

Study to explore how cognitive development shapes attitudes about physical activity

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Even though we know the benefits of physical activity, many of us would rather watch TV than exercise. The reason we avoid working out may stem from our childhood experiences.

Iowa State University researchers are working to understand how the emotional connection we develop with physical activity as children influences attitudes and behaviors throughout our lifetime. Kinesiology Professor Panteleimon "Paddy" Ekkekakis and graduate student Matthew Ladwig suspect our prefrontal cortex, which regulates emotions, plays a significant role.

As adults, this region of the brain helps us push to our maximum effort and manage how we feel during exercise, researchers said. Since the [prefrontal cortex](#) is not fully developed until early adulthood, as children it may be harder to control our emotions, especially when exercise is hard or unpleasant.

"If children cannot regulate displeasure, they'll give up and start to have negative feelings about exercise," Ekkekakis said. "Over time, just the idea of physical activity will activate an inherent urge to avoid it."

To demonstrate how children respond during exercise, Ekkekakis and Ladwig are conducting a research trial to measure children's brain activity, exertion and indicators of pleasure while riding an exercise bike. Researchers are recruiting children, ages 7 to 9, for the trial. Ladwig says a computer will gradually increase the bike's intensity to push participants to maximum effort.

Negative memories of gym class

It will take several months to collect and analyze data from the lab. Ekkekakis says the results will demonstrate whether children have the cognitive infrastructure to push to their full potential or if they will simply give up. The researchers also will look at psychological indicators to determine if children experience pleasure or displeasure throughout the experiment.

The work builds upon research by Ekkekakis, Ladwig and Spyridoula Vazou, an associate professor of kinesiology, which found a link between childhood memories of physical education classes, either positive or negative, and attitudes about physical activity and sedentary behavior as adults. They saw an increase in negative memories starting in sixth grade and peaking throughout middle school, which corresponds with a period marked by a dramatic decrease in physical activity for adolescents. The research, published in the *Translational Journal of the American College of Sports Medicine*, included survey responses from more than 1,000 participants across the U.S.

"Knowing those [negative memories](#) from [gym class](#) stick with us into adulthood can help us understand why some people chose [sedentary behavior](#) over physical activity," Ladwig said. "If we can find a way to make movement more pleasant, we think that may be key to getting people off the couch."

Measure enjoyment, not fitness

Many of the worst memories reported in the survey were associated with [fitness](#) testing. The researchers identified several common themes in the responses, ranging from embarrassment to bullying to anxiety about body image. To foster more positive experiences for children, Ekkekakis and Ladwig say we need to promote movement that is enjoyable and focus less on measurements of fitness and skill. They suggest designing fitness tests and PE activities that fit with children's natural movement patterns.

"Children move intermittently with brief bursts of intense physical activity. Playing tag is one example," Ladwig said. "If activities are less structured and more natural for children, it may improve outcomes for enjoyment."

If children feel good about [physical activity](#), it will help establish a lifelong habit, Ekkekakis said. He and Ladwig hope data from their research trial offers new insight on appropriate ways to design and conduct fitness tests. Ekkekakis says asking children to push to their maximum ability on these tests may unavoidably lead to poor experiences and memories.

"By subjecting children to physical fitness tests, we are making them feel bad when they don't have the biological machinery required to regulate those bad feelings," Ekkekakis said. "If promoting fitness and skill creates an unpleasant experience for a large percentage of [children](#), we need to look very critically at that situation and consider what can be changed."

More information: *Translational Journal of the American College of Sports Medicine*, [DOI: 10.1249/TJX.0000000000000067](https://doi.org/10.1249/TJX.0000000000000067)

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