

Recent applied CI research suggests that moderate CI is superior to high and low CI. However, this research has typically involved children, or skilled performers practicing a well-learned skill. To date, there is little evidence indicating how moderate CI affects adults learning a new skill. Therefore, this study explored the effects of three levels of CI with naïve adult learners ($N = 34$) acquiring two sport skills. Two skills from the sport of Ultimate were selected: the backhand and the forehand flick. (Ultimate is a field sport in which teams attempt to throw and catch a flying disc beyond the opposing goal line.) Participants received basic instruction on the skills (grips, arm action, release points) followed by 10 min of practice with instructor feedback and a 20-trial blocked pretest. Over the next 2 days the participants performed 200 trials of each skill (100 per day) under either low, moderate, or high CI. Learning was assessed through three, counterbalanced 20-trial posttests: blocked, alternating, and random. The dependent measure for practice and posttests was the trial scores derived from where the disc struck a target positioned 10 m from the participant. Practice data were analyzed with a $3 \times 2 \times 2$ (Schedule \times Days \times Skills) analysis of variance (ANOVA) with repeated measures on the last two factors. Data from the three posttests were analyzed with a 3×3 (Schedule \times Test) ANOVA. A significant schedule by day by throw interaction $F(2, 28) = 6.45, p < .05$, was obtained on the practice data. Graphs of the data showed that the moderate and high CI groups improved on the backhand from Day 1 to Day 2, while the low CI group improved on the forehand flick across days. Analysis of the posttest data revealed no significant group differences. The posttest findings are in contrast to previous research with moderate CI which found it superior to low and high CI. The discussion centers on the degree of similarity between the tasks, the amount of interference created, and how that may have influenced the posttest results.

Practice Schedule Effects on Learning the Golf Putt and Pitch

Dennis Landin, Wes Grisham, and Brian Baum, Louisiana State University, and Edward P. Hebert, Southeastern Louisiana University

The motor learning literature contains an extensive body of research indicating that for most laboratory-based skills high contextual interference (CI) is superior to low CI. An interesting paradox exists in that while high CI degrades practice performance it produces greater learning. In sport settings there is evidence indicating that (a) the CI effect is mediated by the participant's skill level and (b) moderate levels of CI may be superior to high and low CI due to the complexity of most sport skills. Nearly ignored in CI research, whether from applied or laboratory settings, is how various practice schedules influence performance production measures (movement patterns). The purpose of this study was to compare three levels of CI on learning two golf skills (putt and pitch), measuring both performance outcomes and production. Participants ($N = 24$), inexperienced with golf, were taught the basics of the two strokes, practiced for 15 min while receiving instructor feedback, and then performed a 20-trial blocked pretest. The next day 160 trials (80 per stroke) were performed under either low, moderate, or high CI. On the third day three, counterbalanced, 20-trial posttests (alternating, blocked, and random) were performed. Performance

outcome data for practice and posttests were scores obtained from targets drawn on indoor golf surfaces. Performance production data for both strokes were derived from evaluations of the take away, forward swing, and movements of the head. These data were obtained by coding videotapes of all practice and posttest trials. Practice data for both dependent measures were analyzed with separate 3×16 (Schedule \times Trial Blocks) repeated measures analyses of variance. Results revealed a significant Trial Blocks effect for outcomes and production (both: $p < .001$). Posttest data were analyzed with separate 3×3 (Schedule \times Test) analyses of variance for each dependent measure. On the alternating and blocked posttests high CI was superior ($p < .05$) to moderate and low CI on both performance measures. On the random posttest both high and moderate CI were superior ($p < .05$) to low CI on the two measures. The superiority of the high interference group regarding performance outcomes stands in contrast to previous CI research in sport settings which generally reports that moderate CI is best. This finding may be attributed to the similarity in the two strokes and is addressed in the discussion. Regarding production measures, the results are consistent with the one known previous study that investigated the effects of varying levels of CI on movement production.

A Case Study of Developmental Dyspraxia in Improving Perceptual Motor Performance and Handwriting Through an Exercise Intervention

Yuhua Li, Shawn P. Whitman, Amy Friedman, and Tammy Krugger, University of Memphis

Dyspraxia has been defined as motor difficulties caused by perceptual problems, especially visual-motor and kinesthetic-motor difficulties. It is an immaturity of the brain resulting in messages not being properly transmitted to the body. It affects at least 2% of the population in varying degrees with boys identified four times more frequently than girls. There is no cure, nor underlying mechanisms being clearly understood. Children who have dyspraxia may experience a number of learning deficits (e.g., poor writing, reading, and drawing abilities). The consequences could be severe such as having extreme emotional and behavioral difficulties in school. Limited research has been reported due to the complexity of the problem. A case study was conducted in 8 months to examine the effect of an exercise intervention program designed for a seven years old child with developmental dyspraxia. An ABAB single-subject reversal design was used to evaluate the changes in perceptual-motor performance through the treatment. Specifically, the ABAB design included four tests: baseline (pretest 1), treatment (posttest 1 following a 3-month treatment), baseline (pretest 2 following a 2-month no-treatment), and treatment (posttest 2 following a 3-month treatment). The exercise intervention was twice a post and 1 hr each session. It consisted of various types of gross and fine motor control tasks, which require the necessary sensorimotor coordination. The focus of the intervention was on enhancing participant's neuromuscular function through the exercises that stimulate the connections and integration of the sensorimotor systems. Seven lab tasks (including balance, choice reaction time on both upper and lower limbs, rotary pursuit tracking, anticipation timing, Minnesota manual dexterity, and Fitts' tapping task) and handwriting (including quality and speed) were tested on pre- and postintervention for the initial and reversal