

POSTER: MANUAL DEXTERITY, NOT GRIP STRENGTH, IS ASSOCIATED WITH EXECUTIVE FUNCTIONS IN ADOLESCENTS AND YOUNG ADULTS WITH DOWN SYNDROME

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Objective: Past findings primarily focused on the associations between fine motor skills and executive functions in typical populations. The purpose of this study was to examine the relations between manual skills (i.e., manual dexterity and grip force) and executive functions (EFs) (i.e., processing speed, set-shifting, verbal functioning, and inhibition control) in adolescents and young adults with Down syndrome (DS). **Method:** To answer this question, 30 participants with DS, aged 21.26 ± 5.46 yrs, were recruited. Peabody Picture Vocabulary Test- III was used to measure the mental age (MA) of each participant. Next, the participant was requested to perform the Purdue Pegboard Test and Hand Grip Force Test to assess manual dexterity and grip strength levels. In addition, two-point Choice Reaction Time Test, Dimensional Card Change Sorting (DCCS) Test, Verbal Fluency Test, and Knock-Tap Test were conducted to assess processing speed, set-shifting, verbal functioning, and inhibition control aspects of EFs. We investigated the correlations between background variables (age, MA, height, weight, and BMI), manual skills, and EFs. A further analysis was performed to identify the influence of manual dexterity, background variables, and EFs were compared between high and low dexterity level groups through a median split on the performance of the Purdue Pegboard Test. **Results:** Our results showed MA was positively correlated with the performance in the DCCS test, verbal fluency test, and knock-tap test. Results also revealed that high dexterity level group significantly performed with faster processing speed and better performance in verbal fluency than the group with low dexterity level, controlling for MA. Participants with high MA may produce more correct answers and successfully completed more trials in EFs tests. Moreover, the co-activation theory in the cerebellum and prefrontal areas was hypothesized as the possible mechanism. **Implications:** Manual dexterity may help identify the risk of impairment of EFs among DS population. Our finding is useful for parents and teachers to adopt manual dexterity interventions to simulate the cerebellar function that may further lead to cognitive improvement in individuals with DS.