

I author: Sandra Salb
II title: Perception and imagery of movements – studies in context of motor learning in childhood
III source: Georg-August-University of Göttingen eDiss 2015

IV short outline of the thesis:

1 summary.....	8
2 introduction.....	11
3 subject and questions.....	14
4 perception.....	21
4.1 definition of perception.....	21
4.2 model of Milner und Goodale.....	22
4.3 perceptual principles.....	23
4.4 gender differences in perception	24
5 imagery.....	25
5.1 definition of imagery.....	25
5.2 function of imagery.....	29
5.3 measurement of imagery.....	30
5.4 properties of imagery.....	35
5.5 models of imagery.....	38
6 comparison of perception and imagery	42
6.1 common characteristics.....	42
6.2 differences	49
7 current state of research	54
7.1 motor functions, perception and imagery	54
7.2 imagery and memory: interference effects.....	58
7.3 imagery and embodiment.....	64
7.4 correlation of imagery and motor functions in childhood.....	68
7.5 imagery and age.....	69
7.6 imagery and knowledge.....	75
7.7 imagery and gender	78

8 empirical research.....	87
8.1 hypothesis.....	87
8.2 plan and course of empirical research.....	90
8.3 study 1: correlation of motor and cognitive achievements in childhood	
8.4 study 2: influence of experience on perception and imagery of movements in childhood	117
8.5 study 3: influence of gender on perception and imagery of movements in childhood	126
8.6 study 4: influence of experimental condition on perception and imagery of movements in childhood.....	132
8.7. study 5: influence of experience on perception and imagery of movements in the experimental group.....	135
8.8 study 6: influence of training experience on motor learning in the experimental group	138
8.9 study 7: influence of gender on motor learning in the experimental group	147
8.10 general discussion.....	150
8.11 prospects	153
9 attachment.....	154

Summary

The core of the thesis was the development of a new method to measure mental images of movements. First children's motor and cognitive achievements were explored while they were learning tennis. Within this approach motor skills at different times were recorded and correlated with perception and imagery skills (study 1). The latter was investigated by a new method. The imagery skills were recorded during three consecutive weeks by pairs of videos presented on a computer screen, which showed a movement sequence (a tennis forehand stroke). Parts of the movement were covered by a mask. The Children's task was to judge whether pairs of videos were the same regardless of the cover. The chance of guessing was 50%. In the perception condition (basic condition) video pairs were shown without a cover. As a result correlations between some imagery and perceptual conditions and some motor skills could be found.

Second the influence of *experience* on perception and imaging of movements was explored by quasi-experimental study (study 2). To research this, children who had beginner's motor and visual experience with tennis were compared to children without that experience by novice-expert-paradigm and with respect to the factor *gender* (study 3). As a result children without experience in tennis had an advantage in the solution of the perception and imagery tasks; girls were on average better than boys. This was explained by their different strategy use. At the same time it seems to be difficult for the beginners to recall motor experiences and create new ones. Results give evidence of complementary skills in mental imagery and perception.

In the study 4 the influence of the experimental condition on perception and mental imagery was experienced. The difference between perceptual and mental imagery skills could be quantified, whereas gender played a role as a moderator variable. Accordingly, boys but not girls showed differences in these functions, while perception and imagery seemed to have common characteristics in girls at this age.

In the study 5 it was identified, whether the two training groups were comparable by their perceptual and imagery abilities, which was the case.

Based on previous work, the learning of movements was measured according to the factors *experience* (study 6) and *gender* (study 7). No differences were found between the girls and the boys regarding the learning of motor skills. *Experience* also had no influence on motor skill learning.

The results show first evidence of measuring dynamic mental imagery by this method.