

Brown.B. The effect of an isometric strength program on the intellectual and social development of trainable retarded males. *American Corrective Therapy Journal*. 1967;31:44–48. **POSTURAL STABILTY (PS) WITH ATTENTIONAL FOCUS. 40 12-year old boys with low IQ** (Mean IQ=35). Children randomly placed to either a 6-week exercise isometric program (12 yoga-like activities) or an attention-control condition. Children who participated in a yoga exercise program, compared to controls improved on both the IQ test (exercise ES=0.54; control ES=0.13) and the social scale (exercise ES=0.86; non-exercise ES=0.08). Brown hypothesized that “Because the exercise tasks required the **children to attend, use memory and reasoning processes, and control motor movements** exercise-related improvements were due to the mental demands experienced by children.”

Buddea H, Voelcker-Rehageb C, Pietraszyk-Kendziorraa S, Ribeiroc P. Acute coordinative exercise improves attentional performance in adolescents. *Neuroscience Letters*. 2008;441:219–223. **COORDINATION CONCENTRATION ATTENTION IN HIGH ACADEMIC ACHIEVERS (gifted kids)**. 115 adolescents 13–16yrs. Intervention daily coordination exercises (CE). CE more effective in completing the concentration and attention task compared to controls. “Because of neuronal connections between the cerebellum and the frontal cortex, bilateral CE may effect cognition!” **“CE might lead to a pre-activation of parts of the brain which are also responsible for mediating functions like attention.”**

Knight D, Rizzuto T. The Relations for Children in Grades 2, 3 and 4 Between Balance Skills and Academic Achievement. *Perceptual and Motor Skills*. 1993;76:1296-1298. **RELATIONS FOR CHILDREN IN GRADES 2, 3, AND 4 BETWEEN PS AND ACADEMIC ACHIEVEMENT**. 122 7-11 year olds. 10 dynamic or static postural tests were judged pass/fail and score given out of 10. High correlation between high balance scores and success in numeracy and reading in data suggest **the reading and mathematics academic achievement scores increase as several balance skill scores increase**.

Reynolds D, Nicolson R, Hambly H. Evaluation of an Exercise-based Treatment for Children with Reading Difficulties. *Dyslexia*. 2003.9:48–71. **QUALITATIVE PA PROGRAMS’ INFLUENCE ON AS IN DYSLEXIA**. Evaluation of an Exercise-based Treatment for Children with Reading Difficulties (Dyslexia). Halsam school project provided **statistically significant improvements in reading, reading comprehension and numeracy**. Program provided training in postural stability, movement coordination and visual attention to task.

Vieiraa S, Quercia P, Michela C, Pozzo T, Bonnetblanca F. Cognitive demands impair postural control in developmental dyslexia: A negative effect that can be compensated. [Neurosci Lett](#). 2009;462(2):125-129. **Cognitive demands impair postural control in developmental dyslexia: A negative effect that can be compensated**. Dyslexic children show cerebellar signs, such as motor coordination impairment, reach and gaze overshoot or unbalance, inaccurate ocular proprioception. The link between PS deficits and dyslexia opens the possibility to improve PS and reading abilities. Treatment included postural advice, PS training, breathing exercises and application of prism glasses Possible to recalibrate the relationship between cognitive demands and PS in dyslexic children. **Cognitive demands and balance control are linked and interact in developmental dyslexia. Significant improvement in reading scores in intervention group**

Tsai CL. The effectiveness of exercise intervention on inhibitory control in children with developmental coordination disorder: using a visuospatial attention paradigm as a model. *Res Dev Disabil*. 2009;30(6):1268-80. Epub 2009 Jun 3. **TABLE TENNIS AS A QUALIATIVE PA INTERVENTION FOR ENHANCED COGNITION**. Table tennis promotes eye hand co-ordination, attention, focus, strategy formation and PS under low to moderate PA intensity load. Examined the effect on attentional networks in 43 9-10 year olds with DCD. Intervention and control. M-ABC and cognitive control task. **Table-tennis training resulted insignificant improvement of cognitive and motor functions for the children with DCD**.

Rothlisberger M, Michel E. Development and evaluation of motor coordination training for children in special-needs classes *Prax Kinderpsychol Kinderpsychiatr*. 2009;58(3):215-30. Medline abstract. (German Publication). **QUALITATIVE PA TRAINING IN SPECIAL NEEDS CHILDREN AND THE COGNITIVE INFLUENCE**. Special need children perform systematically poorer in executive functions and motor coordination skills compared to non-selected controls. Qualitative PA included body coordination, rhythm and balance with flexibility of action, interference control and focused attention. Training - easy to complex, action accuracy to speed, teacher guidance to children's self monitoring. 3 weeks duration. 53 children were trained daily for 20 mins. **“children in the training condition caught up during training in specific cognitive and motor tasks, and trained children showed a more optimistic self-concept. Training effects were pronounced for children with balance problems.”**

Niklasson M, Niklasson I, Norlander T. Sensorimotor therapy: using stereotypic movements and vestibular stimulation to increase sensorimotor proficiency of children with attentional and motor difficulties. *Percept Mot Skills*. 2009;108(3):643-69. **PRE-ADOLESCENT BALANCE TRAINING IMPROVES SENSORY MOTOR PROFILE IN LEARNING DISORDER, DCD, ADHD** sensorimotor therapy Retraining for PS. 232 children (181 boys, 51 girls), whose mean age was 9.3 yr. (SD = 2.7), presented attentional and motor difficulties. Treatment period 3 years. Study authors **suggested PS training may prove a viable treatment for children with Developmental Coordination Disorder, Learning Disability, and ADHD**. Study included as authors suggested possible relationship with cognitive function and balance training.

Box 1. Summary of selected papers exploring Qualitative PA and cognition