On the Gradual Construction of Complex Abstract Representations in Spatial Problem Solving

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Abstract

Finding adequate representations is an important challenge in solving complex problems. Especially in unfamiliar task domains, initially chosen representations might not cover all of its relevant aspects. I am presenting a theory of representational change based on results from a case study of dyadic problem solving using a spatial transformation task of gradually increasing complexity. This theory proposes that change is driven by expressive limitations of the representational substrates in question. Iconic representations, such as gestures are useful in representing simple objects, but full resemblance soon encounters limits. Metonymic gestures, iconically resembling parts of an object but referring to the whole can extend this scope. By omitting aspects of the problem domain, those partial resemblences can then feed into memory retrieval processes for metaphors bearing no actual similarity to domain objects but to, for instance, such metonymic gestures. Finally, elaborating on such metaphors can open up further representational possibilities.