SELF-CONTROLLED LEARNING OF MOTOR SKILLS: IS THERE A TRADE-OFF BETWEEN COGNITION AND MOTIVATION?

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Introduction

Studies have shown that self-control over (al least) one aspect of the practice situation results in a more effective motor learning (e.g., Post et al., 2011). However, this "self-control effect" consistently occurs delayed, i.e. in the retention test. To explain this delay, a model was developed in which a trade-off between cognitive and motivational processes during acquisition is assumed: Compared to externally controlled learners, self-control learners are exposed to a higher cognitive load (due to the need of decision-making) but stronger intrinsically motivated (due to the perception of autonomy). The aim of the present study was to test this model.

Methods

A sample of 48 young adults (M_{age} = 23.5) were randomly assigned to one of four groups: 1. Self-control (SC), 2. Yoked (YO), 3. Self-control + Training (SC+T), 4. Yoked + Training (YO+T). Self-control was given over the frequency of augmented feedback. Prior to the experiment, subjects in the SC+T group took part in a training with the objective to reduce the cognitive load during self-controlled learning. Both SC groups were paired with yoked groups. The task was to throw a standard tennis ball to a 1x1m-target with the non-dominant hand. Participants completed two acquisition sessions and a no-treatment retention test 4 days later.

Results

Data were analyzed in two separate 2 (control of learning) x 2 (training) x 20 (blocks of 10 trials) MANOVAs with throwing accuracy and form as dependent variables. *Accuracy*: All groups enhanced throwing accuracy during acquisition, $F(19,836) = 4.36$, $p < .05$, $\eta_{p2} = .06$. However, the effects of control of learning and training were not significant, both $F(1,44) < 1$. Analysis of retention data yielded a significant effect of control, $F(1,44) = 5.37$, $p < .05$, $\eta_{p2} = .08$, with the SC groups showing more accurate throws than the YO groups. The effect of training was not significant, $F(1,44) < 1$. *Form*: All groups improved clearly their throwing form during acquisition, $F(19,836) = 17.26$, $p < .001$, $\eta_{p2} = .21$. Again, the main effects were not signifikant, both $F(1,44) < 1$. Across retention, the form scores were similar, i.e. the effects of control and training were not significant, both, $F(1,44) < 1$.

Discussion

In view of the fact that the SC groups were (partly) superior to the YO groups in the retention test but not during acquisition, the findings of this study confirm prior research on self-controlled motor learning. However, the SC+T group did not show better acquisition performance than the SC group, which is contradictory to our model. Possible theoretical and methodological reasons are discussed in the poster.

References

Post, P.G., Fairbrother, J.T. & Barros, J.A.C. (2011): Self controlled amount of practice benefits learning of a motor skill. Research Quarterly for Exercise and Sport, 82, 474-481.