Gaze behavior changes from step to step based on motor performance during walking

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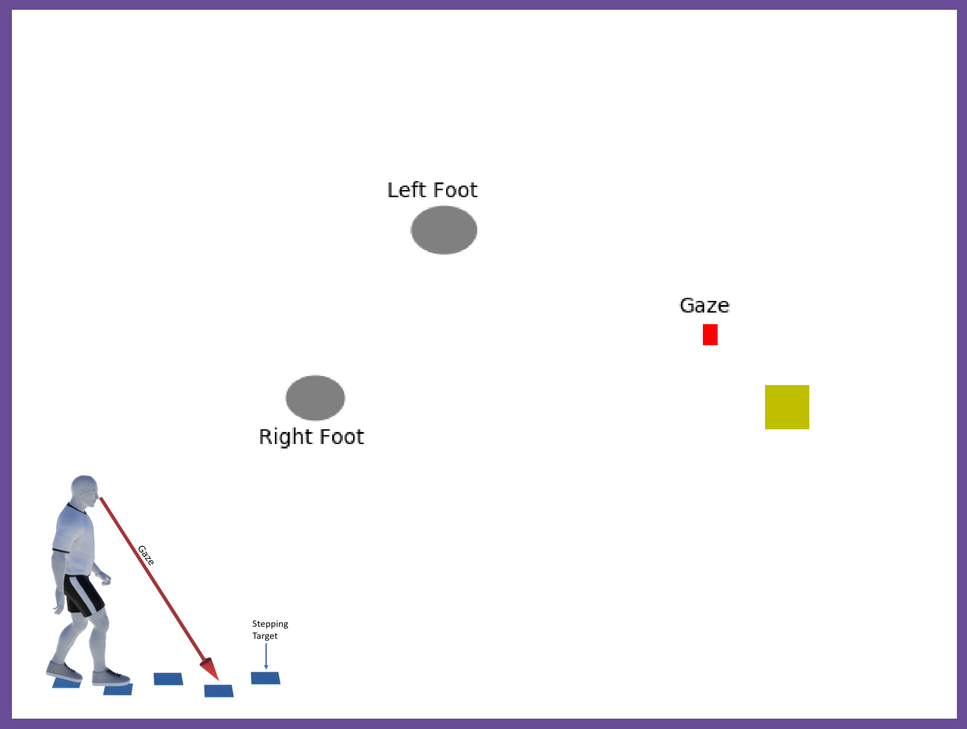
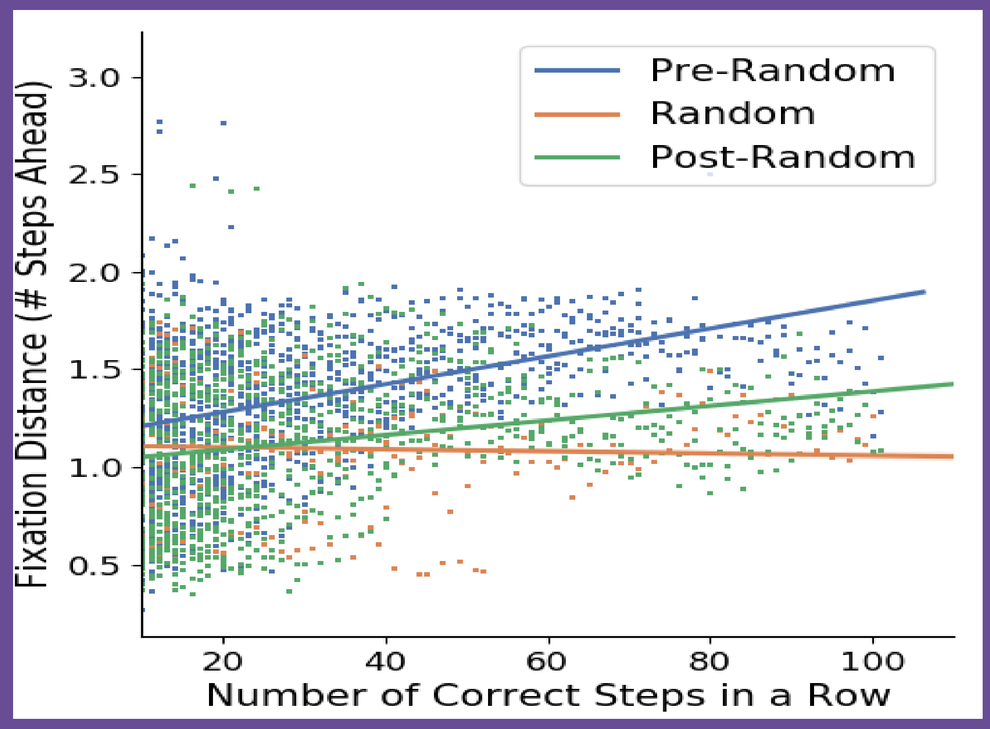


Representative trial, participant's feet (gray) and gaze point (red) relative to projected stepping targets (yellow). Target distances varied based on step length (Short 80%, Medium 100%, or Long 120% of normal step length) in a repeating pattern.



As the number of correct steps in a row increased, participant's gaze shifted forward (more predictive). This relationship dropped during the random trial and did not fully return, suggesting a shift in gaze strategy based on previous performance

INTRODUCTION

- Gaze behavior describes where an individual looks when completing a task
- 3 characteristic fixations during walking: Reactive, Predictive, and Anticipatory[1]
- Elite athletes look farther forward, more predictive[2]
- Clinical Populations look more at their feet, more reactive[3]

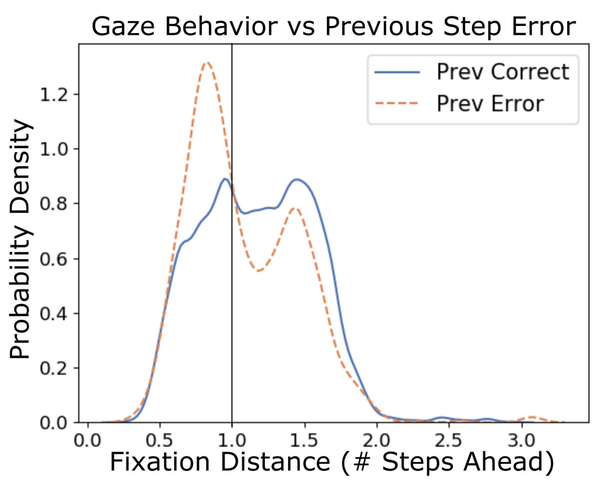
HYPOTHESIS

- Gaze behavior will move forward (more predictive) during motor learning

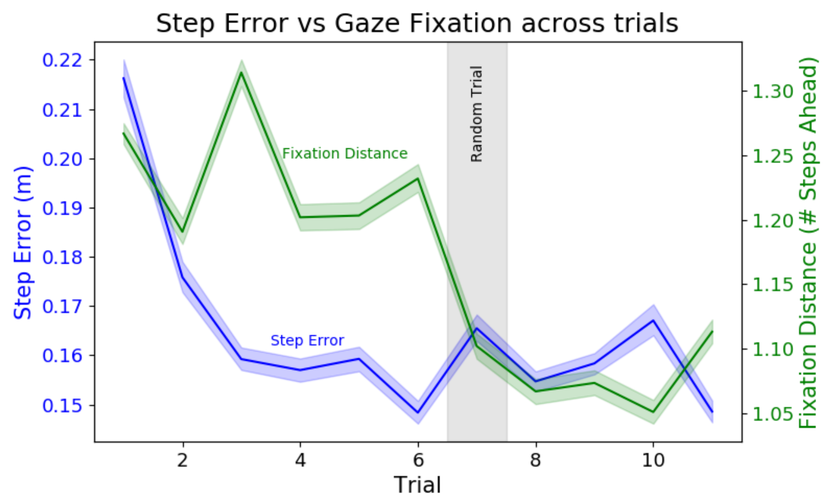
METHODS

- N = 5
- 11 trial blocks of 102 steps
- Repeating 6-step pattern of short, medium, and long steps
- Targets 2x walking speed
- Auditory feedback on steps > 0.2m away
- Random trial at trial 7

RESULTS



Following a step error (orange), participants look at their feet (fixations less than 1 step ahead marked by the vertical line)



Step error (blue) exponentially decreased, as expected.
Fixation distance (green) didn't change until the catch trial, then reset to focus more on reactive fixations

CONCLUSION

- Gaze Behavior dynamically changes step to step based on previous stepping performance

References
1. Patla 2003 *IEEE Eng Med Biol* 22:2.
2. Piras et al. 2010 *J Sport Med Phys Fit* 50:1.
3. Malik et al. 2017 *J Neurophysiol* 117