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H A Dye* (hdye@ttocs.org), MADN-MATH, US Military Academy, 646 Swift Road, West Point, NY 10566. *Diagrammatic Reasoning*.

In mathematics, we frequently use diagrams while problem solving. Diagrams reduce the working memory load and provide certain computational efficiencies, aiding our problem solving. In my research, I work with cognitive psychologists to understand how perception and reasoning interact during diagrammatic reasoning (reasoning with and obtaining information from diagrams). Diagrammatic reasoning involves both visual search tasks and reasoning using knowledge obtained through these searches. Previously, researchers have conducted qualitative studies of diagrammatic reasoning tasks, such as geometric problem solving, and examined the strategies and heuristics used during problem solving. In comparison, perceptual psychologists have used quantitative data to build detailed cognitive models of human behavior during visual search tasks. I have collected quantitative data from participants completing a route planning task on a 5 x 5 grid. This data has been used to construct a cognitive model of diagrammatic reasoning. This type of cognitive model can be used as predictive or objective model for the development of pedagogical materials in mathematics. (Received September 22, 2006)