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The role of operation sense in transitions from arithmetic to algebraic thought.

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As attention to the development of algebraic understandings at early grade levels increases, theory and empirical support for these efforts are needed. This paper outlines a theoretical perspective for studying student understandings of mathematical operations, with a particular focus on addition. The notion of operation sense is defined using a perspective that incorporates the construction of mental objects. In the context of addition, it is argued that operation sense can be used to describe student development of additive concepts as well as transitions into algebraic ways of thinking. The report of a case study on the development of a young boy is then provided. The investigation attempts to instantiate the framework in regard to student development of an understanding of addition. Evidence was found that his attainment of aspects of operation sense supported transitions into algebraic ways of thinking, including a finite group setting and use of addition on unknown and arbitrary quantities. Limitations of the framework are discussed. (Abstract)

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