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**Students' distributive reasoning with fractions and unknowns.**

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Summary: To understand 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 study included six students with each of three different multiplicative concepts, which are based on how students create and coordinate composite units (units of units). Students participated in two 45-min semi-structured interviews and completed a written fraction assessment. This paper reports on how 12 students operating with the second and third multiplicative concepts demonstrated distributive reasoning in equal sharing problems and in taking fractions of unknowns. Students operating with the second multiplicative concept who demonstrated distributive reasoning appeared to lack awareness of the results of their reasoning, while students operating with the third multiplicative concept demonstrated this awareness and the construction of more advanced distributive reasoning when they worked with unknowns. Implications for relationships between students' fractional knowledge and algebraic reasoning are explored.

*Classification:* F40 H20 H30

*Keywords:* fractional knowledge; algebraic reasoning; distributive reasoning; distributive property; distributive partitioning scheme; multiplicative concepts; unknowns

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