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Word problems present significant difficulties to many students. Educational researchers have suggested that creation of an accurate mental model constitutes an important step in solving a word problem. A "mental model" might be described as a mental representation of the physical situation described by the word problem. This talk will report the results of three investigations of the relationships between students' mental models and their success at solving a calculus word problem. We will report the results of a survey (n=317) to uncover the demographic factors contributing to students' ability to create an accurate mental model. We will report the results of a correlational study (n=70) in which the flexibility and accuracy of students' mental models was related to their level of mathematical expertise. Finally, we will describe the results of a correlational study (n=143) that related the accuracy of students' mental models to their ability to set up an equation, take derivatives and solve the word problem. Results suggest that while mental models lacking serious conceptual flaws are important, students' success in solving a calculus word problem is more strongly predicted by proficiency with mathematical operations rather than accuracy of their mental models. (Received September 08, 2008)