Formation of pattern generalization involving linear figural patterns among middle school students: results of a three-year study.

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Summary: This chapter provides an empirical account of the formation of pattern generalization among a group of middle school students who participated in a three-year longitudinal study. Using pre-and post-interviews and videos of intervening teaching experiments, we document shifts in students’ ability to pattern generalize from figural to numeric and then back to figural, including how and why they occurred and consequences. The following six findings are discussed in some detail: development of constructive and deconstructive generalizations at the middle school level; operations needed in developing a pattern generalization; factors affecting students’ ability to develop constructive generalizations; emergence of classroom mathematical practices on pattern generalization; middle school students’ justification of constructive standard generalizations, and; their justification of constructive nonstandard generalizations and deconstructive generalizations. The longitudinal study also highlights the conceptual significance of multiplicative thinking in pattern generalization and the important role of sociocultural mediation in fostering growth in generalization practices. [This chapter is a reprint of an article published in ZDM-International Reviews on Mathematical Education, 40(2008)1), p. 65-82, ME 2009f.00493]. The ZDM article reported on findings drawn from the first two years of the study. This chapter reports on various aspects of the three-year study.

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