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**Concept development of decimals in Chinese elementary students: a conceptual change approach.**

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Summary: The aim of this study was to examine the concept development of decimal numbers in 244 Chinese elementary students in grades 4–6. Three grades of students differed in their intuitive sense of decimals and conceptual understanding of decimals, with more strategic approaches used by older students. Misconceptions regarding the density nature of decimals indicated the progress in an ascending spiral trend (i.e., fourth graders performed the worst; fifth graders performed the best; and sixth graders regressed slightly), not in a linear trend. Misconceptions regarding decimal computation (i.e., multiplication makes bigger) generally decreased across grades. However, children’s misconceptions regarding the density and infinity features of decimals appeared to be more persistent than misconceptions regarding decimal computation. Some students in higher grades continued to use the discreteness feature of whole numbers to explain the distance between two decimal grades, indicating an intermediate level of understanding decimals. The findings revealed the effect of symbolic representation of interval end points and students’ responses were contingent on the actual representations of interval end points. Students in all three grades demonstrated narrowed application of decimal values (e.g., merchandise), and their application of decimals was largely limited by their learning experiences.

*Classification:* F42 F43 D72 D73

*Keywords:* conceptual change; decimal numbers; elementary students; discreteness; density; computation rules; concept formation; misconceptions

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