



Finding Common Ground: Perspectives on Spatial Reasoning and Patterning in Mathematics Education

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Patterning and spatial skills are central to mathematics achievement and are precursors to generalising in mathematics. One line of research has focused on the role of patterning and structure, highlighting how the ability to detect, represent and generalise regularities contributes to the development of early algebraic and numerical concepts (Mulligan & Mitchelmore, 2009; Rittle-Johnson et al., 2019). A second, largely parallel line of research has emphasised spatial thinking skills, finding that skills such as mental rotation and perspective taking are predictors of mathematics performance from preschool onwards (e.g., Mix, 2019).

Although these bodies of work have developed with different emphases and methodological traditions, more recent research suggests patterning and spatial skills reflect interdependent foundations of mathematical reasoning (Lowrie & Logan, 2023; Mulligan et al., 2020). Patterning tasks often require children to utilise spatial processes along with numerical or algebraic relations. At the same time, spatial skills may support children's capacity to perceive and abstract structure within patterns. Emerging studies suggest that these domains mutually reinforce one another, providing complementary pathways into the development of mathematical generalisation, number sense, and STEM (Junker et al., 2025; Lowrie & Logan, 2023; Mulligan et al., 2020). Further collaborative research aims to impact reform in mathematics pedagogy and curricula that currently limits the place of pattern and structural development, and spatial reasoning as core aspects of number sense.

References

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For more information, please refer to the following paper presented at the 48th Annual Conference of MERGA in July 2026.

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