EBERHARD KARLS UNIVERSITÄT TÜBINGEN

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Promoting self-regulation and executive functions in children: Evaluating the effectiveness of a brief physical activity intervention

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BACKGROUND

- **Self-regulation and executive functions are critical for successful transition** from kindergarten to school (Suchodoletz et al., 2014).
- Physical activity interventions have been shown to improve executive functions in studies with adult samples (Barenberg, Berse, & Dutke, 2011), probably driven by neurophysiological and affective mechanisms.
- Qualitative (e.g., coordinative) and quantitative (e.g., intensity level) demands of the specific type of physical activity influence the activity effects on executive functions (Best, 2010).
- **Combining coordinative and intense physical activities may foster executive functions most effectively**.

RESEARCH QUESTION

Does a brief physical activity intervention enhance executive function performance in children compared to a control condition?

DESIGN

Between-person randomized trial

***N* = 100 children, 4-7 y**

Conditions

Rabbit
Coordinative and moderate-intense activity

Control
Sitting activity

Child session

1 Affect
- Self-assessment manikin scale (SAM; Lang, 1980)

Video recording of condition
Heart rate & body movement
Condition Rabbit/ Control

2 Affect SAM
Executive functions
- Head-Toes-Knees-Shoulders-task (Cameron Ponitz et al., 2009)
- Day-Night-Stroop-like task (Berlin & Bohlin, 2002)

Enjoyment

Parent report

Executive functions
- Brief self-control scale (Rauch et al., 2014)

ADHD symptoms
- Conners 3 (Lidzba et al., 2013)

Physical activity
Social functioning
- Strengths and difficulties questionnaire (Goodman, 1997)

Body mass index
Demographics

FIRST RESULTS

Sample descriptives

N = 61 participants (24 female)
Age*: M* (*SD*) = 67.93 (11.72) months
BMI: *M* (*SD*) = 15.05. (1.45)
Condition: *n* = 30 Rabbit,
n = 31 Control
Kindergarten: *n* = 52 participants
Primary school: *n* = 8 participants

Manipulation checks

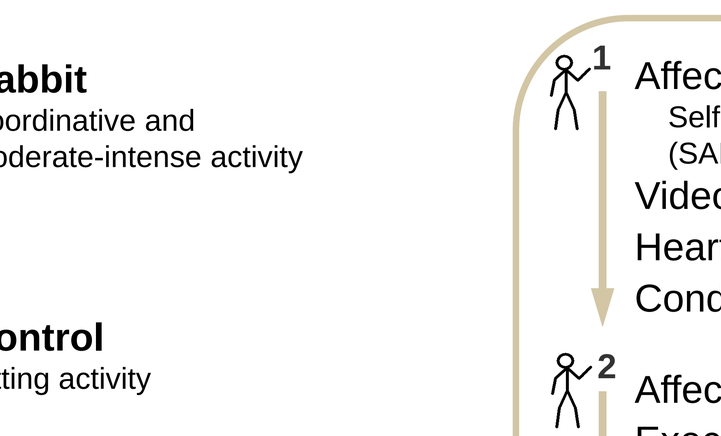

Figure 1. “How much did you enjoy the tasks with rabbit and hedgehog?” - intervention condition (red) and control condition (blue).

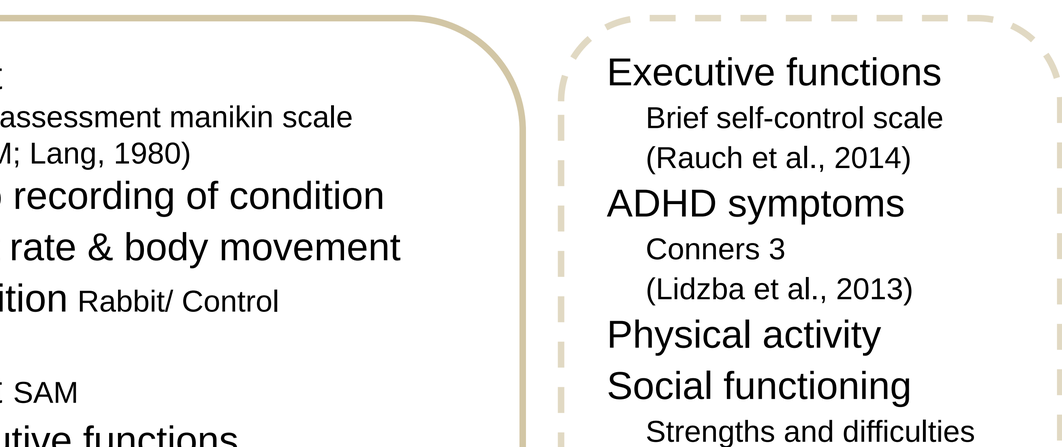

Figure 2. Time course of mean heart rate in the intervention condition (red) and in the control condition (blue).

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References

Barenberg, J., Berse, T., & Dutke, S. (2011). Executive functions in learning processes: Do they benefit from physical activity? *Educational Research Review, 6*(3), 208–222. || Berlin, L., & Bohlin, G. (2002). Response inhibition, hyperactivity, and conduct problems among preschool children. *Journal of Clinical Child and Adolescent Psychology, 31*(2), 242–251. || Best, J. R. (2010). Effects of physical activity on children"s executive function: Contributions of experimental research on aerobic exercise. *Developmental Review, 30*(4), 331–351. || Goodman R (1997) The Strengths and Difficulties Questionnaire: A Research Note. *Journal of Child Psychology and Psychiatry, 38*, 581-586.|| Lang, P. J. (1980). *Self-assessment manikin*. Gainesville, FL: The Center for Research in Psychophysiology, University of Florida. || Lidzba, K., Christiansen, H. & Drechsler, R. (2013). Conners 3 (R). *Conners Skalen zu Aufmerksamkeit und Verhalten - 3. Deutschsprachige Adaptation der Conners 3rd Edition (R) (Conners 3 (R)) von C. Keith Conners*. Bern: Huber. || Cameron Ponitz, C.c., McClelland, M.M., Matthews, J.S, & Morrison, F. J. (2009). A structured observation of behavioral self-regulation and its contribution to kindergarten outcomes. *Developmental psychology, 45*, 605-619. || Rauch, W. A., Gawrilow, C., Schermelleh-Engel, K., & Schmitt, K. (2014). Children’s dispositional self-control: Evaluation of a parent-rating version of the SCS-K-D. *Diagnostica, 60*(2), 61-72. || Suchodoletz, A. von, Trommsdorff, G., Heikamp, T., Wieber, F., & Gollwitzer, P. M. (2009). Transition to school: The role of kindergarten children's behavior regulation. *Learning and Individual Differences, 19*(4), 561-566.

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