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Early spatial reasoning predicts later creativity and innovation, especially in STEM fields

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Exceptional spatial ability at age 13 predicts creative and scholarly achievements over 30 years later, according to results from a new longitudinal study published in *Psychological Science*, a journal of the Association for Psychological Science.

The study, conducted by psychology researcher David Lubinski and colleagues at Vanderbilt University, provides evidence that early spatial ability—the skill required to mentally manipulate 2D and 3D objects—predicts the development of new knowledge, and especially innovation in science, technology, engineering, and mathematics (STEM) domains, above and beyond more traditional measures of mathematical and verbal ability.

"We live in the age of human capital," says Lubinski. "Creativity is the currency of the modern era, especially in STEM disciplines. Having a better understanding of the human attributes that facilitate innovation has clear practical implications for education, training, business, and talent development."

And yet, despite longstanding speculation that spatial ability may play an important role in supporting creative thinking and innovation, there are very few systems in place to track skill in spatial reasoning:

"Current procedures for identifying intellectually precocious youth

currently miss about half of the top 1% in spatial ability," Lubinski explains.

Using data from a study that began in the late 1970s, Lubinski and colleagues followed up with 563 students who had scored exceptionally well—in the top 0.5%—on the SATs at age 13. The researchers also examined data on the participants' spatial ability at age 13, as measured by the Differential Aptitude Test.

Confirming previous research, the data revealed that participants' mathematical and verbal reasoning scores on the SAT at age 13 predicted their scholarly publications and patents 30 years later.

But spatial ability at 13 yielded additional predictive power, suggesting that early spatial ability contributes in a unique way to later creative and scholarly outcomes, especially in STEM domains.

Importantly, these results confirm longstanding speculation in the psychological sciences that spatial ability offers something important to the understanding of creativity that traditional measures of cognitive abilities used in educational and occupational selection don't capture.

Lubinski believes cultivating these skills is imperative for ensuring scientific innovation.

"These students have exceptional and under-challenged potential, especially for engineering and technology," Lubinski explains. "We could do a much better job of identifying these students and affording them better opportunities for developing their talents."

Provided by Association for Psychological Science