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Gender differences in spatial ability: implications for STEM education and approaches to reducing the gender gap for parents and educators.

Khine, Myint Swe (ed.), Visual-spatial ability in STEM education. Transforming research into practice. Cham: Springer (ISBN 978-3-319-44384-3/hbk; 978-3-319-44385-0/ebook). 195-224 (2017).

Summary: While men and women do not differ in levels of general intelligence, gender differences do exist for more specific cognitive abilities. In particular, gender gaps in spatial ability are the largest of all gender differences in cognitive abilities. Research on gender differences in spatial ability is reviewed, including the role that parents and educators can play in encouraging these skills using formal instruction, at home and through play. A variety of psychobiosocial factors contribute to these gender differences. Research has shown that the development of spatial ability lays down the foundation for quantitative reasoning, a collective term for mathematical and science skills. For this reason, some researchers have claimed that they contribute to the underrepresentation of women in STEM-fields. However, like other cognitive skills, instruction and practice can yield dramatic improvements in performance on spatial tasks, reducing the magnitude of gender differences. There is also evidence of transfer effects and persistence across the passage of time. A growing number of educational psychologists have argued that early education of spatial intelligence is necessary as a matter of equity for all students, and that it may offer substantial benefits for the later development of mathematical and scientific skills across all ability levels. Parents and caregivers can also encourage children by using spatial language, providing children with enrichment activities that offer spatial learning experiences. Concerted efforts to address the gender gap in spatial ability has the potential to translate into a reduction of the gender gap in STEM, but further research is required to determine which types of training and at what intervals is most efficacious.

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