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Finding fitness, educational links

By GREG KLINE
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Heads covered with what looks like a bizarre cross between a bicycle helmet and a swimming cap festooned with wires, the kids watch a series of cats and dogs flash on a computer screen in front of them.

When a cartoon drawing of a cat comes up, or a dog depending on the scenario, they punch an assigned button on the video game-like controller in their hands.

But the activity is no game. The funny hat monitors the cognitive resources the kids devote to paying attention, and how fast they're able to react when a button-pushing image appears.

"We are measuring electrical activity in the brain as it relates to components of cognitive function," University of Illinois kinesiology Professor Charles Hillman said recently. The system also tracks eye movements.

Hillman and UI Professor Darla Castelli have used the tests and other data to identify in a series of studies what appears to be a link between how fit a child is, cognitive performance and, perhaps, academic achievement.

They emphasized that the results are preliminary. It's too early to say whether there is a direct relationship between fitness and doing well in school.

But Castelli, also a kinesiology professor, said the kids who score well academically in the studies, which have been going on for about two years, also show a strong tendency to score well in fitness.

At least, the indication is one more reason for parents to make sure their kids are getting adequate exercise, Castelli said.

Moreover, she said it raises questions about the demise of physical education, even recess, in many schools as the focus has taken a hard shift to academic preparation and testing, for example as a result of the federal No Child Left Behind legislation.

Castelli specializes in studying the effectiveness of physical education programs for children's fitness. In the course of doing that, she found that schools with high academic performance also tended to have fit student bodies.

"I was really interested in taking that down to the individual child," Castelli said.

She began studying third-, fourth- and fifth-graders in Champaign schools, giving the kids a "Fitnessgram" – a standard test to measure such things as weight, height and body mass, aerobic capacity, flexibility and



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muscle fitness – and, with parental permission, also reviewed the kids' Illinois Standard Achievement Test scores.

Enter Hillman, who had been using the neuroelectric and other measurements to look at cognitive improvements in senior citizens who exercise. He proposed a collaboration and the two, along with graduate student Sarah Buck, took the testing a step further.

A sample of the children then went through the cognitive exercises in Hillman's lab, as did an adult control group. The UI researchers reported the results at the annual meeting of the Society for Psychophysiological Research in New Mexico in late October.

They found that fit kids allocated more brain resources to identifying stimuli and also reacted faster. Fit kids still were slower than the adults – the brain tends to mature in the late teens before leveling off in the 20s – but faster than sedentary children.

In addition, children who were fit also made fewer errors during the testing than their sedentary peers.

The UI researchers are examining data from three other studies, which they plan to present in the spring in Chicago at the national convention of the American Alliance of Health, Physical Education, Recreation and Dance.

Among other things, they found a significant, positive relationship between fitness and scores on the Illinois achievement test.

Future plans include replicating the results they've produced initially, and in a larger sample of children. The researchers also are interested in exploring how the phenomenon translates to kids of different backgrounds and to other measures of academic performance, such as the nationally used Stanford Achievement Test, Castelli said.

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