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Key words: Academic performance, school-based, accelerometry

Background: The school setting has long been recognized as an apt opportunity to influence youth health-related parameters (i.e. cardiorespiratory fitness, physical activity levels and adiposity). Recent findings support the notion that these parameters may also be linked to performance in school (i.e. academic achievement). These findings may be explained by the concurrent reportings that particular brain functions, known as the executive functions, which are involved in planning, maintaining and initiation of goal-directed actions, are more developed in youth exhibiting higher levels of fitness and lower levels of adiposity. These later findings, however, have primarily been reported in laboratory settings and the relationship between health-related parameters and executive functions among youth in a public school setting is thus unknown.

Methods: The LCoMotion study is a cluster-randomized controlled trial with the purpose of investigating changes in academic performance and executive functions as a result of a more physical activity-based school-day. Participants are students attending the 6th and 7th grade of the normal Danish public school system. Baseline assessments were performed during November/December 2013 with follow-up assessments scheduled for May/June 2014. Physical activity was assessed using accelerometry while executive functions were assessed using the Flanker Task which is a measure of an individual's ability to inhibit a pre-potent response during a stimulus trial.

Results: Baseline associations between physical activity assessments at 14 schools including more than 700 consenting adolescents and performance on the Flanker Task will be presented. These associations will be adjusted for potential confounders (i.e. socio-economic status) and a potential mediating effect of weight status (BMI) will be explored. Results from both reaction time and accuracy during the Flanker Task will be presented, as few datasets are available, including an objective measure of physical activity and of executive functions in a large school-based population. It is hypothesized that students who, are more physically active (counts/min), will perform better on the Flanker Task. Similarly, that minutes spent in moderate and/or vigorous activity/per day will be associated with better performance. Finally, it is hypothesized that the associations will only be pronounced during the incongruent condition on the task as this requires the greatest amount of cognitive control.

Conclusions: The relationship between health-related parameters and learning is difficult to completely entangle, but any association between health-related parameters and specific brain functions required for learning will be an important step in the promotion of physical activity in public schools.