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Early algebra and mathematical generalization.

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Summary: We examine issues that arise in students' making of generalizations about geometrical figures as they are introduced to linear functions. We focus on the concepts of patterns, function, and generalization in mathematics education in examining how 15 third grade students (9 years old) come to produce and represent generalizations during the implementation of two lessons from a longitudinal study of early algebra. Many students scan output values of $f(n)$ as n increases, conceptualizing the function as a recursive sequence. If this instructional route is pursued, educators need to recognize how students' conceptualizations of functions depart from the closed form expressions ultimately aimed for. Even more fundamentally, it is important to nurture a transition from empirical generalizations, based on conjectures regarding cases at hand, to theoretical generalizations that follow from operations on explicit statements about mathematical relations.

Classification: H22 C32

Keywords: elementary algebra; algebraic thinking; cognitive development; linear functions; concept formation; grade 3; primary education; generalizing patterns

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