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**Drawing on a theoretical model to study students' understandings of fractions.**

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Summary: Teaching and learning fractions has traditionally been one of the most problematic areas in primary school mathematics. Several studies have suggested that one of the main factors contributing to this complexity is that fractions comprise a multifaceted notion encompassing five interrelated subconstructs (i.e., part-whole, ratio, operator, quotient, and measure). Kieren was the first to establish that the concept of fractions is not a single construct, but consists of several interrelated subconstructs. Later on, in the early 1980s, Behr et al. built on Kieren's conceptualization and suggested a theoretical model linking the five subconstructs of fractions to the operations of fractions, fraction equivalence, and problem solving. In the present study we used this theoretical model as a reference point to investigate students' constructions of the different subconstructs of fractions. In particular, using structural equation modeling techniques to analyze data of 646 fifth and sixth graders' performance on fractions, we examined the associations among the different subconstructs of fractions as well as the extent to which these subconstructs explain students' performance on fraction operations and fraction equivalence. To a great extent, the data provided support to the associations included in the model, although, they also suggested some additional associations between the notions of the model. We discuss these findings taking into consideration the context in which the study was conducted and we provide implications for the teaching of fractions and suggestions for further research.

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