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## Strong relationship between kids academic achievement and fitness

Child Health News

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**The health benefits of exercise - across the lifespan - have been well documented. More recently, scientists have begun to demonstrate that exercise also may improve cognitive functioning in older adults.**

But what about children? Are physically fit kids better suited to compete not only on the ball field, but in the classroom as well?

[University of Illinois](#) researchers have been exploring these and other related questions in a series of studies during the past two years, and preliminary results indicate a correlation.

"We have found a strong relationship between academic achievement and fitness scores," said Darla Castelli, a professor of kinesiology whose area of expertise is effective physical education practices. "Those who scored well in academics also did well in physical fitness.

"We're not suggesting that if we run more laps it will make us smarter," she said, "but there does

appear to be a correlation."

Castelli noted that teachers who work closely with young and preadolescent children have long suspected a link between physical fitness and cognitive function. Anecdotal evidence is plentiful, she said, but empirical data to back up those assumptions have been harder to come by.

That's why Castelli jumped at the chance to team with colleague Charles Hillman, also a kinesiology professor at Illinois, to examine possible connections more thoroughly. Hillman's primary research focus is on executive control and cognitive function in elderly adults, which involves studying the effects of exercise on older individuals' abilities to process complex mental tasks.

Together, with assistance from graduate student Sarah Buck, Castelli and Hillman conducted a series of studies with school-aged children and control groups of adults. Data were gathered on subjects' physical attributes (height, weight, body mass), fitness levels and cognitive abilities.

Much of the data was collected first-hand by going into local schools. Working with the cooperation of physical education teachers in Champaign's Unit 4 school district, the researchers measured the physical fitness of some 500 third-, fourth- and fifth-graders. Using the "Fitnessgram," which Castelli said is widely regarded by physical education researchers as a reliable field assessment tool, they measured subjects' aerobic capacity, flexibility and muscle fitness. Cognitive function was determined by analyzing scores on standardized academic performance tests (the Illinois Standard Achievement Test) and by observing and measuring neuroelectric and behavioral responses to stimulus discrimination tasks.

Hillman and Buck will present results from one of the research group's studies ("Physical Fitness and Cognitive Function in Healthy Preadolescent Children") at the annual meeting of the Society

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for Psychophysiological Research in Santa Fe, N. M., Oct. 20-24. In that study, the U. of I. researchers examined the relationship between age and physical fitness on attention and working memory among groups of fit and sedentary children, and fit and sedentary adults.

"We looked at the relationship between age and fitness from both a neuroelectric and behavioral perspective," Hillman said.

The researchers observed and recorded the subjects' ability to recognize, respond to, and discriminate between different visual stimuli using a "visual oddball" task. In that task, researchers present subjects with two stimuli; in this case, one was a cartoon drawing of a dog; the other, a cat. Both appeared with different probabilities - one was presented more frequently than the other.

When the researchers measured brain activation, "we found that fit children allocated more resources towards identifying stimuli, and also processed stimuli faster," Hillman said.

"Behaviorally, these effects showed up in that these fit children made fewer errors than sedentary ones," Hillman said. In terms of response speed, the fit children were still slower than fit and sedentary adults, but were faster than sedentary children, he said.

Hillman - who stressed the preliminary nature of their findings - said the research team is analyzing data for three related studies and plans to present a symposium on their findings next spring in Chicago during the national convention of The American Alliance of Health, Physical Education, Recreation and Dance.

"There's a lot of basic research that needs to go on before we can determine what underlies achievement," Hillman said.

Nonetheless, if scientists can demonstrate that

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increased levels of physical activity and exercise can have a positive effect on children's physical health and their ability to succeed academically, Castelli is hopeful that educators, school administrators, legislators and other policymakers will take note.

"Despite increased incidence of childhood obesity and type II diabetes mellitus, physical education time is being reduced to address academic issues related to federal 'No Child Left Behind' legislation," Castelli said. "If evidence existed that physical education contributed to intellectual development, it may gain credibility and instructional time."

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