

## Study shows colorful blocks can prep preschoolers for a future in math

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A 4-year-old lines up colorful blocks in a row: red-red-green-red-redgreen. Her teacher encourages her to replicate the pattern using soft toys: bear-bear-monkey-bear-bear-monkey. Another child uses blocks to build



a doorway, figuring out how to balance blocks on top of others. This isn't just play.

Patterning and spatial activities like block play are simple yet powerful activities in which preschoolers develop early math skills, according to a growing body of research by Vanderbilt scholars.

Bethany Rittle-Johnson, professor of psychology and human development, and Erica Zippert, postdoctoral scholar, at Vanderbilt's Peabody College of education and human development, are the lead authors of an Institute of Education Sciences-funded study. It was recently published by Early Childhood Research Quarterly.

In the study they assessed 73 <u>preschool children</u>'s repeating patterning skills, <u>spatial skills</u>, general cognitive skills and math knowledge at the beginning of the prekindergarten year, and re-assessed math knowledge near the end of the school year. They found that patterning and spatial skills were related and were each unique predictors of children's math knowledge at the same time point and seven months later.

"Because math knowledge begins to develop at a young age to varying degrees, it is imperative that we identify foundational cognitive and academic skills that contribute to this development and explain its variation," Rittle-Johnson said. "This study provides further evidence that activities at home and school curricula should reflect the potential role of patterning and spatial skills for math knowledge development, and be included in early math standards."

So why do patterning activities promote later math learning?

"Patterning skills involve deducing underlying rules in the sequence of objects, and may also promote some counting skills," Zippert said. "Because repeating patterning tasks do not require prior number



knowledge, even preschool children can deduce underlying rules in the patterns. Developing such skills with repeating patterns at a young age may support their noticing and use of patterns and rules in numbers as they acquire basic numeracy knowledge."

And spatial skills are important too. Solving math problems often involves thinking about moving through space, so spatial skills may support math problem solving.

"Both are important for preparing students for a workforce that demands more mathematical literacy than ever before," Zippert said. "Preschool is the ideal time to lay the foundation for math learning, and best of all, <u>math</u> learning can occur through playful activities."

**More information:** Bethany Rittle-Johnson et al. The roles of patterning and spatial skills in early mathematics development, *Early Childhood Research Quarterly* (2018). DOI: 10.1016/j.ecresq.2018.03.006

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