Study sheds light on links between cognitive and motor skill development in children with autism

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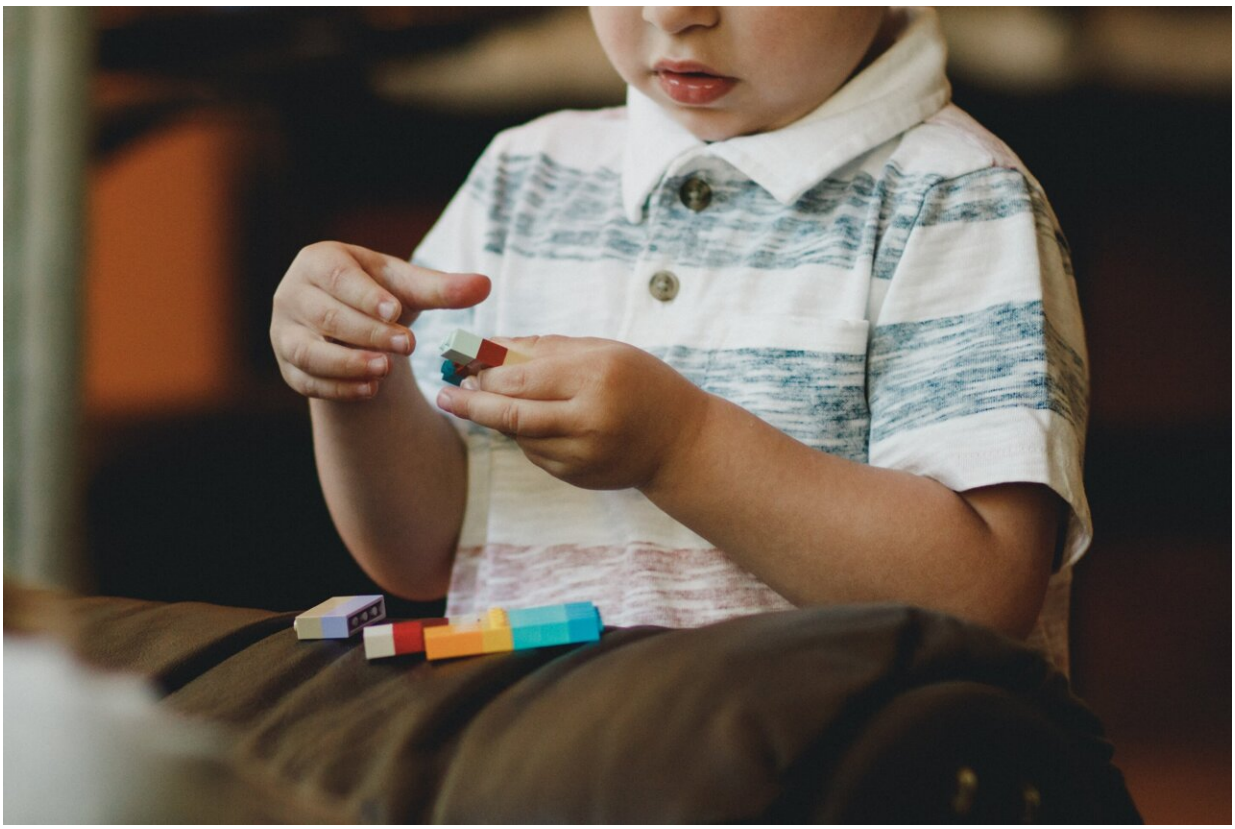

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A recent study by Oregon State University researchers highlighted the ways motor skills and cognitive skills develop in connection with each

other in young children with autism, and found an opportunity for behavioral and physical therapists to work together to improve care.

"We know they're highly linked, but we often talk about them in different domains," said study co-author Megan MacDonald, head of the School of Exercise, Sport, and Health Science in OSU's College of Health. "When we look at wraparound services and talk about academic, social, physical and cognitive services, there's so much we could do together."

When assessing, diagnosing and providing services for young children with autism, providers are often siloed from each other, MacDonald said. Occupational and physical therapists focus on fine and gross motor skills, while behavioral therapists focus on emotional regulation and executive function.

But in many situations, the two sides depend on each other, she said. Fine motor skills are closely linked to cognition, such as the combination of moves kids must remember and perform in the correct order to write their name. The gross motor skills used in a playground game of kickball work in tandem with the social and emotional skills used to interact with other students and work as a team.

To investigate these connections and their practical implications, the study, published in the journal *Frontiers in Public Health*, surveyed the families of 172 children with autism between the ages of 4 and 7. The parents answered detailed questionnaires about what they observed in their children's motor skills and executive function.

In addition to connecting cognitive and physical development, the paper was unique in its comparison of autistic children in the U.S. and in Taiwan, to explore whether the results were the same despite differences in the everyday tasks set for children in Western versus Eastern cultures.

Researchers found a significant association between motor skills and executive function in both the areas of working memory, or how a child fared with multi-step activities, and inhibition, or how well a child followed directions. Fine motor skills were more strongly linked with cognition than gross motor skills. The findings were similar across both countries.

The study found that children develop the capacity for problem-solving through the interaction of their motor behavior, and through exploring and interacting with their environment. With this, researchers wrote, early motor skills seem to lay the foundation for later cognitive development among children.

This idea is supported by previous neurophysiological research findings that brain regions thought to be only involved in either cognitive or motor functions actually co-activate when people engage in certain cognitive and motor tasks.

The results have implications for early interventions with autistic children, MacDonald said.

"It's really an opportunity to collaborate and work together," she said. "Can the folks in kinesiology who know how to break down and teach motor development skills be involved in some of the early techniques for developing cognitive skills?"

The findings may also provide entry points for families, who spend far more time with their kids than the weekly appointments they might have with different therapists.

"We're talking about the importance of play, functional and otherwise," MacDonald said. "Really engaging with kids in opportunities where they can use their skills and we can also teach them how to do some of these

skills."

More information: Ming-Chih Sung et al, Association between motor skills and executive function of children with autism spectrum disorder in Taiwan and the United States, *Frontiers in Public Health* (2024). DOI: 10.3389/fpubh.2023.1292695

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