Analyzing Preservice Teachers’ Thinking about Proportionality

Teacher Preparation Committee Themed Session: Engaging Future Teachers with Concepts of Rational Numbers

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Theoretical Perspective

• Cognitive constructivism:

  – focus on describing the mental images of an individual to learn one’s ways of thinking and approaches to problem situations (Piaget, 1970).

  – the philosophical belief that learning occurs through experiences and action, rather than through knowledge passed on by others (Steffe & Thompson, 2000).

Task-Based Interviews
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- Comprised of mathematical tasks
- Semi-structured
- Researcher mode, not teacher mode
- Purpose: to probe student thinking!
Juice Task: Suppose $\frac{3}{5}$ of a cup of juice provides $\frac{4}{3}$ of your daily serving of vitamin C.

a) Find the amount of vitamin C in one cup of juice.

b) Find the amount of juice needed to provide one daily serving of vitamin C.

Proportional Reasoning

If $\frac{3}{5}$ of one of John’s steps has the same length as $\frac{4}{3}$ of one of Lucy’s steps, then how many steps must Lucy take to travel one full John-step?
John/Lucy Steps

- Liping Ma (1999)
- U.S. Teachers: “invert and multiply”
- Chinese Teachers: “dividing by a number is equivalent to multiplying by its reciprocal”

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\frac{4}{3} \div \frac{3}{5} = \frac{20}{15} \div \frac{9}{15} = \frac{20}{9} \div \frac{15}{15} = \frac{20}{9} \div 1 = \frac{20}{9}
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Thank you! Questions?

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