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INFLUENCE OF MOTOR COORDINATION-LEVEL ON MOTOR LEARNING BY CHILDREN AT THE AGE OF 10 AND 11 YEARS

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Introduction:

Motor learning is an important part of the infantile world to participate in various activities. An increased motor competence can cause social acceptance and an expanded movement repertoire, which is expressed e. g. by eased daily movements (Martin, Carl & Lehnertz, 1993 and Hirtz, 1994). Many studies in the motor learning research by children are about feedback frequency in order to manipulate their learning results (Schmidt & Wrisberg, 2008 and Magill & Anderson, 2014). Basic literature and numerous elaborations mostly describe an influence of motor coordination on motor learning (Willimczik et al., 1999; Juras, 2002 and Meinel & Schnabel, 2015). It was also described that the coordinative performance is an essential requirement for motor learning (Hirtz, 1985). The aim of the study was to examine the influence of motor coordination on the motor learning progress by children at the age of ten and eleven years.

Methods:

The study consisted of 29 children (9 boys and 20 girls) at the age of ten to eleven (Ø 10.48 +/- 0.51 years). The recording of the coordination level took place on one day during two regular PE-lessons. The coordi-nation level of the subjects was determinated by four coordination tests (toggle lateral, balance backwards, target throw-ing (see fig. 1a) and ring lead with gymnastic rod (see fig. 1b)). The units of the coordination tests were first transferred in Z-values. The coordi-nation of precision was summarized from the average of the balance backwards and the target throwing test. The test to toggle lateral and ring lead with gymnastic rod resulted in the coordination of time pres-sure. Both, the coordination of precision and coordination of time pres-sure, was about the average resumed to the total coordination-level. The subjects were divided by the median of their respective total co-ordination Z-value in two groups („low-level“ [lL; n=15] and „high-level“ [hL; n=14]). The learning task was to make a maximum distance by dri-ving a Pedalo (ten total trials) in 30 seconds. A quotient of distance and descents by driving the Pedalo were measured. The average of the first two trials (1. measurement point) in relation to the average of both last trials (2. measurement point) was the learn criterion (Willimczik et al., 1999).

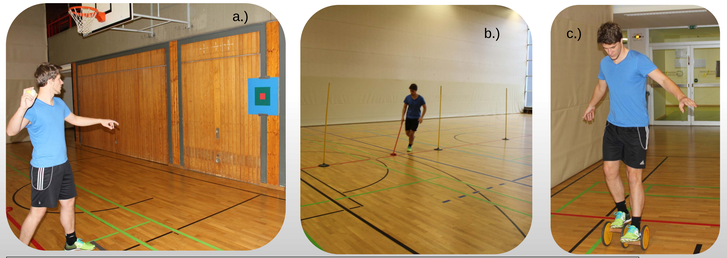

Fig. 1: a.) target throwing , b.) ring lead with gymnastic rod und c.) driving a Pedalo

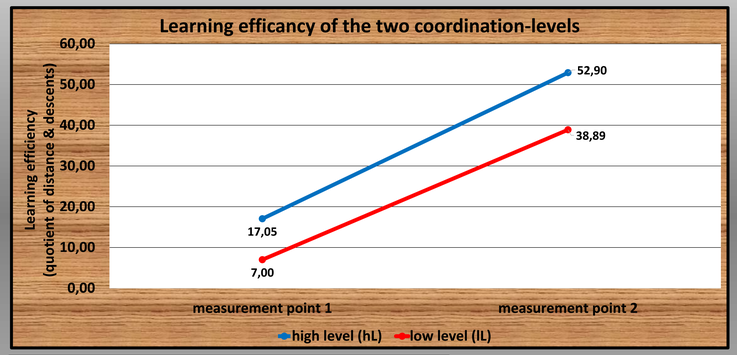

Fig. 2: Learning efficiency of the total coordination-levels

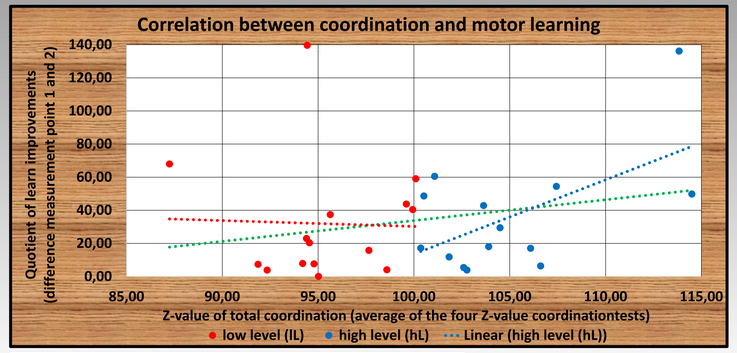

Fig. 3: correlation between coordination and motor learning

Results:

Between the level-groups and both measurement points was no significant interaction effect found (p=.768, η2=.003). All children showed a significant improvement of their learning efficiency (p≤.001, d=.89). Therefore, the high-level-group (p=.002; d=.83) improved the learning task also significantly as well as the low-level-group (p=.004; d=.93) (see Fig. 2). Moreover, the children in the high level-group showed no significantly better motor learning improvements than the children in the low level-group (p=.390, d=.32). Only the participants in the high level-group showed a significant positive middle correlation between the motor coordination and the motor learning (r=.573, p=.032) (see Fig. 3).

Discussion:

All children learn to drive Pedalo within ten trials. The participants in the high level-group have no learning advantage of the motor task in comparison to the children in the low level-group. Moreover, the high-level-group starts its learn efficiency in a higher level than the low-level-group. No strong relation between motor coordination and motor learning was shown. However, only the children in the high level-group demonstrate a positive, significant correlation between the motor coordination and the motor learning. Probably but not in general, a high basic coordination is important for a higher learning progress.

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