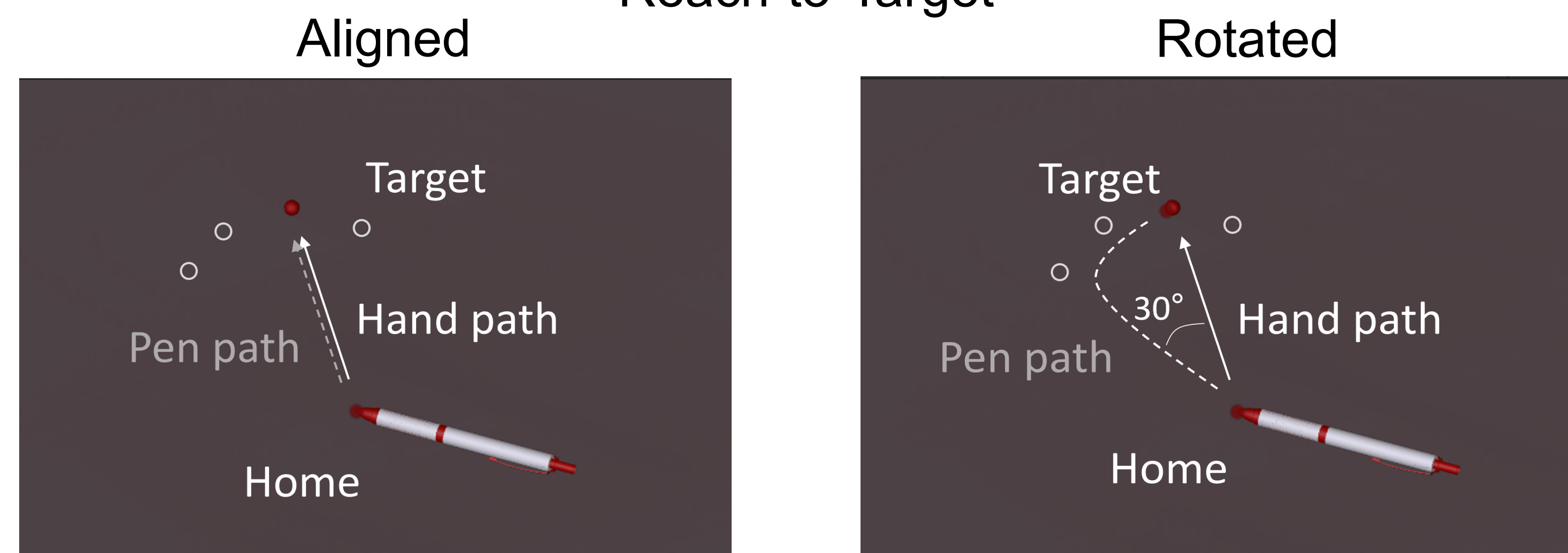


Localization

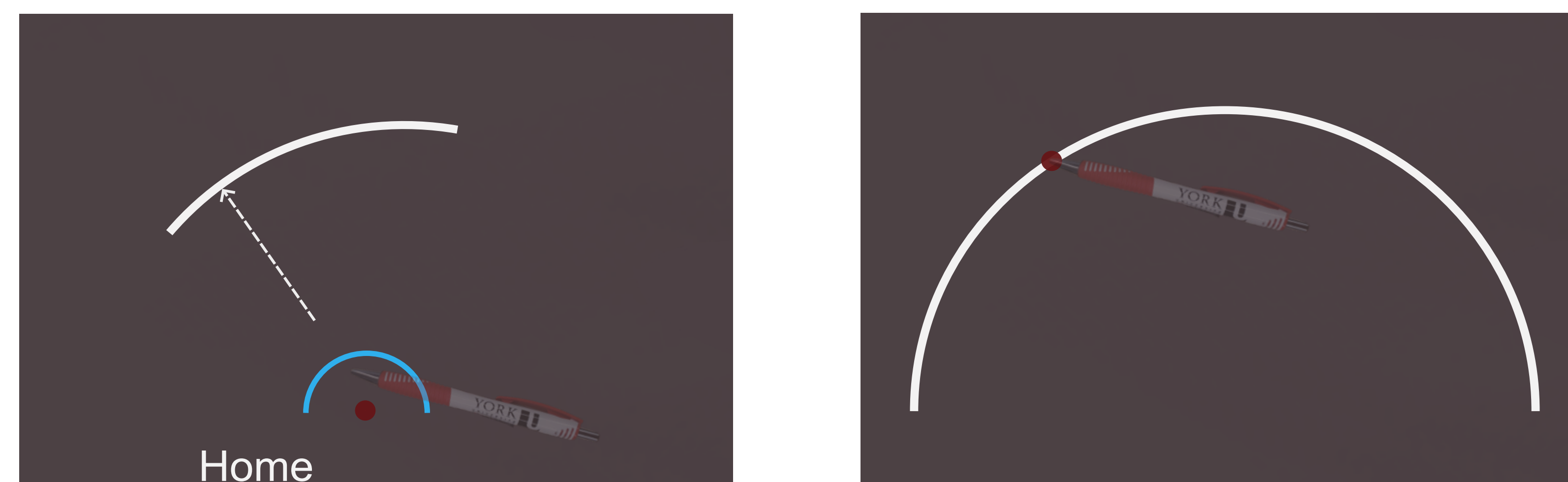


Part 2 - Tool Localization

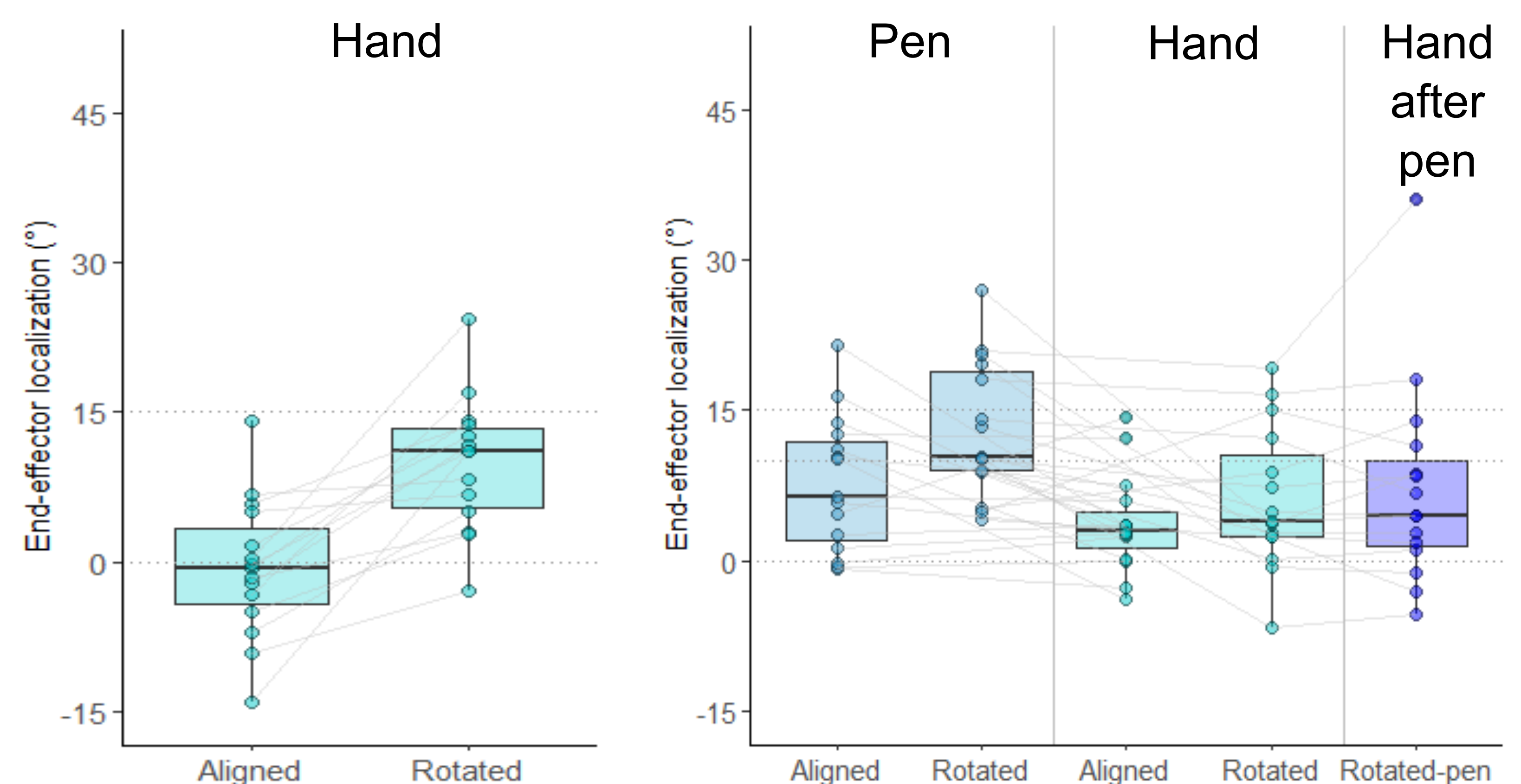
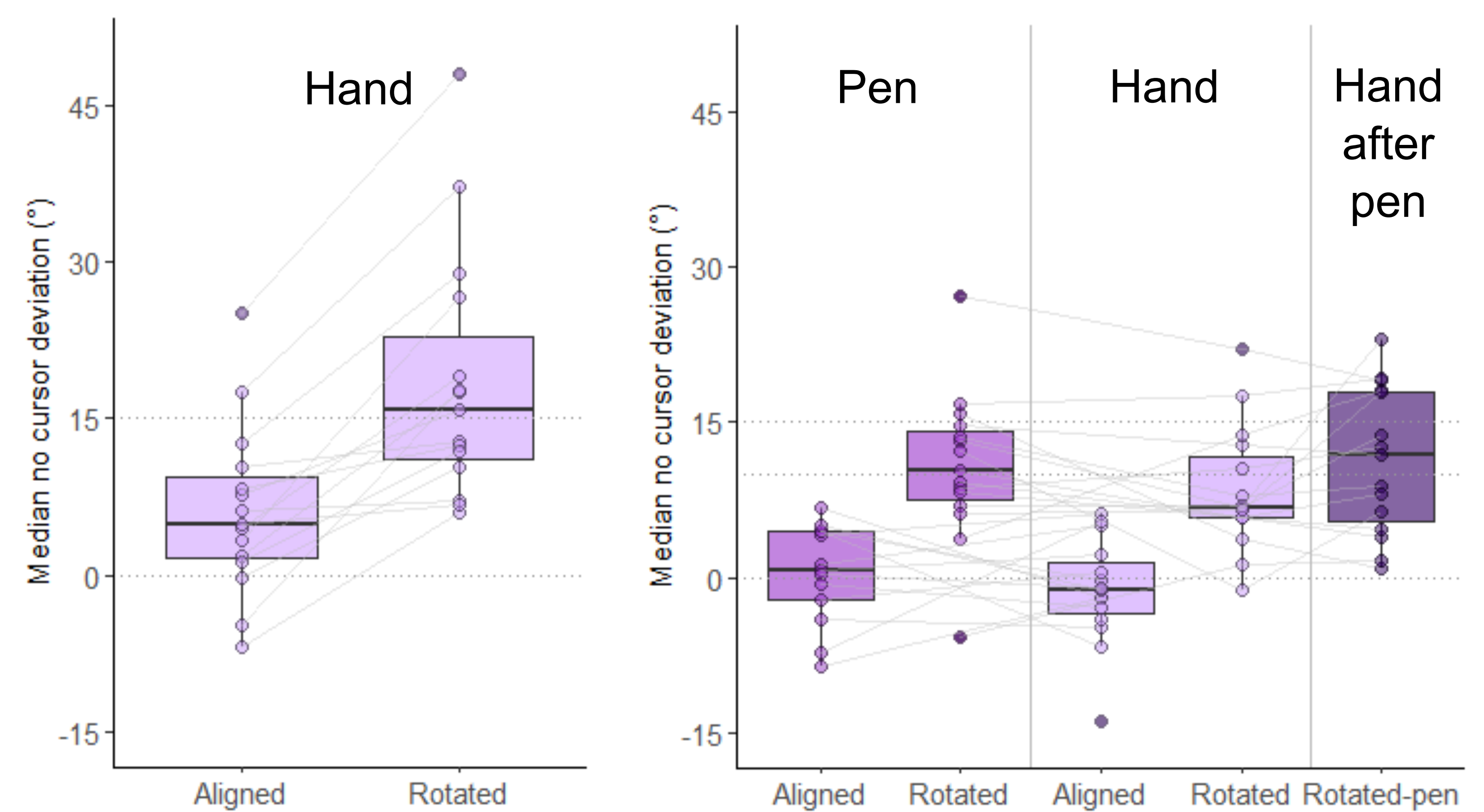
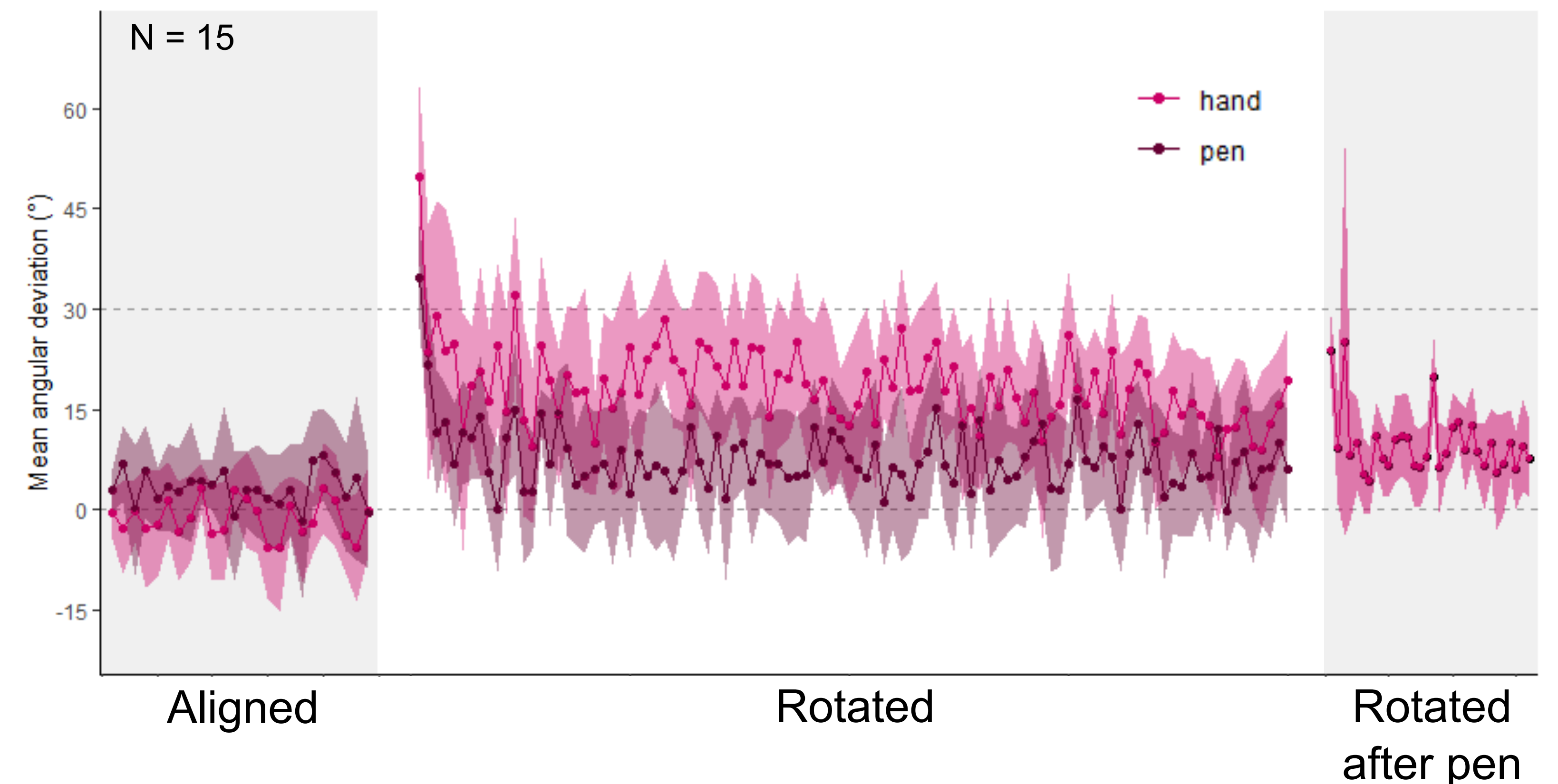
Reach-to-Target



Localization



Reaches compensated for perturbation which led to reach aftereffects and shifts in hand and tool localization



In VR, adapting to pen reaches led to changes in reach aftereffects and estimate of pen location, but not hand.