

1135-J5-2158 **Margaret Adams*** (drmargaretadams@gmail.com), Charlotte, NC 28269. *Knowing functions before learning limits: undergraduate students' unique perceptions of limits and compromised foundational knowledge of functions.*

This researcher conducted a qualitative case study using in-depth interviews to investigate how Calculus III students think about limits. A constructivist framework and Skemp's model of instrumental and relational understanding guided the study, which explored how 15 students think about functions, limits at a point, limits at infinity and limits that do not exist using a traditional textbook problems and non-traditional tasks. Students with different ability levels were selected and for the initial analysis which gave rise to an evolving in-depth investigation of how students use their definitions of limit and infinity and role of the domain to construct their responses. Follow up research on how students think about functions revealed deficits with generating real-world examples of functions; misperceptions about one to one correspondences and identifying piecewise functions. Results were interpreted with a constructivist framework, and a model of understanding limits was developed. Students appear to assimilate external mathematical content into mental structures, develop appropriate or inappropriate schemas, and ultimately construct correct or incorrect actions. Pedagogical interventions emphasizing the relation between functions and limits are presented. (Received September 26, 2017)