Exam of the course "Normal and abnormal motor development"
Thursday December 23rd 2010 – 9 am to 11 am

Instructions:

I- This exam document includes 10 questions and the literature list (as given on Blackboard).
II- Please write your answers for question 9 and 10 on a separate sheet.
III- Please do not forget to put your name on all your sheets.
IV- Make sure that you write your answers in a style that do not allow misinterpretation and therefore avoid ambiguous formulation, telegraphic sentences or fragments including arrows and flow-charts. If you want to include a small schema make sure that the reader gets all the explanation of it in the text.

“Succes en fijne feestdagen!”
1. (10 points) In their article “Moving toward a grand theory of development: In memory of Esther Thelen” Spencer et al. (2006) describe four central concepts that emerged in the career of Esther Thelen and are now considered as the central concepts of the “dynamic systems theory” applied to development. Please describe these four concepts and give for each concept one example that illustrates the concept (you can use examples that are described in the article and examples that were presented during the lectures).

2. (5 points) During the course “Normal and abnormal motor development” different assessments for motor development were presented during the lectures and in the related literature.
   a) Briefly explain two different qualitative assessments used in infants.
   b) In their article Fallang and Hadders-Algra (2005) present results from quantitative assessment in infants. Briefly explain the assessment and their results.

3. (10 points) Staudt et al. (2002) found evidence for a motor reorganisation in the unaffected (ipsilateral) hemisphere, which they termed 'premotor type'. Describe their clinical findings that underpinned the evidence for this motor reorganisation. Please incorporate their transcranial magnetic stimulation (TMS) and functional magnetic resonance imaging (fMRI) results into your answer.

4. (5 points) The study by Wilke et al. (2009) investigated somatosensory organization following early brain lesions (congenital hemiparesis) in two different types of motor (re-)organization. Although the motor impairment was similar in both groups, the sensory impairment differed.
   a) Describe the motor (re-)organization that characterizes each group.
   b) Which group showed the most pronounced sensory impairment? Explain briefly the results showing this.
   c) Which type of sensory interhemispheric reorganization and intrahemispheric reorganization occurred in each of the two types of motor (re-)organization?

5. (5 points)
   a) Explain how it is possible to make predictions about the development in children with Cerebral Palsy.
   b) At what particular age the prediction starts to become (relatively) reliable? Explain why.

6. (5 points) For each of the three domains of the ICF(-CY) model please describe two possible problems for a child with unilateral Cerebral Palsy as well as two possible problems for a child with Developmental Coordination Disorder.
7. (5 points) Wilmut and Wann (2008) examined the ability of individuals with Developmental Coordination Disorder (DCD) to organize a movement in response to advance information. Pre-cues were presented and varied in the extent to which they indicated the response target. Both eye movement latencies and hand movements were measured. In the absence of pre-cues, individuals with DCD were as fast in initial hand movements as the typically developing (TD) participants, but were less efficient at correcting initial directional errors. That is to say, the TD group was able to reduce initial heading error of about 24 degrees, to less than 10 degrees by the time they had reached peak velocity of the movement. In contrast, the DCD group relied upon a greater number of end point corrections to compensate for an inaccurate initial directional error. In addition, the results for the response to partial or full pre-cues showed no difference between groups in eye-movement onsets.

a) How do the authors interpret the group difference for the trials without pre-cues in terms of type of motor control?
b) What do the authors conclude about the lack of difference between groups in eye-movement onsets in trials with partial or full pre-cues?

8. (5 points) Crajé et al. (2010) investigated whether motor planning problems in people with hemiparetic cerebral palsy are paralleled by impaired ability to use motor imagery, compared to a control group of typically developing people. To measure motor imagery, participants judged the laterality of hands presented at different degrees of rotations from a back view and a palm view.

a) Explain why the authors expect that people with motor planning problems will also show less developed capacity to use motor imagery.
b) In the discussion the authors write: “An unexpected finding in the control group was the lack of significant difference between lateral and medial rotations for the back view stimuli, despite the difference for palm view stimuli”. How do the authors explain this finding?

PLEASE write the answer to the questions 9 and 10 on a separate sheet (please do not forget to put your name on it!)

9. (5 points) A pregnant woman comes at 38 weeks gestational age for an ultrasound examination in order to assess fetal growth and fetal position (fetal head or breech in maternal pelvic inlet). The examination takes 20 minutes during which no fetal movements are seen.

a) Explain why you think that this is normal or abnormal?
b) What is the duration of the longest rest period at 38 weeks
c) Describe the motility during the various fetal behavioural states
d) Give two examples of external stimulation which can influence behavioural states

10. (5 points) During the course you saw film fragments of various movements, e.g. general movements.

a) Define a general movement.
b) Describe a possible benefit for the foetus to perform this movement during pregnancy.