A Middle School Student's Concept of Equivalent Fractions: Misconception or Transitional Conception?

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It has been well documented in many previous studies that students have difficulty understanding the concept of equivalent fractions that two different fractions can represent the same quantity (Behr et al., 1984; Kamii & Clark, 1995; Wong, 2010). They struggle to translate between pictorial and symbolic representations for equivalent fractions (Wong & Evans, 2007). Even in the early years of secondary school, some students exhibited whole number thinking about fractions despite their procedural competence with fractions (Pearn & Stephens, 2004). Understanding of fraction equivalence must not be reduced to the mastery of the procedure: multiplying or dividing the numerator and denominator of a fraction by the same number (Ni, 2001).

The data reported here were collected as part of the larger project to understand the relationship between students' arithmetic and algebraic knowledge. While conducting a retrospective analysis of our clinical interviews with middle school students, we found that Hyun (the seventh-grade student)'s unexpected answers and problem-solving behaviours were partly due to the quantitative structure related to his use of the equivalent fraction algorithm. (e.g., His multiplying the numerator and denominator of $\frac{1}{5}$ by 3 to make $\frac{3}{15}$ is associated with his pictorial representation of $\frac{3}{15}$ as the composition of three $\frac{1}{5}$s).

In this short communication, we report on Hyun's (mis)understanding of equivalent fractions and how the concept of equivalent fractions influenced his problem-solving activities across various problem contexts during the interview. We will also discuss whether his fraction concept should be considered as a misconception to be removed and replaced with the expert (teacher)'s view or a *transitional conception* that arose as a result of his sense-making of those specific problem contexts and "can be used productively to move toward a subsequent conception, a refined version of the original conception" (Moschkovich, 1998, p. 169).

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