

Author: Denis Glage
Title: On the interrelationship between coordination and motor learning in children, adolescents and young adults
Source: Logos Verlag, Berlin 2022

Table of contents

List of figures	15
List of tables	23
1. Introduction	27
2. Basics of motor coordination	31
2.1 Definition of coordination	32
2.2 Coordination as a motor ability	55
2.3 Models of motor coordination	78
2.4 Diagnostics of coordination	88
2.5 Development of coordination	96
2.6 Importance and function of coordinative abilities	114
2.7 Chapter summary	122
3. Basics of motor learning	127
3.1 Definition of motor learning	128
3.2 Motor learning theories and models	130
3.3 Diagnostics of motor learning	162
3.4 Development of motor learning	172
3.5 Influence on motor learning	174
3.6 Chapter summary	188
4. On the interrelationship between motor coordination and motor learning	191
4.1 Theoretical approach	192
4.2 Empirical state of the art	200
4.3 Chapter summary	227
4.4 General research hypotheses	229
5. Inventory of methods and data analysis	233
5.1 Coordinative test procedures	234
5.2 Formation of the overall coordination level	243
5.3 Motor learning tasks	248
5.4 Sample descriptions	263

5.5	Data analysis	278
5.6	Chapter summary	281
5.7	Operationalization of the research hypotheses	283
6.	Empirical Results	287
6.1	Development of the coordination tests and learning tasks	287
6.2	Influence of overall coordination and the structurally similar dominant coordination tests on motor learning	312
6.3	Influence of training biography on coordination and motor learning	353
6.4	Chapter summary	394
7.	Implications for empirical research and practice	405
7.1	Conclusions for the theories and models	405
7.2	Critical reflection and prospects	418
7.3	Chapter summary	432
	Literature	448
	Appendix	469

Summary

Since the 1980s, the statement in German language literature has been set that coordination has an important and influencing role in motor learning (e.g. Meinel & Schnabel, 2015). In the past, coordination has never been seen as a set of several coordinative abilities and was never related to motor learning. However, the coordination from the ability-oriented perspective assumes several coordinative abilities (e.g. Roth, 2014). The central questions of the dissertation are directed towards the influence of coordinative performance (as a whole) on motor learning in children, adolescents and young adults and the training biography (partial aspect of movement experience) as an explanatory variable for overall coordination and for motor learning.

A total of 371 children, adolescents and young adults (205 male and 166 female) between the ages of six and 28 were examined. All participants completed four coordination tests (balancing backwards, side jumping, lead the ring with a gymnastics stick and throwing at target), which were brought together to produce an overall coordination score for each age group. The overall coordination was then related to the motor learning tasks of throwing the beanbag (elementary school children) and pedaling (children, adolescents and young adults) as well as the results of the training biography questionnaire (elementary school children and young adults).

The results show that the overall coordination and the movement-structure-like coordination tests mostly influenced the performance of the motor learning tasks at the 1st and 2nd measurement time significantly (all subjects: $p \leq .002$) and the learning performance (change between the two measurement times) not significantly (all subjects: $p = .397$ to $p = .707$). The training biography shows no notable significant influence on overall coordination and motor learning parameters for children and young adults ($p = .060$ to $p = .777$).

A good initial level of coordination influences motor learning at the 1st measurement time (learning at first attempt) in children, adolescents and young adults. However, this advantage does not lead to a better change in motor learning performance from the 1st to the 2nd measurement time. From this it can be concluded in order to increase coordination performance, coordination training should take place in early childhood. As a result, the children benefit from motor skill learning (learning at first attempt), which, through better access to a larger movement repertoire, may promote the movement automatization of motor skill learning tasks. However, the training biography, as a partial aspect of the movement repertoire, does not represent a suitable indicator for the explanation of the overall coordination and the motor learning parameters. Consequently, subsequent studies must clarify which further examination criteria can be used to determine the movement experience of children, adolescents and young adults.