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Happy and sad thoughts: an exploration of children's integer reasoning.

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Summary: The purpose of this study was to investigate elementary children's conceptions that might serve as foundations for integer reasoning. Working from an abstract algebraic perspective and using an opposite-magnitudes context that is relevant to children, we analyzed the reasoning of 33 children in grades K-5. We focus our report on three prominent ways of reasoning. We do this by describing and analyzing the responses of three particular children (in grades 1, 3, and 5) who exemplify these ways of reasoning. We view each of the three ways of reasoning as rich and interesting, and we see relationships of each to formal integer reasoning. At the same time, we view these ways of reasoning in terms of increasing levels of sophistication, potentially belonging to a single learning trajectory. Thus, we see the roots of more sophisticated integer reasoning in children's early intuitions about opposite magnitudes.

Classification: F32 C32

Keywords: number concepts; primary education; mathematical concepts; concept formation; thinking skills; educational research

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