

How robots can help children to be physically active

November 6, 2024



Parents seeking help in encouraging toddlers to be physically active may soon need to look no further than an inexpensive robotic buddy for their kids, a new study by Oregon State University (OSU) suggests.

The findings are important because movement plays a key role in the overall health of children, both in youth and later on in adulthood, the authors note.

Researchers observed individual sessions for eight kids ages 2-3 once a week for two months in a playroom that included various toys as well as a toddler-sized GoBot: a custom, wheeled, foam-padded robot designed through a collaboration between the OSU colleges of Engineering and Health.

WEEKLY SESSIONS

Weekly sessions with each of the five boys and three girls were broken into three segments.

During one of them, the GoBot was in the room but not active, though the child was free to push and pull the robot around if he or she wanted to.

In another, the GoBot's movements – basically keep-away maneuvers – were directed by an operator using a PlayStation DualShock4 controller, and in the third segment type, the motion was autonomous. In either scenario, the GoBot rewarded the child for getting close to it by emitting sounds, lights or bubbles.

The results showed that kids' activity levels, measured by multiple sensors and cameras, were higher in the presence of an active robot.

"It was interesting to us that the simple autonomous routine worked as well as directly teleoperated control when it came to engaging children," said the College of Engineering's Naomi Fitter, who led the study. "That means a relatively low-cost robot playmate – one that offers more intelligence and independence compared to current phone-operated robotic toys – might be feasible in the near future."

PHYSICAL ACTIVITY BENEFITS

For young children, the authors say, physical activity contributes to cognitive, social and motor development and also sets the stage for better psychosocial and cardiometabolic health later on, serving as a foundation for the potential of a lifetime of healthy habits.

"High rates of sedentary behavior are a big current challenge across many phases of life, and better physical activity at any part can lead to better health outcomes," said Fitter, who holds the endowed title of Kearney Faculty Scholar.

The researchers also note that past studies indicate a significant number of children are below recommended physical activity guidelines, which contributes to high levels of childhood obesity and other negative health consequences.

"Toys that motivate crawling and assist with walking are widespread," Fitter said, "but there's a scarcity of toys designed to motivate young children to be active and explore their environments once they are ambulatory."

Assistive robots like GoBot, she added, may be more effective than other tools for physical activity promotion because people tend to see robots as more "peer-like and influential" than non-embodied technologies like phones or computers.

"An important point is that we're not aiming to replace caregivers, but for parents, there can be periods of development during which it is hard to know how best to engage with your toddler," Fitter said. "The work in our paper could lead to new robotic toys that families could play with together to help fill those gaps."

Collaborating with Fitter were Rafael Morales Mayoral and Ameer Helmi of the College of Engineering and Samuel W. Logan of the College of Health.

The findings are published in the Journal of Translational Engineering in Health & Medicine.

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