

The influence of errors during practice on motor learning in young individuals with Cerebral Palsy

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Abstract

The aim of this study was to investigate the effect of errors during practice on motor skill learning in young individuals with Cerebral Palsy (CP). Minimizing errors has been validated in typically developing children and children with intellectual disabilities as a method for implicit learning, because it reduces working memory involvement during learning. The present study assessed whether a practice protocol that aims at minimizing errors can induce implicit learning in young individuals with CP as well. Accordingly, we hypothesized that reducing errors during practice would lead to enhanced learning and a decrease in the dependency of performance on working memory. Young individuals with CP practiced an aiming task following either an error-minimizing (N=20) or an error-strewn (N=18) practice protocol. Aiming accuracy was assessed in pre-, post- and retention test. Dual task performance was assessed to establish dependency on working memory. The two practice protocols did not invoke different amounts or types of learning in the participants with CP. Yet, participants improved aiming accuracy and showed stable motor performance after learning, irrespective of the protocol they followed. Across groups the number of errors made during practice was related to the amount of learning, and the degree of conscious monitoring of the movement. Only participants with relatively good working memory capacity and a poor initial performance showed a rudimentary form of (most likely, explicit) learning. These new findings on the effect of the amount of practice errors on motor learning in children of CP are important for designing interventions for children and adolescents with CP.

Keywords: Cerebral Palsy, Motor Skill, Motor learning, Errorless learning, Working Memory