**The Nature and Effect of Idiosyncratic Examples
in Student Reasoning about Limits of Sequences**

Abstract

We apply a Vygotskian perspective on the interplay between spontaneous and scientific concepts to identify and characterize calculus students' idiosyncratic use of examples in the process of trying to formulate a rigorous definition for convergence of a sequence. Our data is drawn from a larger teaching experiment, but analyzed for this study to address questions of the origins, nature, and implications of students' nonstandard ways of reasoning. We observed two students interpreting a damped oscillating sequence as divergent, drawing from considerations from an initial, intuitively-framed definition, but remaining persistent and consistent over the duration of multiple sessions. We also trace some of the implications of their idiosyncratic reasoning for their reasoning and ultimately for their definition of convergence. We conclude by posing several questions about the nature of such example use in terms of our Vygotskian perspective.