Visual images can impede thinking – *Markus Knauff (Cognitive Science), University of Freiburg (Germany)*

Various evidence is compatible with the assumption that mental imagery is a vital part of human cognition, including the well-known studies of mental rotation, the mental scanning of images and studies on the relationship between imagery and creative problem-solving, suggesting that visualization facilitates innovative solutions. The aim of the talk will be to explore the issue of mental representation in reasoning with a special focus on visual mental images. I will reexamine the hypothesis that visual representations underlie reasoning, reject it, and propose an alternative view. I show that previous reasoning studies have often overlooked a possible confounding between materials that invoke visual imagery and materials that invoke spatial representations.

I will report a series of behavioral studies and fMRI experiments, in which sighted, blindfolded sighted, and congenitally totally blind persons solved deductive inferences. I argue that visual brain areas are only involved if the problem information is easy to visualize and when this information must be processed and maintained in visual working memory. A regular reasoning process, however, does not involve visual images but more abstract spatial representations - spatial mental models - held in parietal cortices. Only these spatial representations are crucial for the genuine reasoning processes. Visual images can even impede the process of reasoning.