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*Student Conceptions and Misconceptions with Order of Operations in Calculus.* Preliminary report.

In this presentation, we report on a phenomenological study exploring student reasoning and understanding of operator precedence in a first semester Calculus course. Data were collected through surveys and interviews. The first survey focused on exponents, fractions, and trigonometric functions; the second survey centered on product rule (multiplying then differentiating versus differentiating then multiplying), chain rule (composing then differentiating versus differentiating then composing), and related rates and other word problems (differentiating and then plugging in particular values versus plugging in and then differentiating). In order to make meaning of the survey responses interviews were conducted with (N=8) students and (N=4) experts (i.e. graduate students and professors of Mathematics). We have found that procedures, such as distribution, and misconceptions, such as variables as objects, developed in K-12 persist all the way through advanced math. The results of the study will be used to improve teaching practices in secondary and introductory Calculus classes and will be further developed for use in advanced mathematics reform. (Received September 22, 2011)