Visuomanual pointing and clicking in children and adolescents

Kudlinski Cyril, Laboratoire PALM EA4649, Université de Caen Basse-Normandie, France, cyril.kudlinski@unicaen.fr
Pr. Jouen François, Laboratoire CHART EA4004, Ecole Pratique des Hautes Etudes, Paris, France, francois.jouen@ephe.sorbonne.fr
Pr. Molina Michèle, Laboratoire PALM EA4649, Université de Caen Basse-Normandie, France, michele.molina@unicaen.fr

Theoretical framework

Visuomanual pointing is commonly studied with Fitts’ law (Fitts, 1954). This law determines the relationship between the movement time and the index of difficulty (ID) of a pointing task where $MT = a + b \log_2(2A/W)$. Using a Fitts’ task, Lambert & Bard (2005) studied pointing movement in children aged from 6 to 10 years. Children pointed and clicked on visual targets varying in width but located at a fixed distance from each other. Authors observed a clear improvement of pointing skills between 6 and 10 years. They also observed that kinematic components of the movement of the 10 years remains different from those observed in adults. This result leaves open the question of a refinement of internal models of action after 10 years.

The present experiment was aimed at evaluating the characteristics of kinematic of action from 6 to 14 years. For the sake of generalization, children aged from 6 to 14 years were proposed a pointing task in which the widths of the targets and the distance to the reached targets varied.

Method

90 children and adolescents (6 to 14 years) and 18 adults were asked to point and click as fast and accurate as possible on a blue bar displayed on a laptop screen. Once a click was performed, the blue and yellow bars switch their position for the next trial. 4 amplitudes and 5 width were combined for a total of 20 ID. 5 clicks per ID were recorded.

![Method](image)

Evolve up to 12 years

Evolve up to 14 years

Discussion

The present results clearly demonstrate that the parameters of the kinematic of action follow a developmental trend between 10 and 14 years.

- The pattern of results obtained sustained the hypothesis of a refinement of internal model of actions between 10 and 14 years. Even if we can observe a strong increase in performances between the age of 6 and 10, adolescents keep improving their movement to reach adult-like performance by 14 years.

- At least, varying both amplitude and width allow 1/ to generalize the results previously obtained by Lambert & Bard, (2005) and 2/ to appreciate the isochrony principle (Viviani & McCollum, 1983)

![Discussion](image)

References