

INFLUENCE OF REACHING DIRECTION ON VISUOMOTOR ADAPTATION: AN EXPLORATIVE STUDY

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INTRODUCTION

Robotics increasingly used in stroke rehabilitation.
Visuomotor adaptation experiments are used to study motor learning.
Usually, one learning curve integrates all movement directions.

AIM

To explore influence of movement direction on visuomotor adaptation.

METHODS

- 40 healthy subjects (18-26 years).
- 48 centre-out reaching movements to each of five directions.
- Visual distortion of 30 degrees CCW rotation.
- Outcome measure: movement direction at peak velocity.

RESULTS

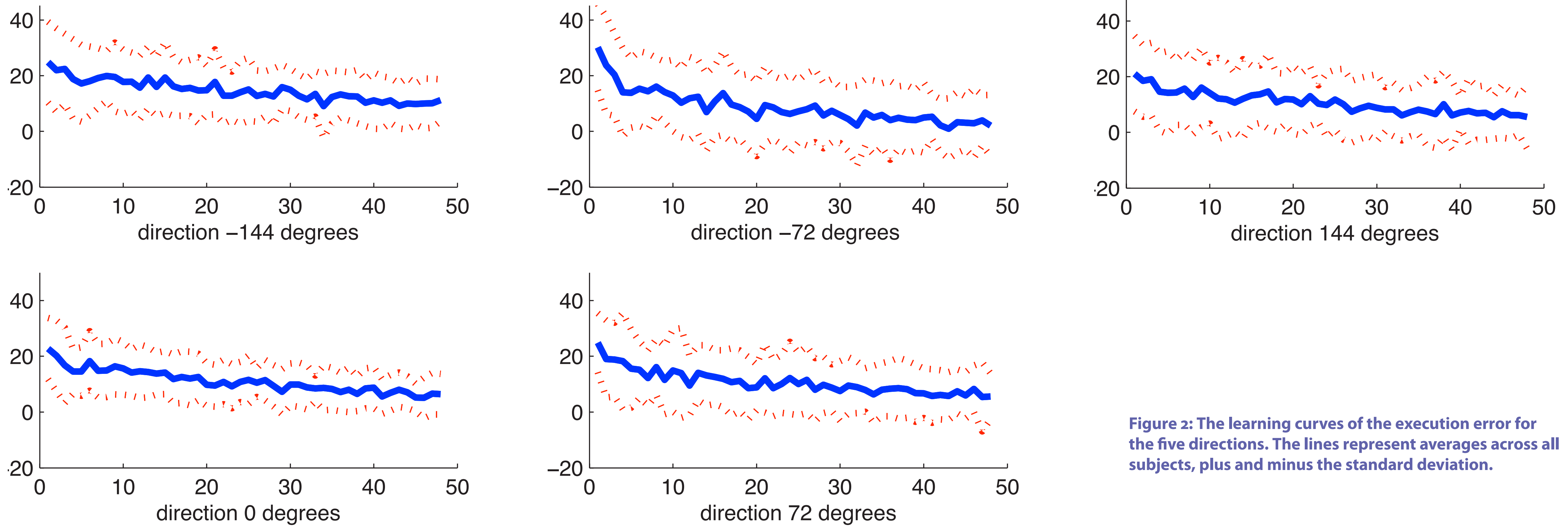


Figure 2: The learning curves of the execution error for the five directions. The lines represent averages across all subjects, plus and minus the standard deviation.

- Significant difference in amount of learning between different directions ($p < 0.05$).
- Significantly larger amount of learning for -72 direction compared to -144, 0, 144 ($p = 0.007$, $p = 0.014$, $p = 0.041$).

DISCUSSION

Updating of internal model seems to be dependent on movement direction.
Difference in learning between directions still present when feedback is not processed yet (at 100 ms).
Possible influence single or multi joint character of movements into different directions.
Stroke survivors limited DOF, does this influence motor learning?

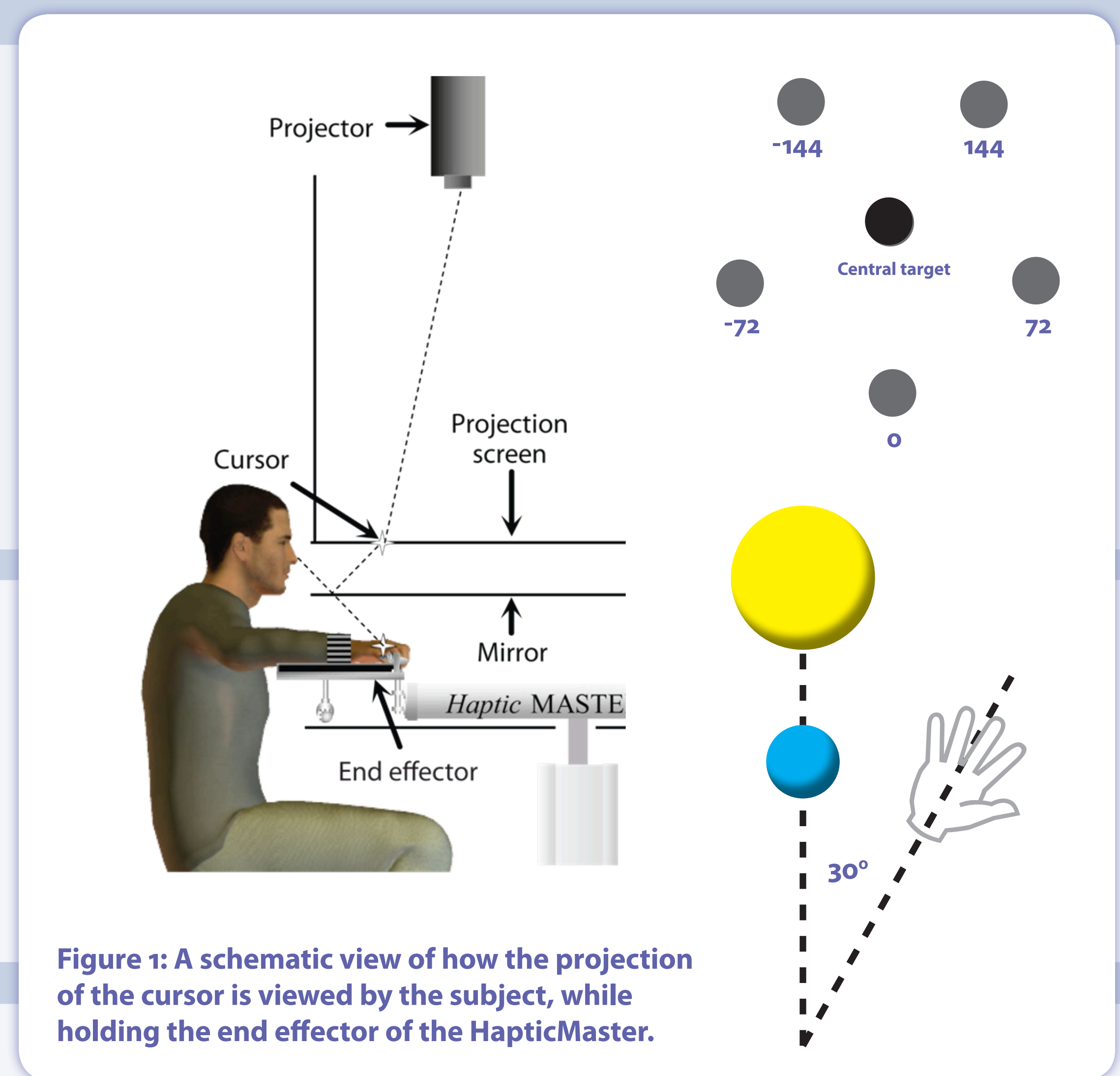


Figure 1: A schematic view of how the projection of the cursor is viewed by the subject, while holding the end effector of the HapticMaster.



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