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Quantitative Reasoning and Student Understandings of Function Composition.

Prior research on function composition has suggested that developing a robust understanding of function composition is critical in understanding subsequent topics in precalculus and calculus (e.g., related rates and trigonometric functions). However, little research has examined the mental actions and reasoning needed to understand and use function composition in ways that support understanding subsequent mathematical topics. The present study explored students' understandings of function composition in the setting of a precalculus class, using curriculum designed from theories of quantitative and covariational reasoning. This presentation highlights precalculus students' understandings of function composition relative to their quantitative reasoning abilities. Specifically, interview excerpts are presented that illustrate how students' ability to quantify problem situations and conceive of quantitative relationships and quantitative structures is reflected in students' understanding and use of function composition in novel problem settings. The students' actions emphasize the importance of students conceiving of a problem's context in ways that support mathematical reasoning (e.g., reasoning about the composition of functions). (Received September 21, 2010)