1145-J5-1210   **Halil I. Tasova*** (`halil.tasova25@uga.edu`), 110 Carlton Street, 105 Aderhold Hall, Athens, GA 30602, and **Biyao Liang**, **Irma E. Stevens** and **Kevin C. Moore**. *Characterizing Two Undergraduate Students' Quantitative Comparisons of Covarying Quantities' Magnitudes.*

In this presentation, we characterize two undergraduate students' (Lydia and Caleb) quantitative operations during a teaching experiment as they reasoned about the relationship between the distance a rider has traveled (i.e., arc length) around a Ferris wheel and the rider's distance above the wheel's horizontal diameter (i.e., height). Both Lydia and Caleb constructed *differences* in height magnitudes for variations of arc length magnitudes; however, the way they operated on those differences differed. Lydia operated on differences in height magnitudes in successive states and additively compared these differences, whereas Caleb operated on both differences in height magnitudes and the corresponding differences in arc length magnitudes in order to multiplicatively compare them. We conjecture that although Lydia's differences reasoning is useful for drawing inferences about the rate of change between two quantities (e.g., height is increasing at a decreasing rate with respect to arc length in the first quarter rotation), Caleb's comparison is likely more productive in constructing rates of change as his comparisons afforded constructing and comparing *ratios* of differences in height to differences in arc length. (Received September 20, 2018)

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