

Spatial Relations in Theories of Reasoning

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Relations are everywhere. Every step of reasoning can be seen as exploiting relations, coded in given information, in order to derive new information. Probably the most familiar sets of relations in everyday life are spatial relations. How are spatial relations represented and processed by the human mind?

One view, presented by Knauff et al. (2013), holds, that people, when confronted with a description of an arrangement of objects, construct a mental model. Such mental models represent information in a non-propositional way, by forming links between ordered object-representations, where these links imply a certain spatial relation. If consistent, new information is integrated into the existing model, if not, the model has to be revised and transformed. These construction and transformation processes are guided by principles of efficiency, like the assumption of fixed reference objects. The presented view stands in opposition to rule-based theories of reasoning, like Lance Rips' PSYCOP model, where relations among objects are considered to be represented in propositions of the form $r(A, B)$ and transformational processes are governed by rules of logic, operating on basis of the representations' symbolic structure.

In my research project I will discuss, how these theories explain revisions of belief in cases of conflicting information about spatial relations and how the processes involved relate to principles of higher-order reasoning, like deductive inferences. This analysis could give rise to insights into the relations among models of relational representation and different concepts of rationality.