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Relationships between fractional knowledge and algebraic reasoning: the case of Willa.

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Summary: To investigate relationships between students' quantitative reasoning with fractions and their algebraic reasoning, a clinical interview study was conducted with 18 middle and high school students. The students were interviewed twice, once to explore their quantitative reasoning with fractions and once to explore their solutions of problems that required explicit use of unknowns to write equations. As a part of the larger study, the first author conducted a case study of a seventh grade student, Willa. Willa's fractional knowledge – specifically her reversible iterative fraction scheme and use of fractions as multipliers – influenced how she wrote equations to represent multiplicative relationships between two unknown quantities. The finding indicates that implicit use of powerful fractional knowledge can lead to more explicit use of structures and relationships in algebraic situations. Curricular and instructional implications are explored.

Classification: H33 F43 E53

Keywords: algebraic reasoning; fractional knowledge; fractions as multipliers; reciprocal reasoning; reversible iterative fraction scheme

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