**Supplementary material**

*Experimental procedures*

All tasks were presented on an Acer Touchpad tablet, which was combined with a Keytek transparent touchscreen. All study participants were tested on four visuomotor transformation tasks (see supplementary figure 2) in the following order:

* Direct: the spatial location of the viewed target and the required movement were the same.
* Plane Change: the spatial location of the viewed target is dissociated from the required movement, i.e. the targets were presented on a vertical screen, while movements were made on a horizontal screen.
* Plane Change Reversal: similar to the Plane Change condition, only the visual feedback of the target was rotated 180 degrees, i.e. the finger had to be moved to the left in order to move the cursor to the right.
* Direct Reversal: similar to the Direct condition, only the visual feedback of the target was rotated 180 degrees.

The sequence of actions during each task trial is described in supplementary figure 1. To start a trial, participants were instructed to move to cursor to a yellow ‘home’ target at the centre of the screen. Once the target was successfully entered, the home target turned green, which indicated the start of the trial. After a delay time of 4000 milliseconds, a peripheral target was presented in red. Participants were instructed to then move the cursor to the peripheral target as fast and as accurate as possible. After holding the target for 500 milliseconds, the peripheral target disappeared, indicating the end of the trial. After a between-trial delay time of 2000 ms, the yellow home target was presented again.

Each task consisted of a total of 20 trials. Targets were presented either to the left, right, top or bottom of the screen, five times per location. The order to target locations was randomized. Target eccentricity was 55 millimeters, target radius was 7.5 millimeters. Throughout the experiment, the researcher from York University monitored the participant’s eye movements, and provided verbal feedback if the task instructions were not followed.

*Data processing and analysis*

Raw data on timing, finger position (x-and y coordinates; 60 Hz sampling rate) were recorded for each trial and converted into a MATLAB readable format using a custom written C++ application. Unsuccessful trials were coded by the software and resulted in trial termination if the finger left the home target too early (<4000 ms after entering), reaction time was too short (<150 ms), reaction time was too long (>8000 ms), or total movement time was too long (>10000 ms). For each trial, position and velocity profiles were plotted using custom-written MATLAB software. Using these plot, the timepoint indicating the onset of finger movement, defined as exceeding 10% of peak velocity, was determined. In addition, the timepoints indicating the end of the initial ballistic movement (velocity going below 10% of peak velocity), and the end of the last correctional movement were determined. If the initial movement direction was not towards the correct quadrant of the screen, and the initial ballistic movement exited the central target, the movement was coded as a direction reversal error. Using the three timepoints described above, the following outcome measures were determined for each correctly executed trial and consequently for each set of 20 trials per condition.

*Outcome measures*

* % of correctly executed trials (%Correct): the percentage of trials that were correctly executed according to the task instructions.
* % of direction reversal trials (%DR): the percentage of trials in which a direction reversal error was made.
* Response Time (RT): the mean response time, define as the time between presentation of the target and finger velocity exceeding 10% of peak trial velocity.
* Ballistic Movement Time (MTb): the mean ballistic movement time, defined as the time between initiation of movement and end of initial ballistic movement.
* Full Movement Time (MTf): the mean full movement time, defined as the time between initiation of movement and end of final corrective movement.
* Absolute Error (AE): the mean distance between the finger position and the centre of the peripheral target at the end of the final corrective movement.
* Variable Error (VE): the mean variance of the finger positions at the end of the final corrective movement.
* Normalized Full Path Length (PLf N): the mean total finger path length, defined as a percentage of a hypothetical straight line between the starting position and the end position of the finger.

**Supplementary figure titles and legends**

Supplementary figure 1: BrDI task instructions

Supplementary figure 2: BrDI task conditions

Supplementary figure 3: Effects of the intervention program on Dementia Rating Score subscores. All data is represented as mean +/- standard error.

Supplementary figure 4: Progression of video game scores during the intervention program, expressed as the average score per four training session, in each condition for each group separately. All data is represented as mean +/- standard error.